



ENERGY STATISTICS 2012

A photograph of three high-voltage power transmission towers (pylons) against a blue sky with scattered white clouds. The towers are made of metal lattice and have multiple cross-arms supporting power lines. The background shows some greenery and a small building on the right.

**CENTRAL STATISTICS OFFICE
NATIONAL STATISTICAL ORGANISATION
MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION
GOVERNMENT OF INDIA**
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ENERGY STATISTICS 2012 (Nineteenth Issue)

CENTRAL STATISTICS OFFICE
MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION
GOVERNMENT OF INDIA
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FOREWORD

Energy is one of the most important building block in human development, and, as such, acts as a key factor in determining the economic development of all countries. In an effort to meet the demands of a developing nation, the Indian energy sector has witnessed a rapid growth. Areas like the resource exploration and exploitation, capacity additions, and energy sector reforms have been revolutionized. However, resource augmentation and growth in energy supply have failed to meet the ever increasing demands exerted by the multiplying population, rapid urbanization and progressing economy. Hence, serious energy shortages continue to plague India, forcing it to rely heavily on imports.

This publication titled “Energy Statistics 2012”, is brought out every year by Central Statistics Office (CSO) and the present one is 19th in the series. The publication contains the latest data available in respect of different energy sources, with different agencies/organizations and a brief analysis of the data on reserves, installed capacity, potential for generation, production, consumption, import, export and wholesale price of different energy commodities as available from the concerned line Ministries of the Government of India. This publication is an attempt to cater to the needs of the planners, policy makers and researchers by making available the entire energy data at a single place.

Analytical indicators viz. Growth Rates, Compound Annual Growth Rates (CAGR), Percentage Distributions, have been provided in relevant tables to increase the utility of the publication.

For the first time energy balance has been included in the publication, to give a more complete picture of the energy sector. However, Energy Balance is still in evolution stage and needs more work to be as per international requirements for compilation of energy balances.

It is reiterated that the statistics provided in the report is provisional as the actual data is reported with a considerable time lag. In view of this, the information based on provisional data for certain years may undergo some modification as and when the actual data is made available.

I convey my thanks to the officers in Ministry of Petroleum and Natural Gas, Central Electricity Authority, Office of Coal Controller, Ministry of New and Renewable Energy and Office of the Economic Advisor, who have co-operated in the compilation and supply of data for this publication. I also convey my thanks to the team of officers in the Economic Statistics Division for their dedicated services in bringing out this publication in time.

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New Delhi
March 2012.

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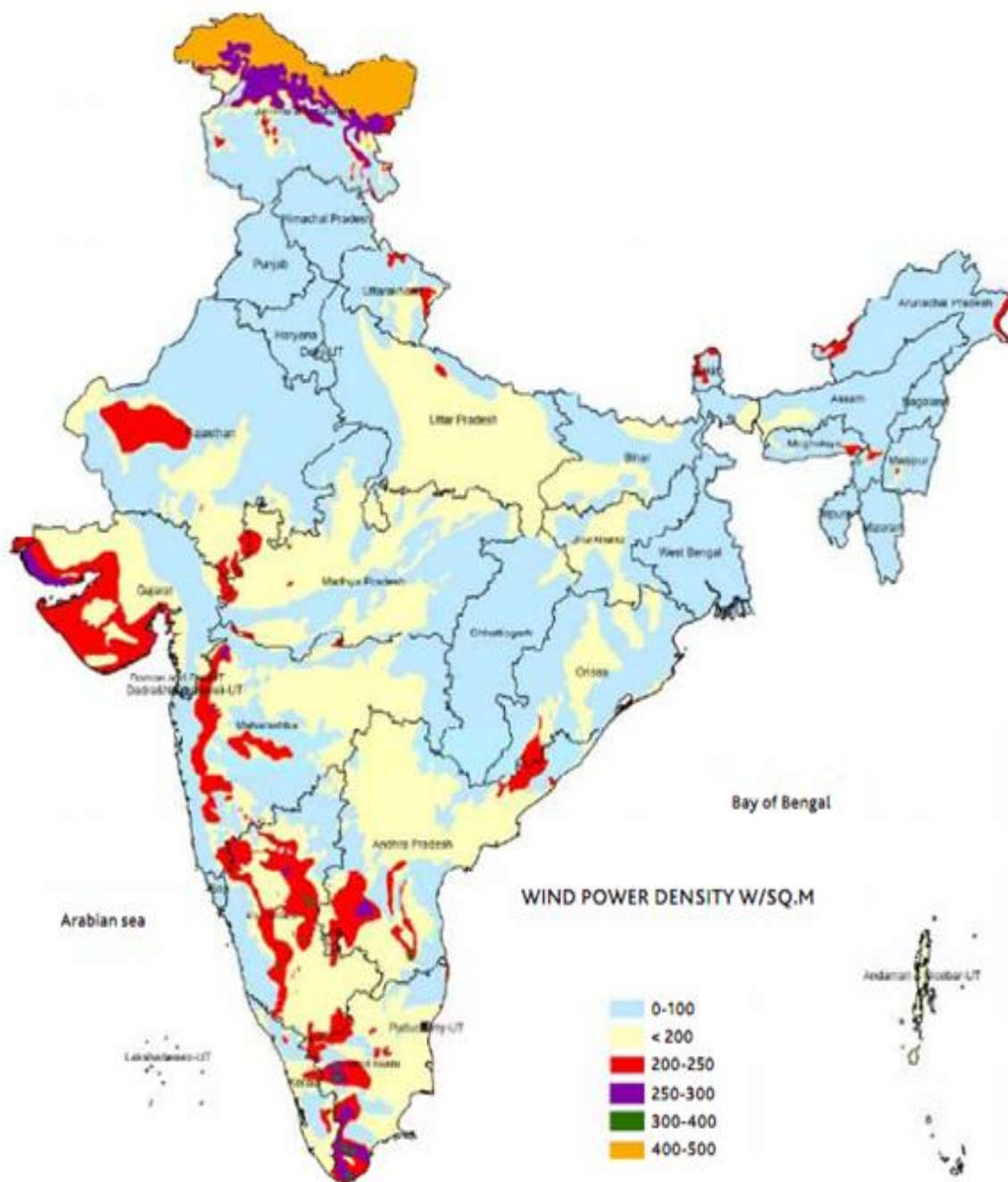
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Wind Power Density



Source : Centre for Wind Energy Technology 2010.

Chapter 1. Reserves and Potential for Generation

India's energy-mix comprises both non-renewable (coal, lignite, petroleum and natural gas) and renewable energy sources (wind, solar, small hydro, biomass, cogeneration bagasse etc.).

Information on reserves of non-renewable sources of energy like coal, lignite, petroleum, natural gas and the potential for generation of renewable energy sources is a pre-requisite for assessing the country's potential for meeting its future energy needs. The changes in the reserves over time indicate the research and development going into the discovery of new reserves and the pace of their exploitation. They also facilitate in devising effective conservation and management strategies for optimal utilization of these resources.

1.1 Coal and Lignite

India has a good reserve of coal and lignite. As on 31.03.11 the estimated reserves of coal was around 286 billion tones, an addition of 9 billion over the last year (Table 1.1). Coal deposits are mainly confined to eastern and south central parts of the country. The states of Jharkhand, Orissa, Chhattisgarh, West Bengal, Andhra Pradesh, Maharashtra and Madhya Pradesh account for more than 99% of the total coal reserves in the country. The total estimated reserve of coal in India as on 31.03.10 was around 277 billion tonnes. There has been an increase of 3.1% in the estimated coal reserves during the year 2010-11 with Madhya Pradesh accounting for the maximum increase of 5 %.

The estimated reserve of lignite as on 31.03.11 was 41 billion tonnes, of which 80 % was in the southern State of Tamil Nadu. (Table 1.1(A)). The increase in the estimated reserve of lignite during the year 2010-11 was 2.4%, Tamil Nadu accounting for the maximum increase of 2.7% .

1.2 Petroleum and Natural gas

The estimated reserves of crude oil and natural gas in India as on 31.03.2011 stood at 757 million tonnes (MT) and 1241 billion cubic meters (BCM), respectively (Table 1.2). Geographical distribution of Crude oil indicates that the maximum reserves are in the Western Offshore (43%) followed by Assam (22%), whereas the maximum reserves of Natural Gas are in the Eastern Offshore (35%) followed by Western offshore (33%). There was an increase of estimated Crude Oil reserves by 33% in Andhra Pradesh followed by Tamil Nadu (8%). However there was a decrease of 2% in the estimated reserve of crude oil for the country as a whole during 2010-11. In case of Natural Gas, the increase in the estimated reserves over the last year was 8%. The maximum contribution to this increase has been from CBM (145%), followed by Tamil Nadu (7%).

1.3 Renewable energy sources

There is high potential for generation of renewable energy from various sources- wind, solar, biomass, small hydro and cogeneration bagasse. The total potential for renewable power generation in the

country as on 31.03.11 is estimated at 89760 MW (Table 1.3). This includes an estimated wind power potential of 49132 MW (55%), SHP (small-hydro power) potential of 15,385 MW (17%), Biomass power potential of 17,538 MW(20%) and 5000 MW (6%) from bagasse-based cogeneration in sugar mills. The geographic distribution of the estimated potential across States reveals that Gujarat has the highest share of about 14% (12,489 MW), followed by Karnataka with 12% share (11,071 MW) and Maharashtra with 11% share (9596 MW), mainly on account of wind power potential.

Table 1.1 :Statewise Estimated Reserves of Coal in India as on 31.03.2010 and 31.03.2011

(In billion tonnes)

States/ UTs	Proved		Indicated		Inferred		Total		Distribution (%)	
	31.03.2010	31.03.2011	31.03.2010	31.03.2011	31.03.2010	31.03.2011	31.03.2010	31.03.2011	31.03.2010	31.03.2011
Andhra Pradesh	9.26	9.30	9.73	9.73	3.03	3.03	22.02	22.05	7.95	7.72
Arunachal Pradesh	0.03	0.03	0.04	0.04	0.02	0.02	0.09	0.09	0.03	0.03
Assam	0.35	0.46	0.04	0.05	0.00	0.00	0.39	0.51	0.14	0.18
Bihar	0.00	0.00	0.00	0.00	0.16	0.16	0.16	0.16	0.06	0.06
Chhattisgarh	12.44	12.88	30.23	32.39	4.01	4.01	46.68	49.28	16.86	17.24
Jharkhand	39.63	39.76	30.99	32.59	6.34	6.58	76.96	78.94	27.80	27.61
Madhya Pradesh	8.51	8.87	11.27	12.19	2.22	2.06	21.99	23.13	7.94	8.09
Maharashtra	5.36	5.49	2.98	3.09	1.97	1.95	10.31	10.53	3.72	3.68
Meghalaya	0.09	0.09	0.02	0.02	0.47	0.47	0.58	0.58	0.21	0.20
Nagaland	0.01	0.01	0.00	0.00	0.31	0.31	0.32	0.32	0.11	0.11
Odisha	21.51	24.49	32.07	33.99	12.73	10.68	66.31	69.16	23.95	24.19
Sikkim	0.00	0.00	0.06	0.06	0.04	0.04	0.10	0.10	0.04	0.04
Uttar Pradesh	0.87	0.87	0.20	0.20	0.00	0.00	1.06	1.06	0.38	0.37
West Bengal	11.75	11.75	13.03	13.13	5.07	5.07	29.85	29.95	10.78	10.48
All India Total	109.80	114.00	130.65	137.47	36.36	34.39	276.81	285.86	100.00	100.00
Distribution (%)	39.67	39.88	47.20	48.09	13.13	12.03	100.00	100.00		

Table 1.1(A) :Statewise Estimated Reserves of Lignite in India as on 31.03.2010 and 31.03.2011

(In billion tonnes)

States/ UTs	Proved		Indicated		Inferred		Total		Distribution (%)	
	31.03.2010	31.03.2011	31.03.2010	31.03.2011	31.03.2010	31.03.2011	31.03.2010	31.03.2011	31.03.2010	31.03.2011
Gujarat	1.24	1.24	0.26	0.32	1.16	1.16	2.66	2.72	6.67	6.66
Jammu & Kashmir	0.00	0.00	0.02	0.02	0.01	0.01	0.03	0.03	0.07	0.07
Kerala	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02
Puducherry	0.00	0.00	0.41	0.41	0.01	0.01	0.42	0.42	1.04	1.02
Rajasthan	1.17	1.17	2.14	2.15	1.50	1.52	4.80	4.84	12.04	11.82
TamilNadu	3.74	3.74	22.52	22.90	5.72	6.26	31.98	32.89	80.15	80.41
India	6.15	6.15	25.34	25.79	8.41	8.97	39.90	40.90	100.00	100.00
Distribution (%)	15.40	15.02	63.52	63.06	21.07	21.92	100.00	100.00		

Source:Office of Coal Controller, Ministry of Coal

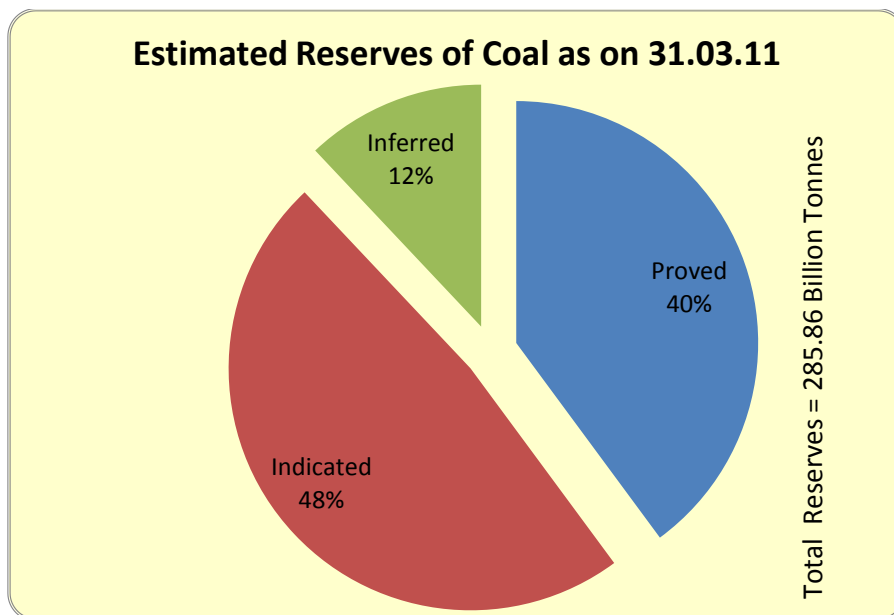


Figure 1.1

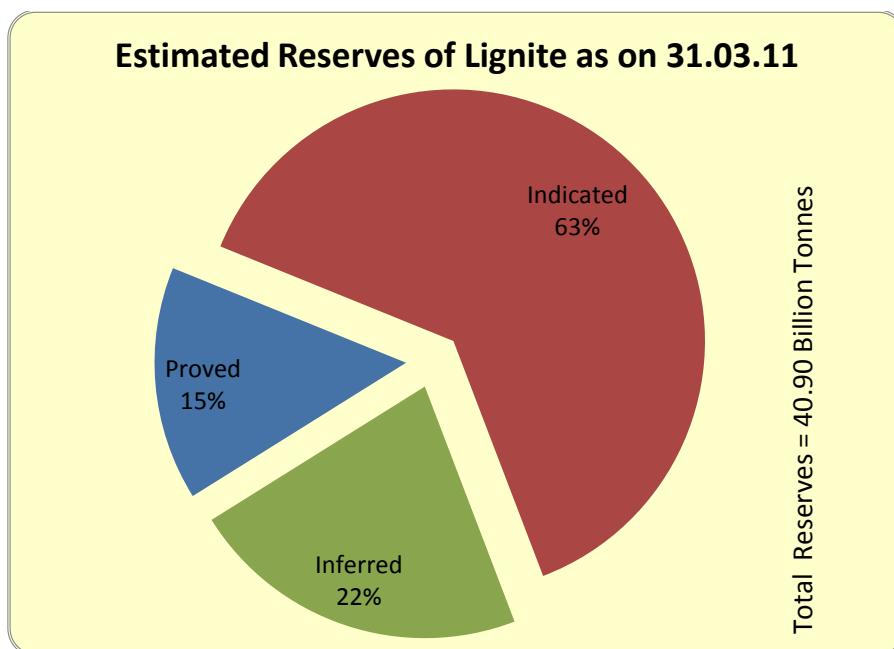


Figure 1.1(A)

Table 1.2 : Statewise Estimated Reserves@ of Crude Oil and Natural Gas in India as on in 31.03.2010 and 31.03.2011

States/ UTs	Crude Petroleum (million tonnes)				Natural Gas (billion cubic metres)			
	31.03.2010		31.03.2011		31.03.2010		31.03.2011	
	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)
Andhra Pradesh	3.94	0.51	5.23	0.69	41.24	3.59	40.58	3.27
Arunachal Pradesh	3.49	0.45	3.39	0.45	1.10	0.10	1.08	0.09
Assam	168.10	21.70	170.34	22.49	95.20	8.29	93.64	7.55
CBM	0.00	0.00	0.00	0.00	39.83	3.47	97.63	7.87
Eastern Offshore ¹	26.52	3.42	26.19	3.46	420.44	36.61	438.03	35.30
Gujarat	136.67	17.64	137.42	18.14	76.57	6.67	78.97	6.36
Nagaland	2.69	0.35	2.69	0.36	0.12	0.01	0.12	0.01
Rajasthan	80.48	10.39	75.33	9.95	12.47	1.09	12.04	0.97
Tamil Nadu	7.84	1.01	8.49	1.12	34.27	2.98	36.88	2.97
Tripura	0.08	0.01	0.08	0.01	32.78	2.85	33.09	2.67
Western Offshore ²	344.85	44.52	328.27	43.34	394.55	34.35	408.88	32.95
Total	774.66	100.00	757.44	100.00	1148.57	100.00	1240.92	100.00

CBM : Cold Bed Methane

@ Proved and indicated Balance Recoverable Reserves.

1 Includes JVC/Pvt. Parties for Crude Oil and includes West Bengal for Natural Gas

2 Includes Bombay High offshore, Rajasthan and JVC for Crude Oil and Bombay High offshore, Rajasthan and Madhya Pradesh (Coal Bed Methane) for Natural Gas

Source: Ministry of Petroleum & Natural Gas

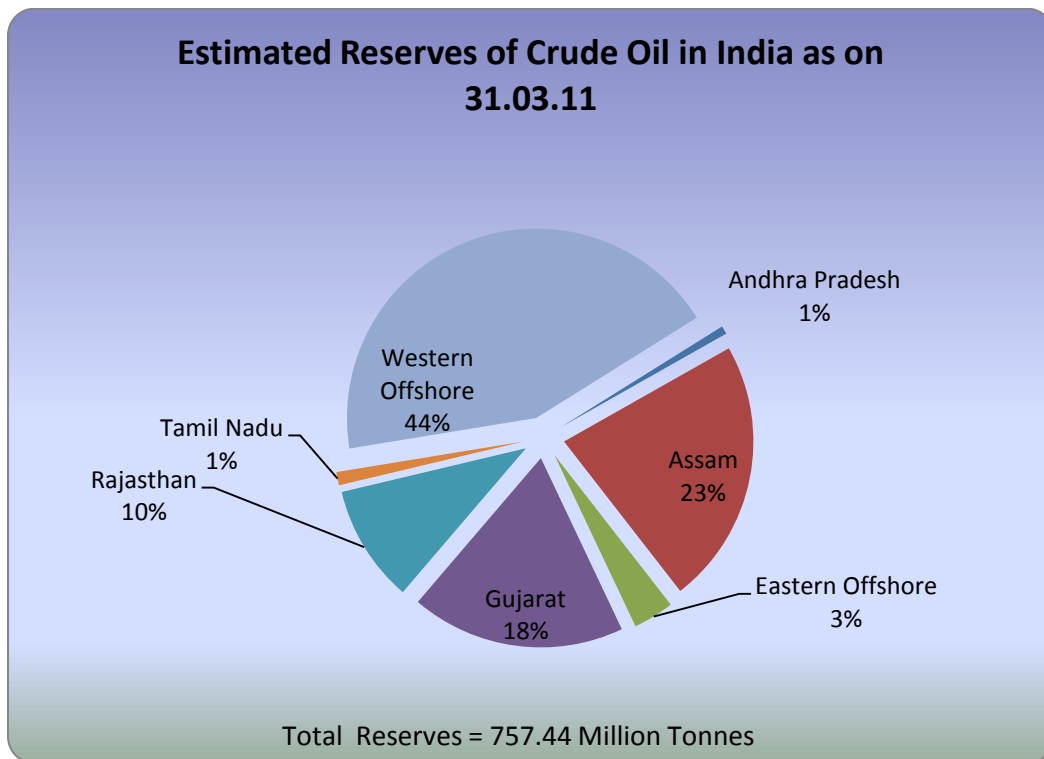


Figure 1.2

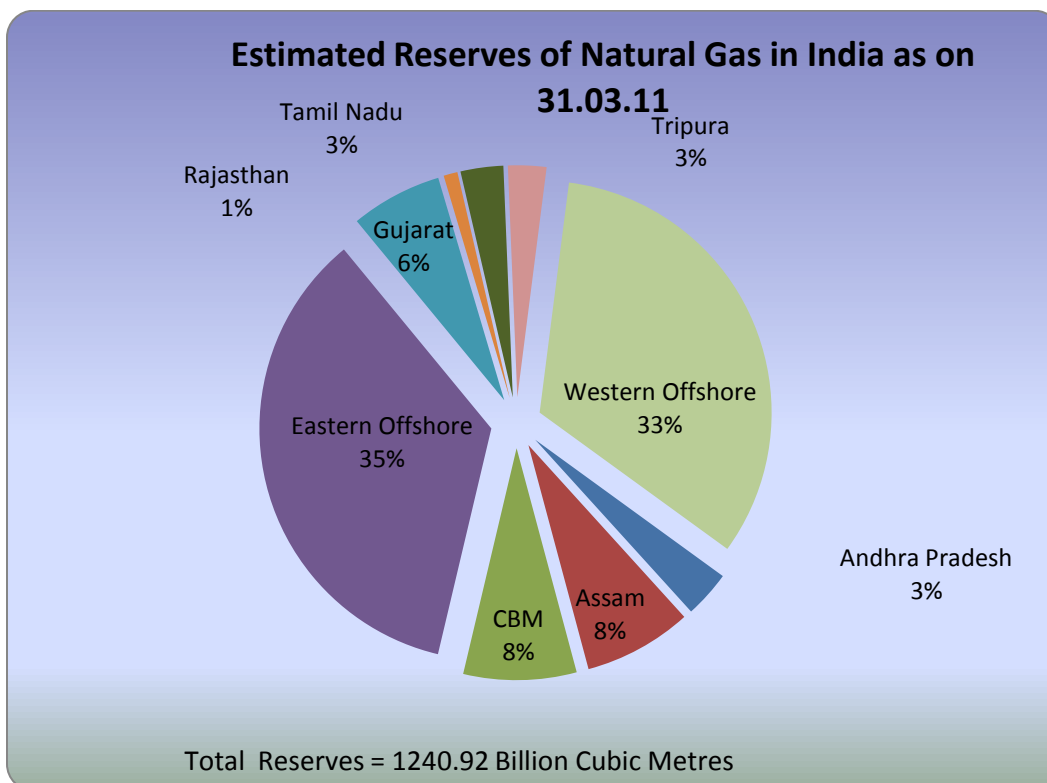


Figure 1.2(A)

Table 1.3 :Sourcewise and Statewise Estimated Potential of Renewable Power in India as on 31.03.2011

(in MW)							
States/ UTs	Wind Power	Small Hydro Power	Biomass Power	Cogeneration-bagasse	Waste to Energy	Total	
						Estimated Reverses	Distribution (%)
1	2	3	4	5	6	7	8
Andhra Pradesh	5394	560	578	300	123	6955	7.75
Arunachal Pradesh	201	1329	8	0	0	1538	1.71
Assam	53	239	212	0	8	512	0.57
Bihar	0	213	619	300	73	1205	1.34
Chhattisgarh	23	993	236	0	24	1276	1.42
Goa	0	7	26	0	0	33	0.04
Gujarat	10609	197	1221	350	112	12489	13.91
Haryana	0	110	1333	350	24	1817	2.02
Himachal Pradesh	20	2268	142	0	2	2432	2.71
Jammu & Kashmir	5311	1418	43	0	0	6772	7.54
Jharkhand	0	209	90	0	10	309	0.34
Karnataka	8591	748	1131	450	151	11071	12.33
Kerala	790	704	1044	0	36	2574	2.87
Madhya Pradesh	920	804	1364	0	78	3166	3.53
Maharashtra	5439	733	1887	1250	287	9596	10.69
Manipur	7	109	13	0	2	131	0.15
Meghalaya	44	229	11	0	2	286	0.32
Mizoram	0	167	1	0	2	170	0.19
Nagaland	3	189	10	0	0	202	0.23
Odisha	910	295	246	0	22	1473	1.64
Punjab	0	393	3172	300	45	3910	4.36
Rajasthan	5005	57	1039	0	62	6163	6.87
Sikkim	98	266	2	0	0	366	0.41
Tamil Nadu	5374	660	1070	450	151	7705	8.58
Tripura	0	47	3	0	2	52	0.06
Uttar Pradesh	137	461	1617	1250	176	3641	4.06
Uttaranchal	161	1577	24	0	5	1767	1.97
West Bengal	22	396	396	0	148	962	1.07
Andaman & Nicobar	2	7	0	0	0	9	0.01
Chandigarh	0	0	0	0	6	6	0.01
Dadar & Nagar Have	0	0	0	0	0	0	0.00
Daman & Diu	0	0	0	0	0	0	0.00
Delhi	0	0	0	0	131	131	0.15
Lakshadweep	16	0	0	0	0	16	0.02
Puducherry	0	0	0	0	3	3	0.00
Others*	0	0	0	0	1022	1022	1.14
All India Total	49130	15385	17538	5000	2707	89760	100.00
Distribution (%)	54.73	17.14	19.54	5.57	3.02	100.00	

* Industrial waste

Source: Ministry of New and Renewable Energy

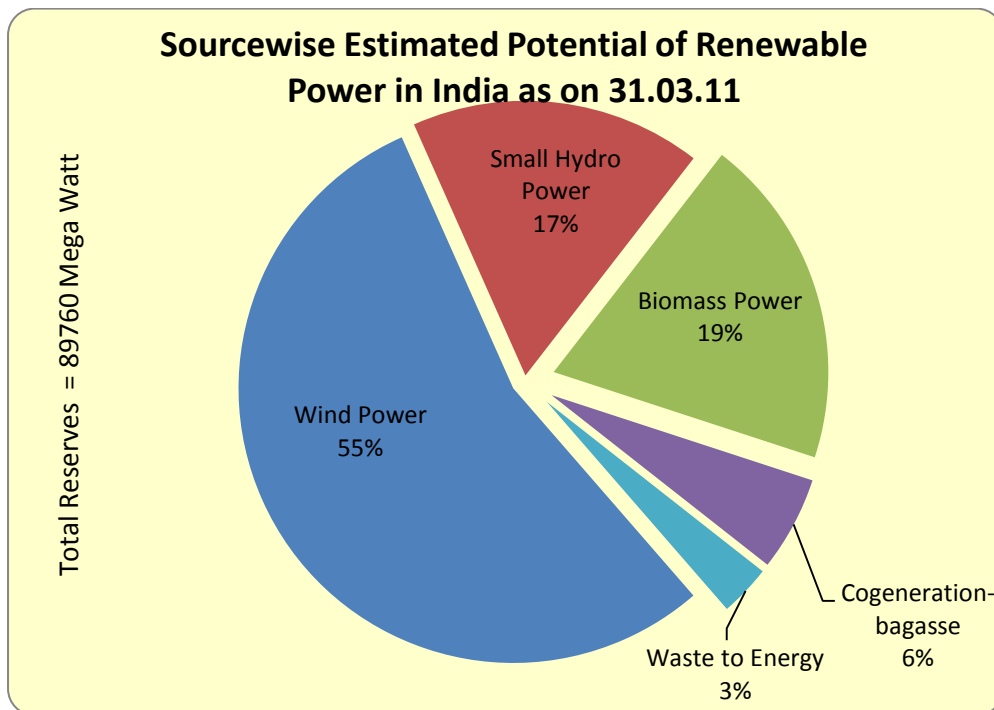


Figure 1.3

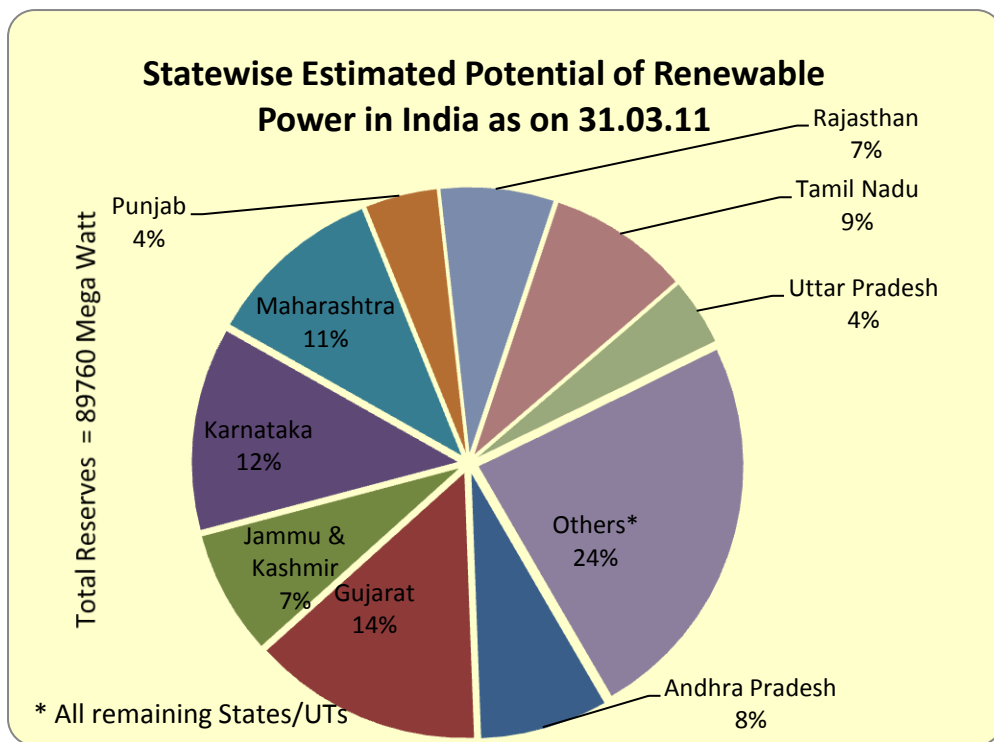


Figure 1.3(A)

Chapter 2: Installed Capacity and Capacity Utilization

Indicators of installed capacity and capacity utilization throw light on the state of preparedness of the country for generation of the energy it requires and the quality or efficiency of the technology used in the generation, respectively. The dynamics of these indicators prompts the planners and policy makers to take appropriate steps for improvement.

2.1 Coal washeries

Coal washing is an integral part of coal production. Raw coal coming from mines is washed to remove the ash contents to make them fit for feeding into boilers, particularly those of steel plants. Barring a few instances, a coal washery does not form part of a coal mine in India. Total installed capacity of washeries in the country increased from 126 Million tonne per year (MTY) during 2009-10 to 131 MTY during 2010-11 (Table 2.1). As on 31.03.11, a total of 52 washeries, both PSUs and Private, were operating in the country. The total installed washing capacity was 131 million tonnes (MT) per annum considering, both Coking (29.69 MTY) and Non-Coking Coal (101.55 MTY). Dipak, Aryan Coal Beneficiation Pvt Ltd, Chattisgarh, Piparwar, CIL, Jharkhand, Korba, ST-CLI Coal washeries Ltd., Chattisgarh and Tamnar, Jindal Steel & Power limited Chattisgarh accounted for 20% of the total installed capacity of all the Coal washeries in India.

2.2 Refineries of crude oil

As on 31.03.11 there were a total of 20 refineries in the country (Table 2.2), 17 in the Public Sector and 3 in the private sector. Public sector refineries are located at Guwahati, Barauni, Koyali, Haldia, Mathura, Digboi, Panipat, Vishakhapatnam, Chennai, Nagapatinam, Kochi, Bongaigaon, Numaligarh, Mangalore, Tatipaka, and two refineries in Mumbai. The private sector refineries built by Reliance Petroleum Ltd and Essar Oil are in Jamnagar and Vadinar respectively.

Total installed crude oil refining capacity in the country at the end of March 2011 was 187 million tonnes per annum. There was an addition of 5 million tonnes per annum to the installed refining capacity due to IOC refinery at Panipat, HPCL refinery at Mumbai and CPCL, Manali refinery.

Total processing of crude oil in the country increased from 192768 thousand metric tonnes (TMT) during 2009-10 to 206154 TMT during 2010-11 registering a increase of 6.9 %. Capacity utilization of the refineries was 105.7% during 2009-10 and 110% during 2010-11. The maximum increase in capacity utilization (31.7%) was at RPL(SEZ), Jamnagar, Gujarat and the highest decrease (22.4 %) in capacity utilization was at IOC refinery at Panipat.

Indian oil corporation, the state owned corporation had highest refining capacity of 54200 TMTY. All units of IOC together processed 52964 TMT during 2010-11 as compared to 50696 TMT during 2009-10. The capacity utilization of these refineries was 97.7% during 2010-11 as against 99% during 2009-10. All the

private refineries taken together processed 90693 TMT during 2010-11 as compared to 80651 TMT during 2009-10. The capacity utilization of these refineries during 2009-10 and 2010-11 stood at 114.4% and 128.6% respectively.

2.3 Installed generating capacity of electricity

The total installed capacity for electricity generation in the country has increased from 16,271 MW as on 31.03.1971 to 206,526 MW as on 31.03.2011, registering a compound annual growth rate (CAGR) of 6.4% (Table 2.3). There has been an increase in generating capacity of 18654 MW over the last one year, which is 10% more than the capacity of last year. The highest rate of annual growth (11.3%) from 2009-10 to 2010-11 in installed capacity was for Thermal power followed by Nuclear Power (4.8%).

The total Installed capacity of power utilities in the country increased from 14,709 MW in 1970-71 to 173,626 MW as on 31.3.11, with a CAGR of 6.2 % over the period. The highest CAGR (7.1%) was in case of Thermal utilities followed by Nuclear (6.1%) and Hydro (4.4%).

At the end of March 2011, thermal power plants accounted for an overwhelming 64% of the total installed capacity in the country, with an installed capacity of 131.2 thousand MW. Hydro power plants come next with an installed capacity of 37.6 thousand MW, accounting for 18.2% of the total installed Capacity. Besides, non-utilities accounted for 15.9% (32.9 Thousand MW) of the total installed generation capacity. The share of Nuclear energy was only 2.31% (4.78 MW).

The geographical distribution of Installed generating capacity of electricity as on 31.03.11 (Table 2.4) indicates that Western Region (both central and state sector) accounted for the highest share (30.98%) followed by Southern Region (27.35%), Northern Region (26.88%), Eastern Region (13.45%) and North Eastern Region (1.35%). Region wise growth in the installed capacity during 2010-11 reveals that Eastern Region registered the highest growth of about 18.21%, followed by Northern Region(10.1%) and Western Region (6.65%). Among the States in the Eastern Region that accounted for the highest growth of 18%, Odisha registered the highest (47.7%) followed by Jharkhand (27.1%). Among all the states Delhi registered highest growth (105.1%) in the installed capacity followed by Odisha (48%) and Jharkhand (27%).

2.4 Grid Interactive Renewable Power

The total installed capacity of grid interactive renewable power, which was 16817 MW as on 31.03.2010 had gone up to 19971 MW as on 31.03.2011 indicating growth of 18.75% during the period (Table 2.5). Out of the total installed generation capacity of renewable power as on 31-03-2011, wind power accounted for about 71%, followed by small hydro power (15.2%) and Biomass power (13.3%). Tamil Nadu had the highest installed capacity of grid connected renewable power (6500 MW) followed by Maharashtra (3005 MW) and Karnataka (2882 MW), mainly on account of wind power.

As on 31.03.2011 out of total Biogas plants installed (41.98 lakh) (Table 2.6), maximum number of such plants installed were in Maharashtra (8 lakh) followed by Andhra Pradesh, Uttar Pradesh, Karnataka and Gujarat each with about 4 lakh biogas plants. Out of about 6.6 lakh Solar Cookers installed as on 31.03.2011, 1.7 lakh were installed in Gujarat and 1.4 lakh were installed in Madhya Pradesh. Further, as on 31.03.2011 there were 1,352 water pumping Wind mills systems installed and 6,975 remote villages and 1,871 hamlets were electrified.

Table 2.1: Installed Capacity of Coal Washeries in India as on 31.3.10 and 31.03.11

Sl. No.	Washery & Operator	State of Location	Capacity (MTY)	
			31.03.2010	31.03.2011
<u>COKING COAL :</u>				
1	Dudga-II, CIL	Jharkhand	2.00	2.00
2	Bhojudih, CIL	West Bengal	1.70	1.70
3	Patherdih, CIL	Jharkhand	1.60	1.60
4	Moonidih, CIL	Jharkhand	1.60	1.60
5	Sudamdih, CIL	Jharkhand	1.60	1.60
6	Mahuda, CIL	Jharkhand	0.63	0.63
7	Kathara, CIL	Jharkhand	3.00	3.00
8	Swang, CIL	Jharkhand	0.75	0.75
9	Rajrappa, CIL	Jharkhand	3.00	3.00
10	Kedla, CIL	Jharkhand	2.60	2.60
11	Nandan, CIL	Madhya Pradesh	1.20	1.20
	(A) CIL		19.68	19.68
12	Durgapur, SAIL	West Bengal	1.50	1.50
13	DCOP, DPL	West Bengal	1.35	1.35
14	Chasnala, IISCO	Jharkhand	1.50	1.50
15	Jamadoba, TISCO	Jharkhand	0.90	0.90
16	West Bokaro-II, TISCO	Jharkhand	1.80	1.80
17	West Boakaro-III, TISCO	Jharkhand	2.10	2.10
18	Bhelatand	Jharkhand	0.86	0.86
	(B) PSU & Private		10.01	10.01
	TOTAL (A + B)		29.69	29.69
<u>NON-COKING COAL</u>				
1	Dugda-I, CIL	Jharkhand	2.50	2.50
2	Madhuban, CIL	Jharkhand	2.50	2.50
3	Gidi, CIL	Jharkhand	2.50	2.50
4	Piparwar, CIL	Jharkhand	6.50	6.50
5	Kargali, CIL	Jharkhand	2.72	2.72
6	Bina, CIL	Uttar Pradesh	4.50	4.50
	(A) CIL		21.22	21.22
7	Dipka, Aryan coal beneficiation pvt.	Chattisgarh	12.00	12.00
8	Gevra, -do-	Chattisgarh	5.00	5.00
9	Panderpauni, -do-	Maharashtra	3.00	3.00
10	Chakabuwa, Aryan Energy private ltd.	Chattisgarh	4.00	4.00
11	Indaram, Aryan Coal Benefication Pvt.Ltd.	Andhra Pradesh	0.60	-
12	Talcher, Aryan Energy Pvt. Ltd.	Odisha	2.00	2.00

**Table 2.1(Contd.): Installed Capacity of Coal Washeries in India
as on 31.3.10 and 31.03.11**

Sl. No.	Washery & Operator	State of Location	Capacity (MTY)	
			31.03.2010	31.03.2011
13	Wani, Kartikay Coal washeries pvt. ltd.(Aryan)	Maharashtra	2.50	2.50
14	Korba, ST-CLI Coal washeries ltd.	Chattisgarh	1.10	5.20
15	Ramagundam, Gupta coalfield & washeries ltd.	Andhra Pradesh	2.40	2.40
16	Sasti, Gupta coalfield & washeries ltd.	Maharashtra	2.40	2.40
17	Wani, Gupta coalfield & washeries ltd.	Maharashtra	1.92	1.92
18	Umrer, Gupta coalfield & washeries ltd.	Maharashtra	0.75	0.75
19	Bhandara, Gupta coalfield & washeries ltd.	Maharashtra	0.75	0.75
20	Gondegaon, Gupta coalfield & washeries ltd.	Maharashtra	2.40	2.40
21	Majri, Gupta coalfield & washeries ltd.	Maharashtra	2.40	2.40
22	Bilaspur, Gupta coalfield & washeries ltd.	Chattisgarh	3.50	3.50
23	Ghugus, Gupta coalfield & washeries ltd.	Maharashtra	2.40	2.40
24	Talcher, Global coal Mining (P) Ltd.	Odisha	2.50	2.50
25	Ib Valley, Global coal Mining (P) Ltd.	Odisha	3.25	3.25
26	Ramagundam, Global coal Mining (P) Ltd.	Andhra Pradesh	1.00	1.00
27	Wani, Bhatia International Ltd.	Maharashtra	2.00	3.73
28	Ghugus, Bhatia International Ltd.	Maharashtra	4.00	4.00
29	Jharsuguda, Bhatia International Ltd.	Odisha	1.50	1.50
30	Tamnar, Jindal Steel & Power Ltd.	Chattisgarh	6.00	6.00
31	Wani, Indo Unique Flame Ltd.	Maharashtra	2.40	2.40
32	Nagpur, Indo Unique Flame Ltd.	Maharashtra	0.60	0.60
33	Punwat, Indo Unique Flame Ltd.	Maharashtra	2.40	2.40
34	Dharamsthal, BLA Industries	Madhya Pradesh	0.33	0.33
(B) Private			75.10	80.33
TOTAL (A+B)			96.32	101.55
Gross Total (Coking+Non-Coking)			126.01	131.24

Source:Office of Coal Controller, Ministry of Coal

Table 2.2: Installed Capacity and Capacity Utilization of Refineries of Crude Oil during 2009-10 and 2010-11

Sl. No	Refinery	Installed Capacity as on 31.03.2010 (TMTPA)	Installed Capacity as on 31.03.2011 (TMTPA)	Refinery Crude Throughput (TMT)		Capacity Utilisation (%)		
				2009-10	2010-11	2009-10	2010-11	Change in utilisation
A	Public Sector Refineries	111886	116886	112117	115461	100.2	98.8	-1.4
I	IOC REFINERIES	51200	54200	50696	52964	99.0	97.7	-1.3
	IOC, Digboi	1000	1000	1078	1118	107.8	111.8	4.0
	IOC, Guwahati	6000	6000	6184	6207	103.1	103.5	0.4
	IOC, Barauni	13700	13700	13206	13561	96.4	99.0	2.6
	IOC, Koyali	7500	7500	5686	6878	75.8	91.7	15.9
	IOC, Haldia	8000	8000	8107	8880	101.3	111.0	9.7
	IOC, Mathura	650	650	600	651	92.3	100.2	7.8
	IOC, Panipat	12000	15000	13615	13660	113.5	91.1	-22.4
	IOC, Bongaigaon	2350	2350	2220	2008.5	94.5	85.5	-9.0
II	BPCL REFINERIES	21500	21500	20391	21752	94.8	101.2	6.3
	BPCL, Mumbai	12000	12000	12516	13020	104.3	108.5	4.2
	BPCL, Kochi	9500	9500	7875	8732	82.9	91.9	9.0
III	HPCL REFINERIES	13800	14800	15761	14952	114.2	101.0	-13.2
	HPCL, Mumbai	5500	6500	6965	6752	126.6	103.9	-22.8
	HPCL, Visakh	8300	8300	8796	8200	106.0	98.8	-7.2
IV	CPCL REFINERIES	10500	11500	10097	10807	96.2	94.0	-2.2
	CPCL, Manali	9500	10500	9580	10104	100.8	96.2	-4.6
	CPCL, Narimanam	1000	1000	517	703	51.7	70.3	18.6
V	NRL, Numaligarh	3000	3000	2619	2255	87.3	75.2	-12.1
VI	ONGC, Tatipaka	66	66	55	69	83.3	104.5	21.2
VII	MRPL, Mangalore	11820	11820	12498	12662	105.7	107.1	1.4
B	PRIVATE REFINERIES	70500	70500	80651	90693	114.4	128.6	14.2
I	RPL, Jamnagar	33000	33000	34415	34517	104.3	104.6	0.3
II	RPL(SEZ), Jamnagar, Gujarat	27000	27000	32735	41303	121.2	153.0	31.7
III	Essar Oil Ltd., Vadinar	10500	10500	13501	14873	128.6	141.6	13.1
Total (A+B)		182386	187386	192768	206154	105.7	110.0	4.32

TMTPA Thousand Metric Tonnes Per Annum

TMT Thousand Metric Tonnes

Source: Ministry of Petroleum and Natural Gas

**Table 2.3 : Trends in Installed Generating Capacity of Electricity
Non-utilities in India from 1970-71 to 2010-11**

(Mega Watt) = (10³ x Kilo Watt)

As on	Utilities				Non-utilities			Grand Total
	Thermal *	Hydro	Nuclear	Total	Railways	Self- ** Generating Industries	Total	
1	2	3	4	5	6	7	8	9
31.03.1971	7,906	6,383	420	14,709	45	1,517	1,562	16,271
31.03.1976	11,013	8,464	640	20,117	61	2,071	2,132	22,249
31.03.1981	17,563	11,791	860	30,214	60	3,041	3,101	33,315
31.03.1986	29,967	15,472	1,330	46,769	85	5,419	5,504	52,273
31.03.1991	45,768	18,753	1,565	66,086	111	8,502	8,613	74,699
31.03.1996	60,083	20,986	2,225	83,294	158	11,629	11,787	95,081
31.03.2001	73,613	25,153	2,860	101,626	-	16,157	16,157	117,783
31.03.2006	88,601	32,326	3,360	124,287	-	21,468	21,468	145,755
31.03.2007	93,775	34,654	3,900	132,329	-	22,335	22,335	154,664
31.03.2008	103,032	35,909	4,120	143,061	-	24,986	24,986	168,047
31.03.2009	106,968	36,878	4,120	147,966	-	26,980	26,980	174,946
31.03.2010	117,975	36,863	4,560	159,398	-	28,474	28,474	187,872
31.03.2011(P)	131,279	37,567	4,780	173,626	-	32,900	32,900	206,526
Growth rate of 2010-11 over 2009-10(%)	11.28	1.91	4.82	8.93	-	15.54	15.54	9.93
CAGR 1970-71 to 2010-11(%)	7.09	4.42	6.11	6.21	-	7.79	7.72	6.39

* From 1995-96 onwards, Thermal includes Renewable Energy Resources.

** Capacity in respect of Self Generating Industries includes units of capacity 1 MW and above.

CAGR: Compound Annual Growth Rate = $((\text{Current Value}/\text{Base Value})^{(1/\text{nos. of years})}-1)*100$

Source : Central Electricity Authority.

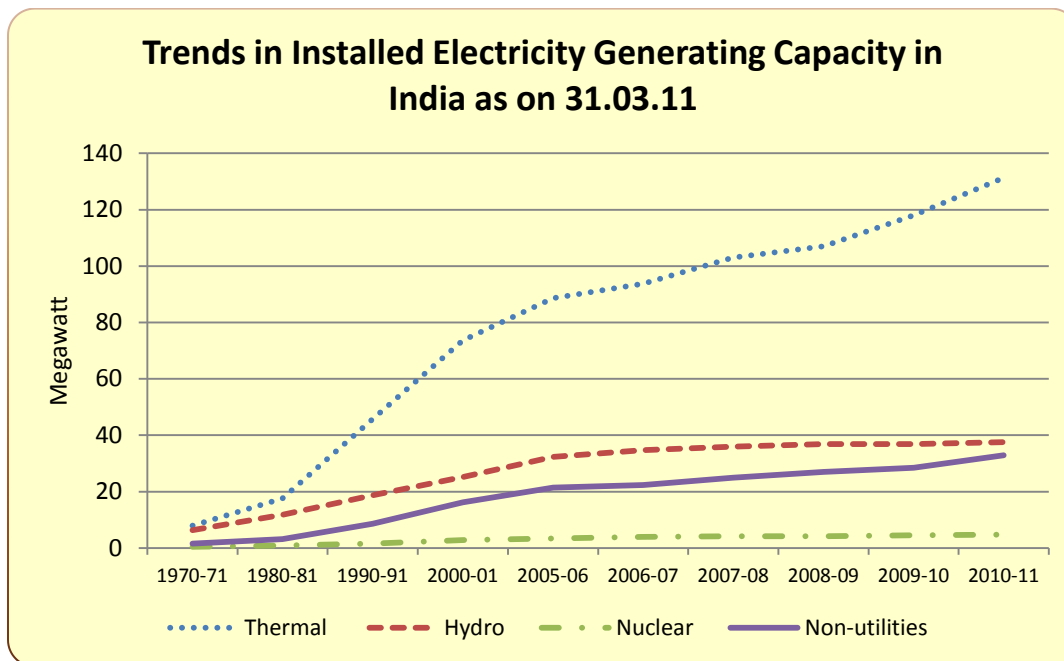


Figure 2.3

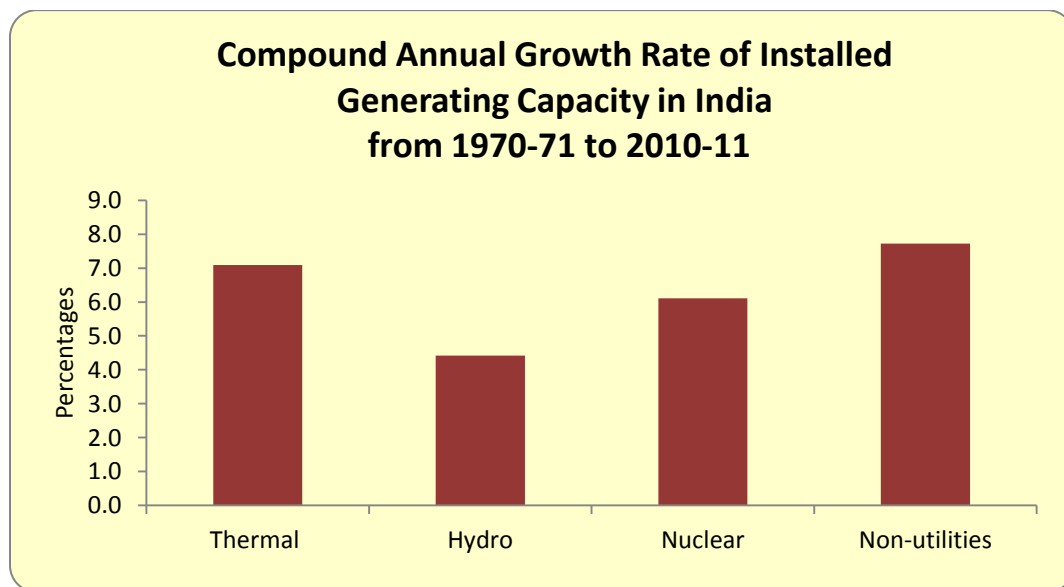


Figure 2.3(A)

Table 2.4 : Regionwise and Statewise Installed Generating Capacity of Electricity (Utilities) in India as on 31.03.2010 and 31.03.2011

States/UTs	(In GW)										Growth* Rate(2009- 10 to 2010- 11)
	Hydro		Thermal		Nuclear		New & Renewable**		Total		
	31.03.10	31.03.11	31.03.10	31.03.11	31.03.10	31.03.11	31.03.10	31.03.11	31.03.10	31.03.11	
Delhi	0.00	0.00	0.74	1.51	0.00	0.00	0.00	0.00	0.74	1.51	105.19
Haryana	0.88	0.88	2.62	3.44	0.00	0.00	0.08	0.11	3.58	4.43	23.73
Himachal Prd.	0.78	0.97	0.00	0.00	0.00	0.00	0.28	0.38	1.06	1.16	9.43
Jammu & Kashmir	0.78	0.78	0.18	0.18	0.00	0.00	0.13	0.13	1.09	1.09	0.00
Punjab	2.23	2.23	2.63	2.66	0.00	0.00	0.28	0.33	5.14	5.21	1.47
Rajasthan	0.99	0.99	3.94	4.33	0.00	0.00	0.93	1.47	5.86	6.78	15.82
Uttar Pradesh	0.52	0.52	4.37	4.67	0.00	0.00	0.59	0.61	5.48	5.81	5.87
Uttarakhand	1.65	1.65	0.00	0.00	0.00	0.00	0.13	0.15	1.79	1.80	0.74
Central Sector NR	5.47	5.79	10.37	11.59	1.62	1.62	0.00	0.00	17.46	18.68	7.01
Sub-Total (NR)	13.31	13.82	24.85	28.38	1.62	1.62	2.41	3.17	42.19	46.47	10.15
Chhatisgarh	0.12	0.12	3.66	3.66	0.00	0.00	0.22	0.25	4.00	4.03	0.80
D & N Haveli	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daman & Diu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Goa	0.00	0.00	0.05	0.05	0.00	0.00	0.03	0.03	0.08	0.08	0.00
Gujarat	0.77	0.77	8.99	10.34	0.00	0.00	1.66	2.00	11.42	13.11	14.84
Madhya Pradesh	1.70	1.70	2.81	2.81	0.00	0.00	0.29	0.27	4.80	4.78	-0.43
Maharashtra	3.33	3.33	10.29	11.05	0.00	0.00	2.44	2.81	16.06	17.19	7.04
Central Sector WR	1.52	1.52	10.51	11.01	1.84	1.84	0.00	0.00	13.87	14.37	3.62
Sub-Total (WR)	7.45	7.45	36.31	38.92	1.84	1.84	4.63	5.36	50.22	53.56	6.65
Andhra Pradesh	3.62	3.70	6.50	7.73	0.00	0.00	0.70	0.77	10.82	12.11	11.97
Karnataka	3.60	3.60	3.28	3.91	0.00	0.00	2.23	2.62	9.12	10.13	11.10
Kerala	1.78	1.88	0.43	0.43	0.00	0.00	0.14	0.15	2.35	2.36	0.30
Lakshadweep	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	7.52
Puducherry	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03	0.08
Tamil Nadu	2.11	2.12	4.66	4.66	0.00	0.00	4.87	5.81	11.63	12.58	8.14
Central Sector SR	0.00	0.00	8.25	8.75	1.10	1.32	0.00	0.00	9.35	10.07	7.70
Sub-Total (SR)	11.11	11.30	23.16	25.52	1.10	1.32	7.94	9.34	43.31	47.29	9.19
A & N Island	0.00	0.00	0.06	0.06	0.00	0.00	0.01	0.01	0.07	0.07	0.15
Bihar	0.00	0.00	0.53	0.53	0.00	0.00	0.05	0.07	0.58	0.60	2.26
Jharkhand	0.13	0.13	1.19	1.55	0.00	0.00	0.00	0.00	1.32	1.68	27.19
Odisha	2.06	2.06	0.42	1.62	0.00	0.00	0.06	0.08	2.55	3.76	47.73
Sikkim	0.00	0.00	0.01	0.01	0.00	0.00	0.05	0.05	0.05	0.05	0.00
West Bengal	0.98	0.98	4.89	6.23	0.00	0.00	0.16	0.16	6.03	7.37	22.17
Central Sector ER	0.71	0.71	8.36	9.02	0.00	0.00	0.00	0.00	9.07	9.73	7.24
Sub-Total (ER)	3.88	3.88	15.46	19.02	0.00	0.00	0.34	0.36	19.68	23.26	18.21
Arunachal Prd.	0.00	0.00	0.02	0.02	0.00	0.00	0.07	0.08	0.08	0.09	13.73
Assam	0.10	0.10	0.32	0.34	0.00	0.00	0.03	0.03	0.45	0.47	5.48
Manipur	0.00	0.00	0.05	0.05	0.00	0.00	0.01	0.01	0.05	0.05	0.00
Meghalaya	0.16	0.16	0.00	0.00	0.00	0.00	0.03	0.03	0.19	0.19	0.00
Mizoram	0.00	0.00	0.05	0.05	0.00	0.00	0.03	0.04	0.08	0.09	9.96
Nagaland	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00
Tripura	0.00	0.00	0.13	0.15	0.00	0.00	0.02	0.02	0.15	0.17	14.15
Central Sector NER	0.86	0.86	0.45	0.38	0.00	0.00	0.00	0.00	1.31	1.24	-6.08
Sub-Total (NER)	1.12	1.12	1.02	0.99	0.00	0.00	0.20	0.22	2.34	2.33	-0.64
Total States	28.30	28.68	62.86	72.08	0.00	0.00	15.52	18.45	106.68	118.83	11.39
Total Central	8.56	8.89	37.94	40.75	4.56	4.78	0.00	0.00	51.06	54.09	5.92
Total All India	36.86	37.57	100.81	112.82	4.56	4.78	15.52	18.45	157.74	172.92	9.62

**:- Renewable Energy Sources includes Small Hydro Projects, Wind Power, Biomass Power
Biomass Gesifier, Urban & Industrial Waste and Solar Power.

* Growth rate of total installed electricity generating capacity of India
Sub-totals/Totals may not tally due to conversion to Gw and rounding off.

Source : Central Electricity Authority.

Table 2.5: Statewise and Sourcewise Installed Capacity of Grid Interactive Renewable Power as on 31.03.2010 and 30.03.2011

(In MW)

States/ Uts	Biomass Power		Waste to Energy		Wind Power	
	31.03.10	31.03.11	31.03.10	31.03.11	31.03.10	31.03.11
Andhra Pradesh	363.25	363.25	35.66	43.16	122.50	191.50
Arunachal Pradesh	-	-	-	-	136.10	-
Assam	-	-	-	-	-	-
Bihar	-	9.50	-	-	-	-
Chhattisgarh	199.90	231.90	-	-	-	-
Goa	-	-	-	-	-	-
Gujarat	0.50	0.50	-	-	1863.63	2176.43
Haryana	7.80	35.80	-	-	-	-
Himachal Pradesh	-	-	-	-	-	-
Jammu & Kashmir	-	-	-	-	-	-
Jharkhand	-	-	-	-	-	-
Karnataka	336.18	365.18	1.00	1.00	1472.80	1726.85
Kerala	-	-	-	-	27.75	35.00
Madhya Pradesh	1.00	1.00	2.70	2.70	229.40	275.90
Maharashtra	218.50	403.00	5.70	5.72	2077.75	2316.75
Manipur	-	-	-	-	-	-
Meghalaya	-	-	-	-	-	-
Mizoram	-	-	-	-	-	-
Nagaland	-	-	-	-	-	-
Odisha	-	-	-	-	-	-
Punjab	62.50	74.50	9.25	9.25	-	-
Rajasthan	31.30	73.30	-	-	1088.30	1525.00
Sikkim	-	-	-	-	-	-
Tamil Nadu	395.70	488.20	5.65	5.65	4906.72	5904.12
Tripura	-	-	-	-	-	-
Uttar Pradesh	567.00	592.50	5.00	5.00	-	-
Uttaranchal	-	10.00	-	-	-	-
West Bengal	16.00	16.00	-	-	4.30	4.30
Andaman & Nicobar	-	-	-	-	-	-
Chandigarh	-	-	-	-	-	-
Dadar & Nagar Haveli	-	-	-	-	-	-
Daman & Diu	-	-	-	-	-	-
Delhi	-	-	-	-	-	-
Lakshadweep	-	-	-	-	-	-
Puducherry	-	-	-	-	-	-
All India Total	2199.63	2664.63	64.96	72.48	11929.25	14155.85
Distribution (%)	13.08	13.34	0.33	0.36	59.73	70.88

Source: Ministry of New and Renewable Energy

Table 2.5 (contd): Statewise and Sourcewise Installed Capacity of Grid Interactive Renewable Power as on 31.03.2010 and 30.03.2011

States/ Uts	Small Hydro Power		Solar Power		Total		Growth* Rate(2009-10 to 2010-11)
	31.03.10	31.03.11	31.03.10	31.03.11	31.03.10	31.03.11	
Andhra Pradesh	186.83	191.43	0.10	2.10	721.94	791.44	9.63
Arunachal Pradesh	73.42	78.84	0.03	0.03	73.45	78.87	7.39
Assam	27.11	27.11	-	-	27.11	27.11	0.00
Bihar	54.60	59.80	-	-	54.60	69.30	26.92
Chhattisgarh	19.05	19.05	-	-	218.95	250.95	14.62
Goa	0.05	0.05	-	-	0.05	0.05	0.00
Gujarat	12.60	15.60	-	5.00	1876.73	2197.53	17.09
Haryana	70.10	70.10	-	-	77.90	105.90	35.94
Himachal Pradesh	330.32	393.47	-	-	330.32	393.47	19.12
Jammu & Kashmir	129.33	129.33	-	-	129.33	129.33	0.00
Jharkhand	4.05	4.05	-	-	4.05	4.05	0.00
Karnataka	640.45	783.35	6.00	6.00	2456.43	2882.38	17.34
Kerala	133.87	136.87	0.03	0.03	161.65	171.90	6.34
Madhya Pradesh	71.16	86.16	0.10	0.10	304.36	365.86	20.21
Maharashtra	245.33	275.13	-	4.00	2547.28	3004.60	17.95
Manipur	5.45	5.45	-	-	5.45	5.45	0.00
Meghalaya	31.03	31.03	-	-	31.03	31.03	0.00
Mizoram	36.47	36.74	-	-	36.47	36.47	0.00
Nagaland	28.67	28.67	-	-	28.67	28.67	0.00
Odisha	64.30	64.30	-	-	64.30	64.30	0.00
Punjab	132.55	154.50	1.33	2.33	205.63	240.58	17.00
Rajasthan	23.85	23.85	0.15	5.15	1143.60	1627.30	42.30
Sikkim	47.11	52.11	-	-	47.11	52.11	10.61
Tamil Nadu	90.05	96.55	0.05	5.05	5398.17	6499.57	20.40
Tripura	16.01	16.01	-	-	16.01	16.01	0.00
Uttar Pradesh	25.10	25.10	0.38	0.38	597.48	622.98	4.27
Uttaranchal	132.92	134.62	0.05	0.05	132.97	144.67	8.80
West Bengal	98.40	98.40	1.15	1.15	119.85	119.85	0.00
Andaman & Nicobar	5.25	5.25	0.10	0.10	5.35	5.35	0.00
Chandigarh	-	-	-	-	-	-	-
Dadar & Nagar Haveli	-	-	-	-	-	-	-
Daman & Diu	-	-	-	-	-	-	-
Delhi	-	-	0.05	2.14	0.05	2.14	4180.00
Lakshadweep	-	-	0.75	0.75	0.75	0.75	0.00
Puducherry	-	-	0.03	0.79	0.03	0.79	3060.00
All India Total	2735.42	3042.92	10.28	35.15	16817.04	19970.76	18.75
Distribution (%)	16.27	15.24	0.06	0.18	100.00	100.00	

Source: Ministry of New and Renewable Energy

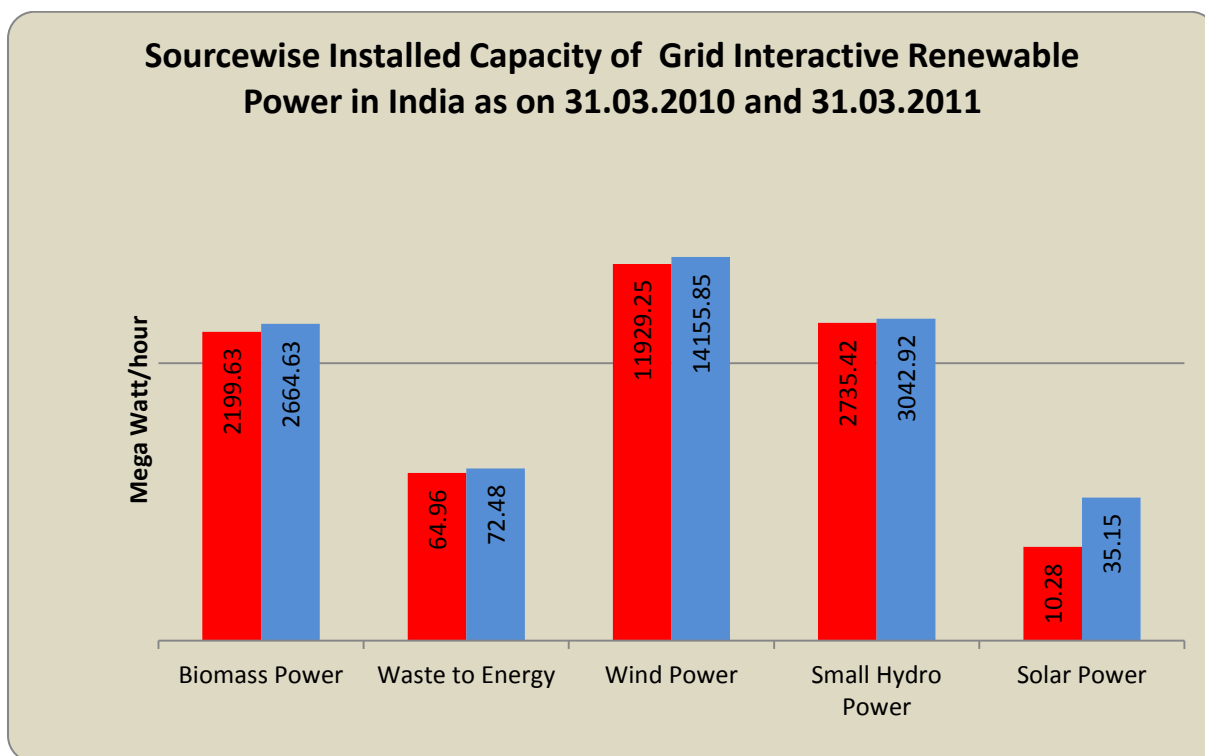


Figure 2.5

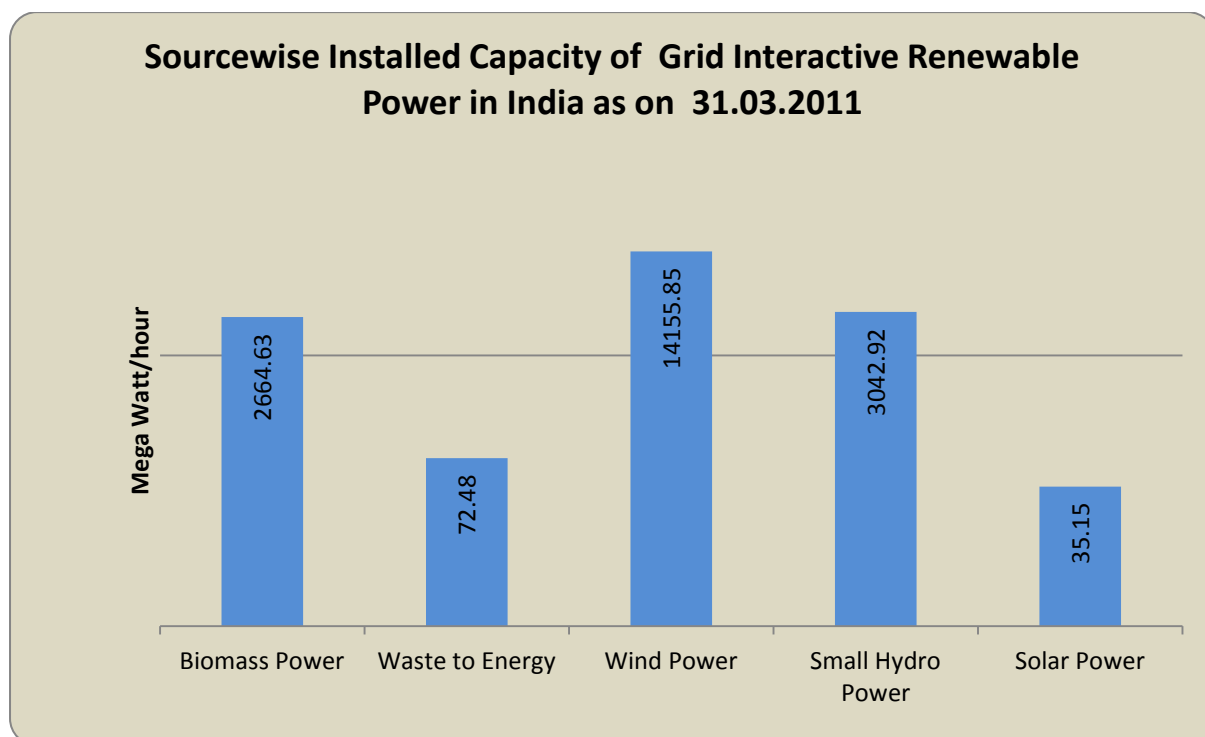


Figure 2.5(A)

Table 2.6 : Installation of Off-grid / Decentralised Renewable Energy Systems/ Devices as on 31.03.2011

Sl. No.	State/UT	Biogas Plants (Nos.)	Water Pumping Wind Mills (Nos.)	SPV Pumps (Nos.)	Solar Photovoltaic			
					SLS (Nos.)	HLS (Nos.)	SL (Nos.)	PP (KWP)
1	2	3	4	5	6	7	8	9
1	Andhra Pradesh	4,74,213	6	613	4,186	1,958	38,215	493.04
2	Arunachal Pradesh	3,132	-	15	1,071	10,178	13,937	17.10
3	Assam	88,324	3	45	98	5,870	1,211	10.00
4	Bihar	1,26,238	46	139	955	3,350	50,117	0.00
5	Chhattisgarh	36,737	1	222	1,923	7,233	3,192	1948.00
6	Goa	3,911	-	15	619	362	1,065	1.72
7	Gujarat	4,18,055	879	85	2,004	9,231	31,603	336.00
8	Haryana	55,462	-	469	20,074	49,418	73,116	676.05
9	Himachal Pradesh	46,161	-	6	4,072	16,848	22,970	1.50
10	Jammu & Kashmir	2,603	-	39	5,596	23,083	28,672	225.00
11	Jharkhand	5,846	-	-	620	6,876	16,374	20.00
12	Karnataka	4,33,223	28	551	2,694	36,134	7,334	225.41
13	Kerala	1,30,404	79	810	1,090	32,326	41,181	47.70
14	Madhya Pradesh	31,946	-	87	6,138	2,651	9,444	45.00
15	Maharashtra	8,02,189	26	228	8,420	2,431	8,683	850.00
16	Manipur	2,128	-	40	928	3,865	4,787	28.00
17	Meghalaya	79,236	-	19	1,273	7,840	24,875	50.50
18	Mizoram	3,920	-	37	431	5,395	8,331	109.00
19	Nagaland	5,407	-	3	271	720	6,317	6.00
20	Odisha	2,46,086	-	56	5,834	5,156	9,882	84.52
21	Punjab	1,28,989	-	1,857	5,354	8,620	17,495	121.00
22	Rajasthan	67,623	222	283	6,852	91,754	4,716	990.00
23	Sikkim	7,691	-	-	212	4,640	5,200	17.73
24	Tamil Nadu	2,18,009	60	829	6,350	7,536	16,816	67.73
25	Tripura	2,882	-	151	1,199	26,066	42,360	25.57
26	Uttar Pradesh	4,27,018	-	573	89,160	1,32,203	16,123	1311.00
27	Uttaranchal	12,659	-	26	8,568	91,307	64,023	180.03
28	West Bengal	3,36,480	-	48	8,076	1,30,873	17,662	775.00
29	Andaman & Nicobar	137	2	5	358	405	6,296	167.00
30	Chandigarh	97	-	12	229	275	1,675	0.00
31	Dadar & Nagar Haveli	169	-	-	-	-	-	0.00
32	Daman & Diu	-	-	-	-	-	-	0.00
33	Delhi	680	-	89	301	-	4,807	80.00
34	Lakshadweep	-	-	-	-	-	5,289	85.00
35	Puducherry	578	-	21	417	25	1,637	0.00
36	Others*	-	-	-	9,150	24,047	1,25,797	148.00
Total		41,98,233	1,352	7,373	2,04,523	7,48,676	7,31,202	9,142.60

Source : Ministry of New and Renewable Energy

* Others includes installations through NGOs/IREDA in different states

SLS = Street Lighting System; HLS = Home Lighting System; SL = Solar Lantern; PP = Power Plants; SPV = Solar Photovoltaic; SHP = Small Hydro Power; MW = Mega Watt; KWP = Kilowatt peak; BOV = Battery Operated Vehicles

Table 2.6(contd..) : Installation of Off-grid / Decentralised Renewable Energy Systems/ Devices as on 31.03.2011

Sl. No.	State/UT	Aerogen. Hybrid System	Solar Cooker	Biomass Gasifiers (Rural+ Industrial)	Waste to Energy	Remote Village Electrification Villages	
						Villages	Hamlets
		(KW)	(Nos.)	(Nos.)	(MW)	(Nos.)	(Nos.)
1	2	3	4	5	6	7	8
1	Andhra Pradesh	16.00	13395	18411	6.55	297	-
2	Arunachal Pradesh	6.80	530	1800	-	-	13
3	Assam	6.00	80	733	-	1,688	-
4	Bihar	-	475	7650	-	568	-
5	Chhattisgarh	-	37464	1710	-	-	-
6	Goa	164.00	1500	-	-	-	-
7	Gujarat	10.00	170675	20230	10.79	38	-
8	Haryana	10.00	27115	2263	4.00	-	286
9	Himachal Pradesh	-	28837	-	-	21	-
10	Jammu & Kashmir	-	868	200	-	160	-
11	Jharkhand	-	280	680	-	449	-
12	Karnataka	39.15	253	7454	3.00	16	14
13	Kerala	8.00	236	-	-	-	607
14	Madhya Pradesh	-	141618	8108	0.11	381	-
15	Maharashtra	607.70	58044	7,150	6.81	338	-
16	Manipur	70.00	365	-	-	191	-
17	Meghalaya	5.00	1165	250	-	97	-
18	Mizoram	-	110	200	-	20	-
19	Nagaland	-	-	1,480	-	11	-
20	Odisha	-	3437	270	0.02	602	-
21	Punjab	30.00	22050	-	1.81	-	-
22	Rajasthan	14.00	36682	2104	3.00	292	-
23	Sikkim	16.00	20	-	-	-	13
24	Tamil Nadu	25.00	1536	10327	6.14	-	101
25	Tripura	2.00	80	1000	-	60	715
26	Uttar Pradesh	-	50494	20340	24.91	98	86
27	Uttarakhand	-	10534	350	3.07	472	34
28	West Bengal	38.00	7959	24743	-	1,176	2
29	Andaman & Nicobar	-	60	-	-	-	-
30	Chandigarh	-	1529	-	0.33	-	-
31	Dadar & Nagar Haveli	-	80	-	-	-	-
32	Daman & Diu	-	-	-	-	-	-
33	Delhi	-	27990	-	-	-	-
34	Lakshadweep	-	-	-	-	-	-
35	Puducherry	5.00	90	600	-	-	-
36	Others*	-	17950	-	-	-	-
Total		1072.65	663501	138053	70.54	6975	1871

* Others includes installations through NGOs/IREDA in different states

SLS = Street Lighting System; HLS = Home Lighting System; SL = Solar Lantern; PP = Power Plants;
SPV = Solar Photovoltaic; MW = Mega Watt; KWP = Kilowatt peak; MWe=Mega Watt electric

Source : Ministry of New and Renewable Energy

Chapter 3: Production of Primary sources of Conventional Energy.

3.1 Production of Coal, lignite, crude petroleum, natural gas, & electricity

Coal production in the country during the year 2010-11 was 533 million tonnes (MTs) as compared to 532 MTs during 2009-10, registering a growth of 0.12% (Table 3.1). The Lignite production during the same period increased by 11%. Considering the trend of production from 1970-71 to 2010-11, it is observed that coal production in India was about 73 MTs during 1970-71, which increased to 533 MTs during 2010-11, with a CAGR of 5%. During the same period the CAGR of Lignite was about 6%, with production increasing from 3.39 MTs in 1970-71 to 37.73 MTs in 2010-11. Production of crude petroleum increased from 6.82 MTs during 1970-71 to 37.71 MTs during 2010-11, a CAGR of about 4%. The CAGRs for natural gas and electricity were 9.14% and 4.04%, respectively. Natural gas has experienced the highest CAGR among all the conventional sources of energy.

For more meaningful comparison in the trends and patterns of growth of different energy resources, it is desirable to convert all the resources to their energy equivalents by applying appropriate conversion factors and express them in energy units (Joules/peta Joules/ Terra joules). The production of energy in peta Joules by primary sources (Table 3.2) shows that Coal and Lignite were the major sources of energy, accounting for about 52% of the total production during 2010-11. Electricity was second (28%), while Natural Gas (11%) was third. The total production of energy from conventional sources increased from 16,889 peta joules during 2009-10 to 17,857 peta joules during 2010-11, showing an increase of 5.73%. Further details of trends in production of Coal & Lignite and trends in production of coal derivatives and coal by-products are presented in Tables 3.3 and 3.4.

3.2 Production of petroleum products

In the year 2010-11, the production of Petroleum Products in the country was 190.36 MTs as against 179.77 MTs during 2009-10, an increase of 5.9% (Table 3.5). Out of the total domestic production of 190.36 MTs of all types of petroleum products, high speed diesel oil accounted for the maximum share (41%), followed by Motor Gasoline (13.73%), Fuel Oil (10.78%), Naphtha (9.2%). Kerosene (4%) and Aviation Turbine Fuel (5%).

Production of Natural Gas increased from 46.51 billion cubic meters (BCM) in 2009-10 to 51.25 BCM in 2010-11 registering a growth of 10.2% and a CAGR of 11.2% from 1970-71 to 2010-11 (Table 3.6).

3.3 Generation of electricity

The all India gross electricity generation from utilities, excluding that from the captive generating plants, was 55,828 Giga Watt-Hours (GWh) during 1970-71.(Table 3.7). It rose to 1,10,844 GWh during 1980-81, to 2,64,329 GWh during 1990-91 and to 8,44,846 GW during 2010-11. The CAGR during the period from 1970-71 to 2010-11, has been an impressive 6.9%. The production of electricity from utilities has

increased from 7,96,281 GWh during 2009-10 to 8,44,846 GWh during 2010-11, registering an annual growth rate of about 6.1%.

Total Electricity generation in the country, from utilities and non-utilities taken together, during 2010-11 was 9,59,070 GWh. Out of this 7,04,323 GWh was generated from thermal and 1,14,257 GWh was from hydro and 26,266 GWh was generated from nuclear sources. Total output from non-utilities was 1,14,224 GWh.

Table 3.1 : Trends in Production of Primary Sources of Conventional Energy in India

Year	Coal (million tonnes)	Lignite (million tonnes)	Crude Petroleum (million tonnes)	Natural Gas (Billion Cubic Metres)	Electricity* Hydro & Nuclear (GWh)
1	2		3	4	5
1970-71	72.95	3.39	6.82	1.45	27,666
1975-76	99.63	3.03	8.45	2.37	35,928
1980-81	113.91	5.11	10.51	2.36	49,543
1985-86	154.30	8.04	30.17	8.13	56,003
1990-91	214.06	14.07	33.02	18.00	77,782
1995-96	273.42	22.15	35.17	22.64	80,561
2000-01	313.70	24.25	32.43	29.48	91,264
2005-06	407.01	30.23	32.19	32.20	118,818
2006-07	430.83	31.29	33.99	31.75	132,304
2007-08	457.08	33.98	34.12	32.42	137,344
2008-09	492.76	32.42	33.51	32.85	142,576
2009-10	532.04	34.07	33.69	47.50	125,316
2010-11(p)	532.69	37.73	37.71	52.22	140,524
Growth rate of 2010-11 over 2009-10(%)	0.12	10.75	11.93	9.95	12.14
CAGR 1970-71 to 2010-11(%)	4.97	6.05	4.26	9.14	4.04

GWh = Giga Watt hour = 10^6 x Kilo Watt hour

* Thermal electricity is not a primary source of energy

- Sources:
1. Ministry of Coal
 2. Ministry of Petroleum & Natural Gas.
 3. Central Electricity Authority.

Table 3.2 : Trends in Production of Energy in India by Primary Sources

(in Peta Joules) @

Year	Coal & Lignite	Crude Petroleum	Natural Gas	Electricity (Hydro & Nuclear) *	Total
1	2	3	4	5	6= 2 to 5
1970-71	1,598	286	56	996	2,936
1975-76	2,150	354	91	1,293	3,888
1980-81	2,493	440	91	1,784	4,808
1985-86	3,185	1,263	313	2,016	6,777
1990-91	4,063	1,383	693	2,800	8,939
1995-96	5,264	1,472	872	2,900	10,508
2000-01	5,727	1,358	1,135	3,286	11,506
2005-06	7,009	1,348	1,240	4,277	13,874
2006-07	7,459	1,423	1,223	4,763	14,868
2007-08	7,926	1,429	1,248	4,944	15,547
2008-09	8,476	1,403	1,265	5,133	16,277
2009-10	9,137	1,411	1,830	4,511	16,889
2010-11(p)	9,207	1,579	2,012	5,059	17,857
Growth rate of 2010-11 over 2009-10(%)	0.76	11.93	9.94	12.14	5.73
CAGR 1970-71 to 2010-11(%)	4.36	4.26	9.13	4.04	4.50

* Thermal electricity is not a primary source of energy

@ Conversion factors have been applied to convert production of primary sources of conventional energy into peta joules

- Sources: 1. Office of Coal Controller, Ministry of Coal
 2. Ministry of Petroleum & Natural Gas.
 3. Central Electricity Authority.

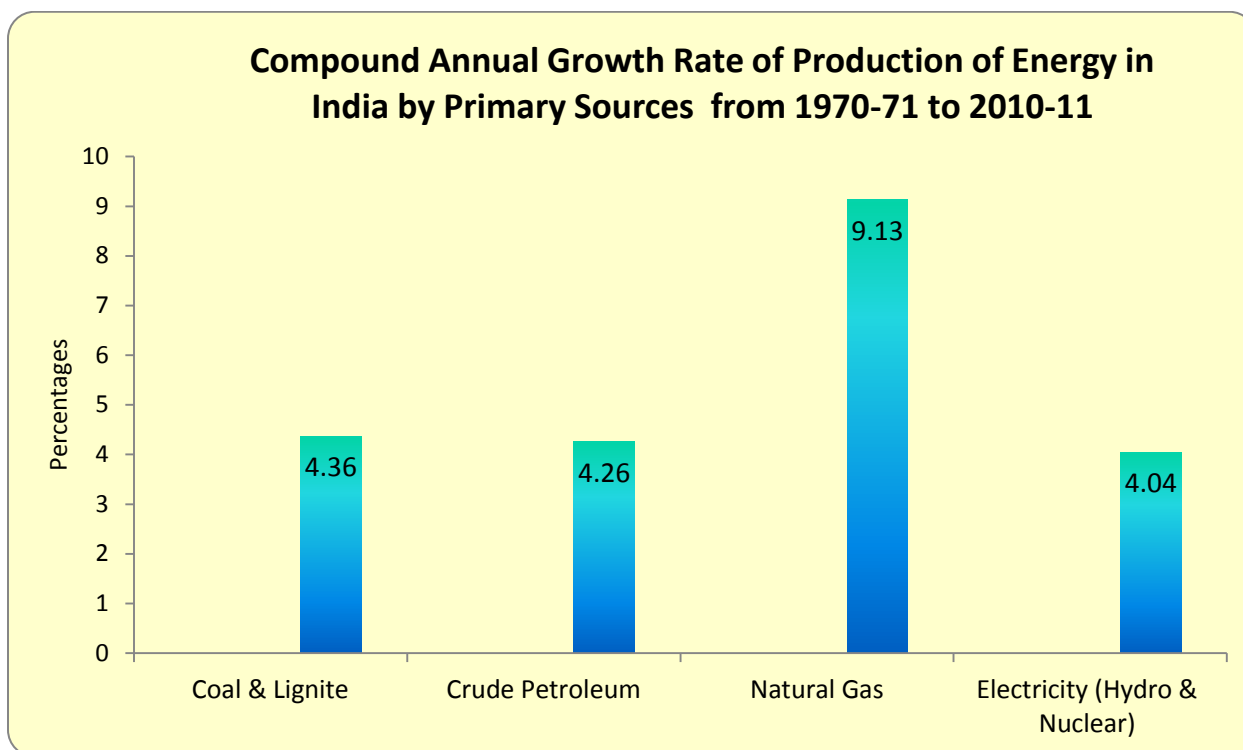


Figure 3.2

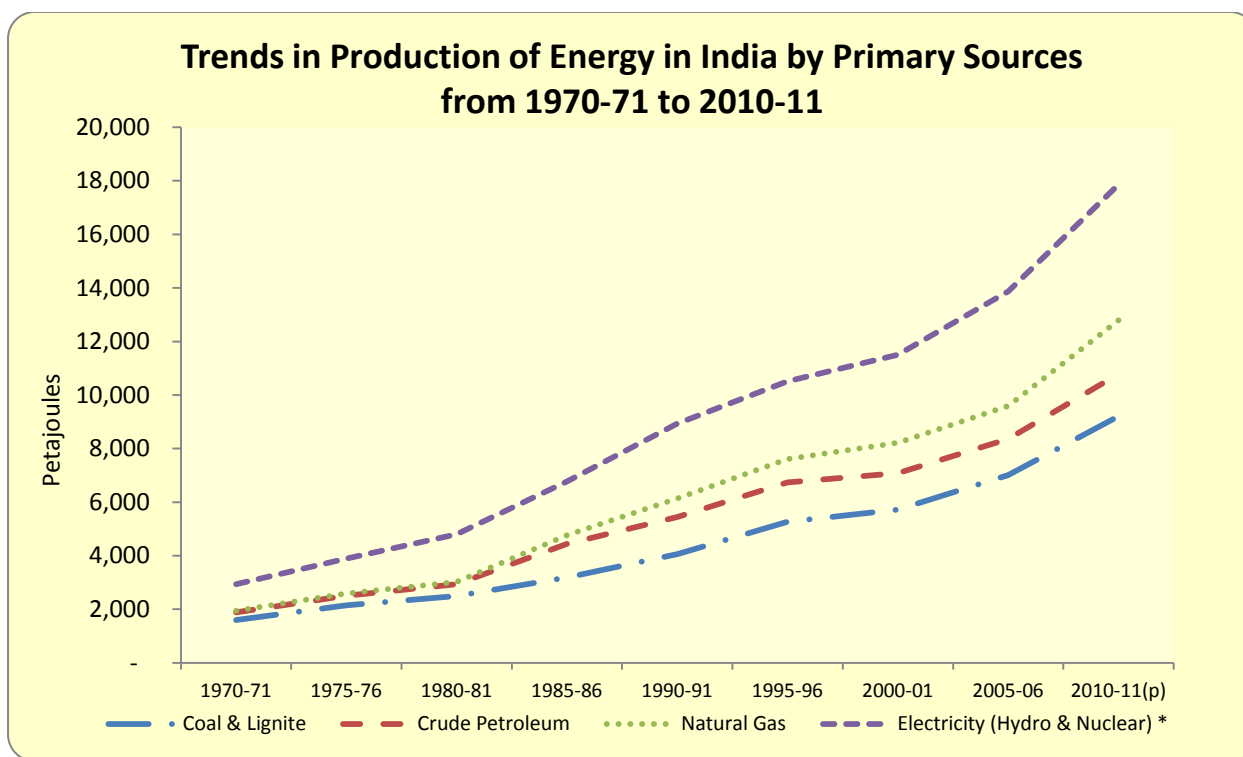


Figure 3.2(A)

Table 3.3 : Trends in Production of Coal and Lignite in India.

(million tonnes)

Year	Coal			Lignite	Grand Total
	Coking	Non-coking	Total		
1	2	3	4=(2)+(3)	5	6=(4)+(5)
1970-71	17.82	55.13	72.95	3.39	76.34
1975-76	30.12	69.51	99.63	3.03	102.66
1980-81	32.62	81.29	113.91	5.11	119.02
1985-86	35.16	119.14	154.30	8.04	162.34
1990-91	44.77	169.29	214.06	14.07	228.13
1995-96	39.91	233.50	273.42	22.15	295.56
2000-01	30.90	282.80	313.70	22.95	336.64
2005-06	31.51	375.50	407.01	30.07	437.08
2006-07	32.10	398.74	430.83	31.29	462.12
2007-08	34.46	422.63	457.08	33.98	491.06
2008-09	34.81	457.95	492.76	32.42	525.18
2009-10	44.26	487.81	532.06	34.07	566.13
2010-11(p)	49.55	483.15	532.69	37.73	570.43
Growth rate of 2010-11 over 2009-10(%)	11.96	-0.96	0.12	10.75	0.76
CAGR 1970-71 to 2010-11(%)	2.53	5.44	4.97	6.05	5.03

Source : Ministry of Coal, Office of Coal Controller

Table 3.4 : Trends in Production of Coal Derivatives and Coal by-products in India.

(million tonnes)

Year	Soft Coke*	Hard Coke			Washed Coke**	Grand Total
		Beehive*	By-products	Total		
1	2	3	4	5	6	7=(2)+(5)+(6)
1970-71	2.71	0.93	9.15	10.07	7.64	20.43
1975-76	2.74	0.93	10.07	11.00	11.38	25.13
1980-81	2.26	0.60	10.67	11.26	11.57	25.10
1985-86	1.71	0.33	10.53	10.86	11.86	24.43
1990-91	0.91	0.15	11.48	11.63	11.42	23.96
1995-96	0.17	0.06	12.80	12.86	11.92	24.94
2000-01	-	-	11.70	11.70	8.64	20.34
2005-06	-	-	13.35	13.35	8.38	21.73
2006-07	-	-	12.57	12.57	7.03	19.59
2007-08	-	-	12.54	12.54	7.17	19.71
2008-09	-	-	13.68	13.68	7.18	20.86
2009-10	-	-	12.66	12.66	-	12.66
2010-11(p)	-	-	10.84	10.84	-	10.84
Growth rate of 2010-11 over 2009-10(%)	*	*	-14.40	-14.40	*	-14.38
CAGR 1970-71 to 2010-11(%)	*	*	0.41	0.18	*	-1.53

* No Production after 1999-2000

** No Production after 2008-09

Source : Office of the Coal Controller, Ministry of Coal

Table 3.5 : Trends in Domestic Production of Petroleum Products In India

(million tonnes)

Year	Light distillates			Middle distillates			
	Liquified Petroleum Gas @	Motor Gasoline	Naphtha\$	Kerosene	Aviation Turbine Fuel	High Speed Diesel Oil	Light Diesel Oil
1	2	3	4	5	6	7	8
1970-71	0.17	1.53	1.21	2.90	0.71	3.84	0.99
1975-76	0.33	1.28	1.91	2.44	0.93	6.29	0.95
1980-81	0.37	1.52	2.12	2.40	1.00	7.37	1.11
1985-86	0.87	2.31	4.96	4.03	1.52	14.62	1.18
1990-91	1.22	3.55	4.86	5.47	1.80	17.19	1.51
1995-96	1.54	4.46	5.98	5.27	2.13	20.66	1.35
2000-01	4.09	8.07	9.91	8.71	2.51	39.05	1.48
2005-06	5.53	10.50	14.51	9.08	6.20	47.57	0.92
2006-07	6.32	12.54	16.66	8.49	7.81	53.47	0.80
2007-08	6.73	14.17	16.44	7.79	9.11	58.36	0.67
2008-09	7.00	16.02	14.83	8.22	8.07	62.89	0.61
2009-10	8.09	22.54	17.11	8.55	9.30	73.28	0.47
2010-11(p)	7.54	26.14	17.53	7.70	9.57	78.05	0.58
Growth rate of 2010-11 over 2009-10(%)	-6.83	15.96	2.49	-9.87	2.95	6.51	22.46
CAGR 1970-71 to 2010-11(%)	9.71	7.17	6.75	2.41	6.55	7.62	-1.29

(p) : Provisional

\$: includes other Light distillates from 2005-06

@: Excludes LPG production from natural gas.

*: Estimated from calendar year figures.

Source : Ministry of Petroleum & Natural Gas.

Table 3.5 (Contd.): Trends in Domestic Production of Petroleum Products in India

(million tonnes)

Year	Heavy ends				Others*	Total
	Fuel oil	Lubricants	Petroleum Coke	Bitumen		
1	9	10	11	12	13	14= 2 to 13
1970-71	4.09	0.23	0.15	0.81	0.50	17.11
1975-76	5.08	0.34	0.16	0.70	0.44	20.83
1980-81	6.12	0.43	0.09	1.08	0.53	24.12
1985-86	7.96	0.50	0.19	1.11	0.65	39.88
1990-91	9.43	0.56	0.23	1.60	1.14	48.56
1995-96	9.58	0.63	0.26	2.03	1.20	55.08
2000-01	11.39	0.68	2.47	2.72	4.52	95.61
2005-06	14.31	0.68	3.18	3.58	3.71	119.75
2006-07	15.70	0.83	3.78	3.89	4.99	135.26
2007-08	15.81	0.88	4.13	4.51	6.34	144.93
2008-09	17.68	0.87	4.71	4.24	5.37	150.52
2009-10	18.35	0.95	4.89	3.71	12.55	179.77
2010-11(p)	20.52	0.74	4.48	2.63	14.89	190.36
Growth rate of 2010-11 over 2009-10(%)	11.84	-22.42	-8.41	-29.04	18.68	5.89
CAGR 1970-71 to 2010-11(%)	4.01	2.87	8.62	2.93	8.62	6.05

* : Includes those of light & middle distillates and heavy ends.

Source : Ministry of Petroleum & Natural Gas.

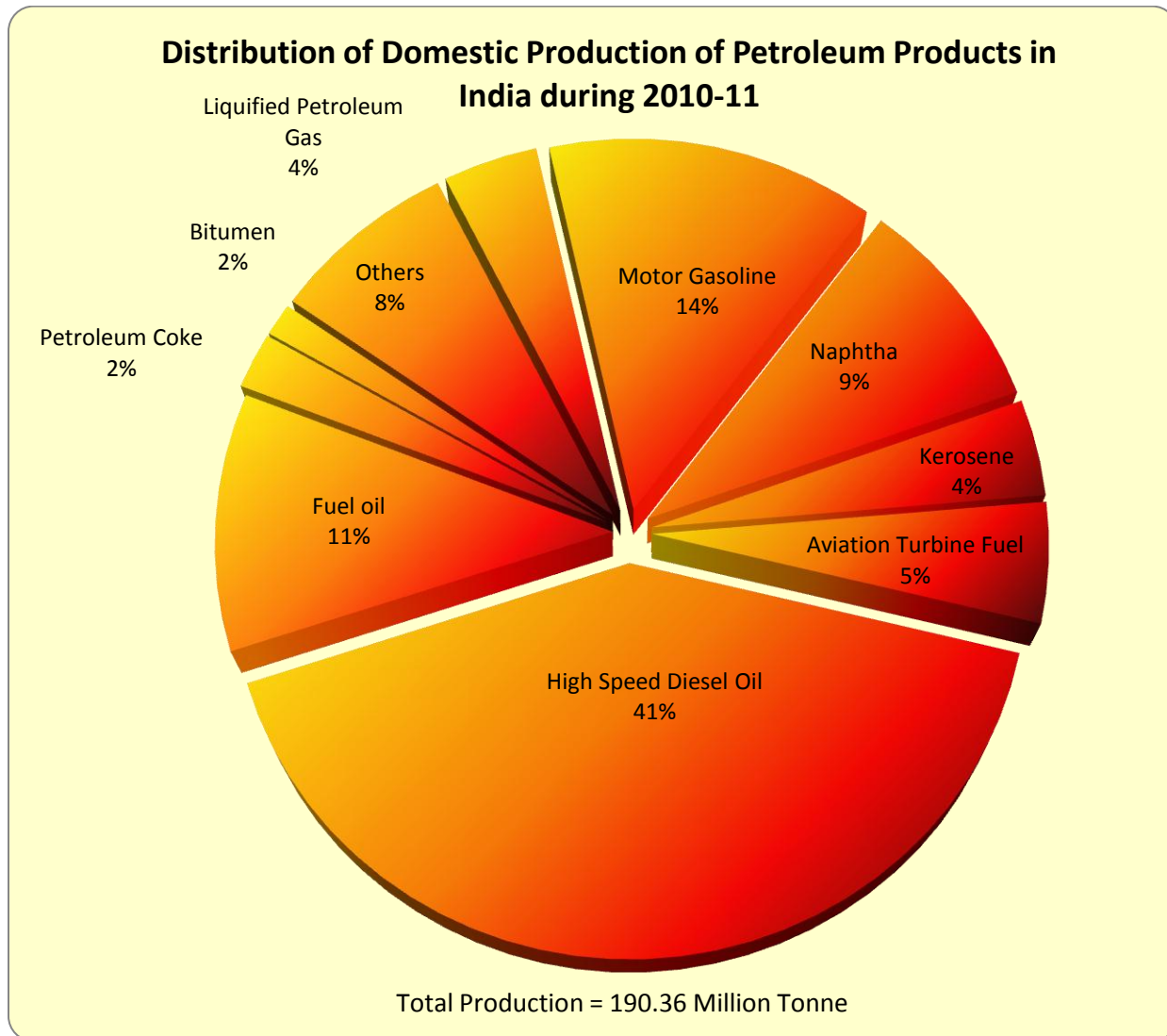


Figure 3.5

Table 3.6 : Trends in Gross and Net Production of Natural Gas in India

(Billion Cubic Metres)

Year	Gross Production	Reinjected	Flared	Net Production
1	2	3	4	5=2-3-4
1970-71	1.45	0.04	0.76	0.65
1975-76	2.37	0.16	1.08	1.12
1980-81	2.36	0.07	0.77	1.52
1985-86	8.13	0.07	3.12	4.95
1990-91	18.00	0.10	5.13	12.77
1995-96	22.64	0.00	1.71	20.93
2000-01	29.48	0.00	1.62	27.86
2005-06	32.20	0.00	0.88	31.33
2006-07	31.75	0.00	0.96	30.79
2007-08	32.42	0.00	0.94	31.48
2008-09	32.85	0.00	1.10	31.75
2009-10(p)	47.50	0.00	0.99	46.51
201-11(p)	52.22	0.00	0.97	51.25
Growth rate of 2010-11 over 2009-10(%)	9.95	-	-2.22	10.21
CAGR 1970-71 to 2010-11(%)	9.14	-	0.59	11.25

(P) : Provisional

Source : Ministry of Petroleum & Natural Gas.

Table 3.7 : Trends in Gross Generation of Electricity in Utilities and Non-utilities in India

(Giga Watt hour) = (10⁶ x Kilo Watt hour)

Year	Utilities				Non-utilities			Grand Total
	Thermal *	Hydro	Nuclear	Total	Railways	Others	Total	
1	2	3	4	5 = 2 to 4	6	7	8=6+7	9=5+8
1970-71	28,162	25,248	2,418	55,828	37	5,347	5,384	61,212
1975-76	43,303	33,302	2,626	79,231	38	6,657	6,695	85,926
1980-81	61,301	46,542	3,001	110,844	42	8,374	8,416	119,260
1985-86	114,347	51,021	4,982	170,350	43	12,997	13,040	183,390
1990-91	186,547	71,641	6,141	264,329	29	25,082	25,111	289,440
1995-96	299,316	72,579	7,982	379,877	24	38,142	38,166	418,043
2000-01	409,940	74,362	16,902	501,204	-	59,638	59,638	560,842
2005-06	505,001	101,494	17,324	623,819	-	73,640	73,640	697,459
2006-07	538,350	113,502	18,802	670,654	-	81,800	81,800	752,454
2007-08	585,282	120,387	16,957	722,626	-	90,477	90,477	813,102
2008-09	617,832	113,081	14,713	745,626	-	95,905	95,905	842,531
2009-10	670,965	106,680	18,636	796,281	-	109,693	109,693	905,974
2010-11(p)	704,323	114,257	26,266	844,846	-	114,224	114,224	959,070
Growth rate of 2010-11 over 2009-10(%)	4.97	7.10	40.94	6.10	-	4.13	4.13	5.86
CAGR 1970-71 to 2010-11(%)	8.17	3.75	5.99	6.85	-	7.75	7.74	6.94

* From 1995-96 onwards, Thermal includes Renewable Energy Sources also.

Source : Central Electricity Authority.

Chapter 4: Foreign Trade in Conventional sources of Energy

4.1 Import and export of coal

Coal is the most abundant conventional source of energy in the country. However, the average quality of the Indian coal is not very high compared to those available in Australia or Canada. Further, the coal washing capacity in the country has not increased sufficiently, due to various reasons, to generate the required quantity of washed coal for consumption, particularly in steel plants. This necessitates the import of high quality coal to meet the requirements of steel plants. There has been an increasing trend in the import of coal. This is evident from the fact that the gross import of coal has steadily increased from 20.93 MTs during 2000-01 to 73.26 MTs during 2009-10 (Table 4.1). During the said period, the quantum of coal exported increased from 1.29 MTs during 2000-01 to 2.45 MTs during 2009-10. However, there was a decline of 5.92% in gross import and 8.89% in net imports of coal in 2010-11 over the previous year. Exports increased by about 80% during the same period.

4.2 Crude oil and petroleum products

India is highly dependent on import of crude oil. Oil import has been steadily rising over the years. There is hardly any export of crude oil from India. Therefore, both gross and net imports of crude oil have increased from 11.68 MTs during 1970-71 to 163.59 MTs during 2010-11. There has been an annual increase of 2.72% during 2010-11 over 2009-10, as the net import increased from 159.26 MTs to 163.59 MTs (Table 4.1).

Although more than 70% of its crude oil requirements and part of the petroleum products is met from imports, India has developed sufficient processing capacity over the years to produce different petroleum products so as to become a net exporter of petroleum products. The export of petroleum product has increased from a mere 0.33 MT during 1970-71, to 8.37 MTs during 2000-01 and to 40.78 MTs during 2007-08. However, during 2010-11, exports stood at 59.13 MTs, recording an increase of 16% from previous year (Table 4.1). The import of petroleum products has increased from only 1.08 MT in 1970-71 to 17.34 MT during 2010-11, although there are some fluctuations in the trend over the above period. (Table 4.1).

Table 4.1: Trends of Foreign Trade in Coal, Crude Oil and Petroleum Products in India

('Million Tonnes)

Year	Coal			Crude Oil			Petroleum Products		
	Gross Imports	Exports	Net Imports	Gross Imports	Exports	Net Imports	Gross Imports	Exports	Net Imports
1	2	3	4=(2)-(3)	5	6	7=(5)-(6)	8	9	10=(8)-(9)
1970-71	0.00	0.47	-0.47	11.68	0.00	11.68	1.08	0.33	0.75
1975-76	0.00	0.44	-0.44	13.62	0.00	13.62	2.22	0.17	2.05
1980-81	0.55	0.11	0.44	16.25	0.00	16.25	7.29	0.04	7.25
1985-86	2.03	0.21	1.82	15.14	0.53	14.62	3.87	1.96	1.90
1990-91	4.90	0.10	4.80	20.70	0.00	20.70	8.66	2.65	6.01
1995-96	8.87	0.09	8.78	27.34	0.00	27.34	20.34	3.44	16.90
2000-01	20.93	1.29	19.64	74.10	0.00	74.10	9.27	8.37	0.90
2005-06	38.59	1.99	36.60	99.41	0.00	99.41	13.44	23.46	-10.02
2006-07	43.08	1.55	41.53	111.50	0.00	111.50	17.76	33.62	-15.86
2007-08	49.79	1.63	48.17	121.67	0.00	121.67	22.46	40.78	-18.32
2008-09	59.00	2.17	56.83	132.78	0.00	132.78	18.52	38.90	-20.38
2009-10	73.26	2.45	70.80	159.26	0.00	159.26	14.66	50.97	-36.31
2010-11(p)	68.92	4.41	64.51	163.59	0.00	163.59	17.34	59.13	-41.80
Growth rate of 2010-11 over 2009-10(%)	-5.92	79.67	-8.89	2.72	-	2.72	18.24	16.01	15.10

(p): Provisional.

Note: Figures in brackets are in negative.

Sources: 1. Office of Coal Controller, Ministry of Coal
2. Ministry of Petroleum & Natural Gas.

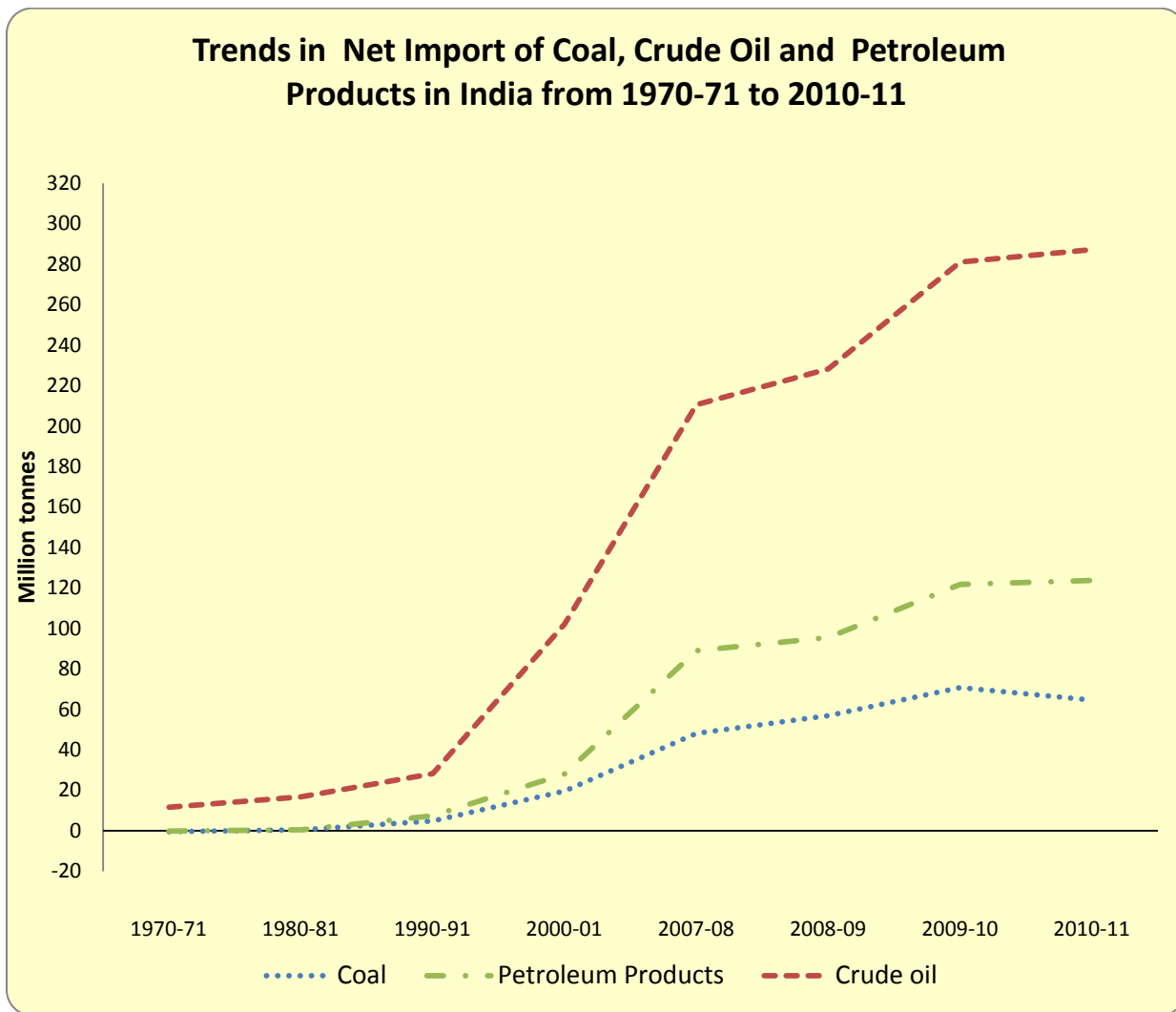


Figure 4.1

5. Availability

5.1 Availability of coal and lignite

The total availability of raw coal in India during 2010-11 stood at 589.87 MTs and that of lignite at 37.73 MTs (Table 5.1). The availability of coal in the year 2010-11 increased by 0.78% compared to 2009-10, the availability of lignite also increased by 9.65% during the same period. The availability of coal has increased at a CAGR of about 5.3% during the period from 1970-71 to 2010-11. This increased availability might be attributed to the secular increase in the coal production (72.95MTs during 1970-71 to 532.69 MTs during 2010-11) supplemented by imports.(Table 5.2).

The availability of lignite during 2010-11 increased by 11.72% compared to 2009-10.(Table 5.3). The availability of lignite has increased at a CAGR of about 1.18% during the period from 1998-99 to 2010-11.

5.2 Availability of Natural Gas

The availability of natural gas has steadily increased from a mere 0.65 BCMs during 1970-71 to 51.25 BCMs during 2010-11, registering a CAGR of 11.25%. Most of this increase in the indigenous production is due to discovery of new reserves. (Table 5.1)

5.3 Availability of Electricity

Since thermal electricity is not a primary source of energy, being produced either from coal or natural gas in India, electricity availability is considered only for that electricity which is generated from Hydro and Nuclear sources. Without taking into account the transmission and distribution losses, the total availability is equal to the total generation, and this figure increased from 27,666 GWh during 1970-71 to 1,40,524 GWh during 2010-11, registering a CAGR of 4% over the period (Table 5.1).

5.4 Availability of Crude Oil and Petroleum Products

The availability of crude oil in the country increased from 18.51MTs during 1970-71 to 106.52 MTs during 2000-01 and then to 201.31 MTs during 2010-11 (Table 5.4). During this period crude oil production increased from 6.82MTs to 37.71 MTs and the net import increased from 11.68 MTs to 163.59 MTs. There was 4.33% increase in availability of crude oil during 2010-11 over 2009-10.

Table 5.1 : Trends in Availability of Primary Sources of Conventional Energy in India

Year	Coal (Million Tonnes)	Lignite (Million Tonnes)	Crude Petroleum (Million Tonnes)	Natural Gas (Billion Cubic Metres)	Electricity Hydro & Nuclear (GWh)*
1	2		3	4	5
1970-71	71.24	-	18.51	0.65	27,666
1975-76	92.17	-	22.07	1.12	35,928
1980-81	109.32	-	26.76	1.52	49,543
1985-86	155.54	-	44.78	4.95	56,003
1990-91	214.99	-	53.72	12.77	77,782
1995-96	284.04	-	62.51	20.93	80,561
2000-01	325.45	24.59	103.44	27.86	91,264
2005-06	432.27	30.24	130.11	31.33	118,818
2006-07	462.35	30.81	146.55	30.79	132,304
2007-08	502.82	34.65	156.10	31.48	137,344
2008-09	549.57	31.85	160.77	31.75	142,576
2009-10	585.30	34.41	192.77	46.51	125,316
2010-11(p)	589.87	37.73	206.15	51.25	140,524
Growth rate of 2010-11 over 2009-10(%)	0.78	9.65	6.94	10.21	12.14
CAGR 1970-71 to 2010-11(%)	5.29	-	6.06	11.25	4.04

(p) - Provisional

GWh = Giga Watt hour = 10^6 x Kilo Watt hour

* Thermal electricity is not a primary source of energy

Sources: 1. Office of Coal Controller, Ministry of Coal
2. Ministry of Petroleum & Natural Gas.
3. Central Electricity Authority.

Table 5.2 : Trends in Availability of Raw Coal for Consumption in India

(Million tonnes)						
Year	Production (Coking + Non-coking)	Changes in Stock at Pit-heads (Closing - Opening)	Change in Industrial Stock	Imports	Exports	Availability for Consumption
1	2	3	4	5	6	7=2-3+4+5-6
1970-71	72.95	2.48	1.24	0.00	0.47	71.24
1975-76	99.63	4.28	-2.74	0.00	0.44	92.17
1980-81	113.91	4.25	-0.78	0.55	0.11	109.32
1985-86	154.30	-1.25	-1.83	2.03	0.21	155.54
1990-91	214.06	4.83	0.96	4.90	0.10	214.99
1995-96	273.42	-1.85	-	8.87	0.09	284.04
2000-01	313.70	7.89	-	20.93	1.29	325.45
2005-06	407.01	10.28	-	36.87	1.33	432.27
2006-07	430.83	10.01	-	43.08	1.55	462.35
2007-08	457.08	34.65	-	49.79	1.63	502.82
2008-09	492.76	0.54	-	59.00	1.66	549.57
2009-10	532.04	17.55	-	73.26	2.45	585.30
2010-11(p)	532.69	7.33	-	68.92	4.41	589.87
Growth rate of 2010-11 over 2009-10(%)	0.12	-58.23	-	-5.92	79.67	0.78

Source : Office of the Coal Controller, Ministry of Coal

Table 5.3 : Trends in Availability of Lignite for Consumption in India

(Million tonnes)

Year	Production	Changes in Stock at Pit-heads (Closing - Opening)	Change in Industrial Stock	Imports	Exports	Availability for Consumption
1	2	3	4	5	6	7=2-3+4+5-6
1998-99	23.42	0.14	-	-	-	23.28
1999-00	22.48	0.44	-	-	-	22.03
2000-01	24.25	-0.34	-	-	-	24.59
2001-02	24.81	0.00	-	-	-	24.81
2002-03	26.02	-0.01	-	-	-	26.03
2003-04	27.96	-0.52	-	-	-	28.48
2004-05	30.41	0.32	-	-	-	30.09
2005-06	30.23	-0.01	-	-	-	30.24
2006-07	31.29	0.48	-	-	-	30.81
2007-08	33.98	-0.67	-	-	-	34.65
2008-09	32.42	0.57	-	-	-	31.85
2009-10	34.07	0.34	-	-	-	33.73
2010-11(p)	37.73	0.05	-	-	-	37.69
Growth rate of 2010-11 over 2009-10(%)	10.75	-86.69	-	-	-	11.72
CAGR 1970-71 to 2010-11(%)	1.17	-2.80	-	-	-	1.18

Source : Office of the Coal Controller, Ministry of Coal

Table 5.4 : Trends in Availability of Crude Oil and Petroleum Products in India

(Million tonnes)

Year	Crude Oil			Petroleum Products		
	Production	Net Imports	Gross Availability	Production @	Net Imports	Gross Availability
1	2	3	4=2+3	5	6	7=5+6
1970-71	6.82	11.68	18.51	17.11	0.75	17.86
1975-76	8.45	13.62	22.07	20.83	2.05	22.88
1980-81	10.51	16.25	26.76	24.12	7.25	31.38
1985-86	30.17	14.62	44.78	39.88	1.90	41.78
1990-91	33.02	20.70	53.72	48.56	6.01	54.57
1995-96	35.17	27.34	62.51	55.08	16.90	71.98
2000-01	32.43	74.10	106.52	95.61	0.90	96.52
2005-06	32.19	99.41	131.60	119.75	-10.02	109.73
2006-07	33.99	111.50	145.49	135.26	-15.96	119.30
2007-08	34.12	121.67	155.79	144.93	-18.32	126.61
2008-09	33.51	132.78	166.28	150.52	-20.38	130.14
2009-10	33.69	159.26	192.95	179.77	-36.31	143.46
201-11(p)	37.71	163.59	201.31	190.36	-41.80	148.57
Growth rate of 2010-11 over 2009-10(%)	11.94	2.72	4.33	5.89	15.10	3.56

.@ Excludes LPG Production from Natural Gas
Source : Ministry of Petroleum & Natural Gas.

Chapter 6: Consumption of Energy Resources

6.1 Consumption of coal and lignite

The estimated total consumption of raw coal by industry has increased from 71.2 MTs during 1970-71 to 592.99 MTs during 2010-11, with a CAGR of 5.3% (Table 6.1). The annual growth rate from 2009-10 to 2010-11 was 0.88%. Consumption of Lignite increased from 3.39 MTs in 1970-71 to 37.69 MTs in 2010-11 registering a compound growth of 6%. Consumption of Lignite is highest in Electricity Generation sector, accounting for about 79% of the total lignite consumption.

Industry-wise estimates of consumption of coal (Table 6.4) shows that during 1970-71 railways were the major consumer of coal (15.58 MTs), followed by steel and washery industries (13.53 MTs), electricity generation (13.21 MT) and cement (3.52 MTs). Gradually railways upgraded their technology and reduced the direct consumption of coal, which declined to an estimated 0.27 MT in 1995-96 and to zero afterwards. From the year 1975-76 electricity generation is the biggest consumer of coal, followed by steel industries. Estimated coal consumption for electricity generation increased from 23 MTs during 1975-76 to 417 MTs during 2010-11. Similarly, the estimated consumption of coal by steel & washery increased from 19 MTs to 44 MTs, a two times increase, during the same period.

6.2 Consumption of Crude Oil and Natural Gas

The estimated consumption of crude oil has a secular increase, from 18.38 MTs during 1970-71 to 206.15 MTs during 2010-11 with CAGR of 6%. It increased from 192.8 MTs in 2009-10 to 206.2 MTs in 2010-11 (Table 6.1).

The estimated consumption of natural gas has shown a remarkable increase, from 0.7 BCM in 1970-71 to 51.3 BCM in 2010-11, with CAGR of 11.25% over the period (Table 6.1). Industry wise off-take of natural gas shows that natural gas has been used both for Energy (69 %) and Non-energy (31%) purposes (Table 6.8) and the maximum use of Natural Gas is in power generation (46%) followed by fertilizers industry (28%) and 11.7% natural gas was used for captive use/LPG shrinkage.

6.3 Consumption of Petroleum Products

High speed diesel oil accounted for 38% of total consumption of all types of petroleum products in 2010-11. This was followed by LPG (9.1%), Petro (9%), Fuel Oil (7%) and refinery fuel (10.1%). Consumption of Light Diesel oil continually decreased from 1970-71 (1.1 MTS) to 2009-10 (0.5 MTS) (Tables 6.6 & 6.7).

Sector-wise consumption of different petroleum products reveals that miscellaneous service sector accounts for the lion's share (80%) of the total consumption of petroleum products. 'Low Sulphur oil' consumption was highest (52%) in industrial sector, (Tables 6.6 & 6.7).

6.4 Consumption of Electricity

The estimated electricity consumption increased from 43,724 GWh during 1970-71 to 6,94,392 GWh during 2010-11, showing a CAGR of 6.98% (Table 6.9). The increase in electricity consumption is 13.34% from 2009-10 (6,12,645 GWh) to 2010-11 (6,94,392 GWh). Of the total electricity sales in 2010-11, industry sector accounted for the largest share (38.6%), followed by domestic (23.8%), agriculture (19.6%) and commercial sector (9.89%). However, it is seen that electricity consumption in domestic sector and agriculture sector has increased at a much faster pace compared to other sectors during 1970-71 to 2010-11, with CAGRs of 9.67% and 8.61% respectively.

Loss of electricity due to transmission has increased from 17.55% during 1970-71 to 32.86% during 2000-01 and declined to 18.04% during 2010-11 (Table 6.10).

6.5 Per-Capita Energy Consumption & Energy Intensity

Per-capita Energy Consumption (PEC) during a year is computed as the ratio of the estimate of total energy consumption during the year to the estimated mid-year population of that year. Energy Intensity is defined as the amount of energy consumed for generating one unit of Gross Domestic Product (At constant prices). PEC and Energy intensity are the most used policy indicators, both at national and international levels. In the absence of data on consumption of non-conventional energy from various sources, particularly in rural areas in the developing countries, including India, these two indicators are generally computed on the basis of consumption of conventional energy.

The estimated PEC has increased from 1204 KWh in 1970-71 to 4816 KWh in 2010-11, a CAGR of 3.44% (Table 6.2). The annual increase in PEC from 2009-10 to 2010-11 was 3.65%. The Energy Intensity (at 1999-2000 prices) increased from 0.128 KWh in 1970-71 to 0.165 KWh in 1985-86, but it has again come down to 0.117 KWh (at 2004-05 prices) in 2010-11.

Like in production of energy, for more meaningful comparison in the trends and patterns of growth of consumption of different energy resources, it is desirable to convert all the resources to their energy equivalents by applying appropriate conversion factors and express them in energy units (Joules/peta Joules/ Terra joules). The consumption of energy in peta Joules by primary sources is given in Table 6.3. It is seen that the major source of energy consumed was Electricity accounting for about 51% of the total consumption during 2010-11. Coal and Lignite were second (25%), while Crude Petroleum (20%) was third. The total consumption of energy from conventional sources increased from 40,354 peta joules during 2009-10 to 42,664 peta joules during 2010-11, showing an increase of 5.73%.

Table 6.1: Trends in Consumption of Conventional Sources of Energy in India

Year	Coal #	Lignite	Crude Oil**	Natural Gas *** (Billion Cubic Metres)	Electricity* (GWh)
	(Million Tonnes)				
1	2	3	4	5	6
1970-71	71.23	3.39	18.38	0.65	43,724
1975-76	92.16	3.03	22.28	1.13	60,246
1980-81	109.31	5.10	25.84	1.52	82,367
1985-86	155.53	7.68	42.91	4.95	123,099
1990-91	213.36	14.20	51.77	12.77	190,357
1995-96	284.04	22.30	58.74	18.09	277,029
2000-01	339.31	24.82	103.44	27.86	316,600
2005-06	433.26	30.34	130.11	31.03	411,887
2006-07	462.32	30.80	146.55	30.79	455,748
2007-08	502.83	34.65	156.10	31.48	500,774
2008-09	549.57	31.75	160.77	31.75	527,564
2009-10	587.81	34.43	192.77	46.51	568,000
2010-11(p)	592.99	37.69	206.15	51.25	607,760
Growth rate of 2010-11 over 2009-10(%)	0.88	9.45	6.94	10.21	7.00
CAGR 1970-71 to 2010-11(%)	5.30	6.05	6.07	11.25	6.63

(p): Provisional

GWh = Giga Watt hour = 10^6 x Kilo Watt hour

* Includes thermal, hydro & nuclear electricity from utilities.

** Crude oil in terms of refinery crude throughput.

*** off take

Does not include Lignite.

Sources: 1. Office of Coal Controller, Ministry of Coal
2. Ministry of Petroleum & Natural Gas.
3. Central Electricity Authority.

Table 6.2 : Trends in Per-Capita Energy Consumption (PEC) and Energy intensity in India

Year	Energy Consumption in billion KWH	Mid year population in '000 numbers	GDP (Rs. crore) (1999-2000 prices)	Per Capita Energy Consumption (KWH)	Energy Intensity (KWH)* per rupee
1970-71	663.99	551311	517148	1204.39	0.1284
1975-76	840.53	617248	596428	1361.74	0.1409
1980-81	1012.58	688320	695361	1471.09	0.1456
1985-86	1477.50	766135	894041	1928.51	0.1653
1990-91	1902.75	852297	1193650	2232.50	0.1594
1995-96	2436.77	939540	1529453	2593.58	0.1593
2000-01	3154.28	1034931	2030710	3047.81	0.1553
2005-06	3909.37	1117734	2844942	3497.59	0.1374
2006-07	4226.78	1134023	3120029	3727.24	0.1355
2007-08	4508.26	1147677	3402716	3928.16	0.1325
2008-09**	4845.25	1161495	4154973	4171.56	0.1166
2009-10	5462.31	1175480	4464081	4646.87	0.1224
2010-11(p)	5693.54	1182105	4877842	4816.44	0.1167
Growth rate of 2010-11 over 2009-10(%)	4.23	0.56	9.27	3.65	-4.61
CAGR 1970-71 to 2010-11(%)	5.38	1.88	5.63	3.44	-0.23

* Estimated value based on sourcewise availability of Coal, Crude Petroleum, Natural Gas and Electricity(Hydro & Nuclear) as given in table 5.1 and by applying fuel specific conversion factors as given in annex II

Energy Intensity=Amount of energy consumed for producing one unit of Gross Domestic Product.

** from 2008-09 GDP estimates are with 2004-05 base year

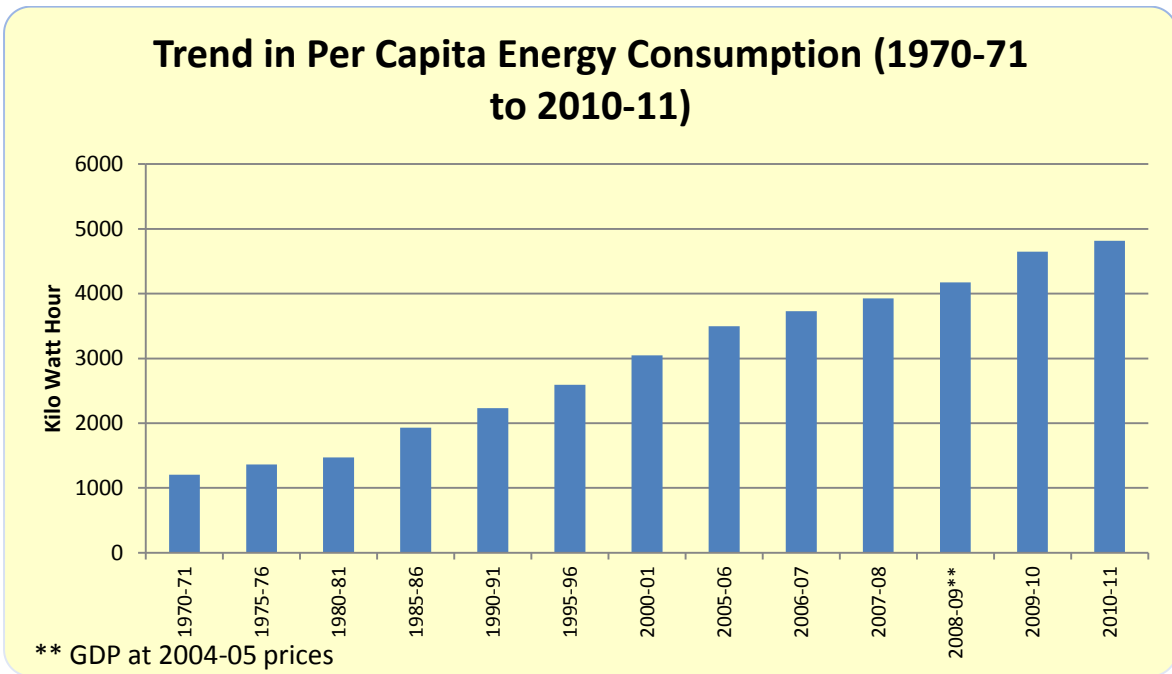


Figure 6.2

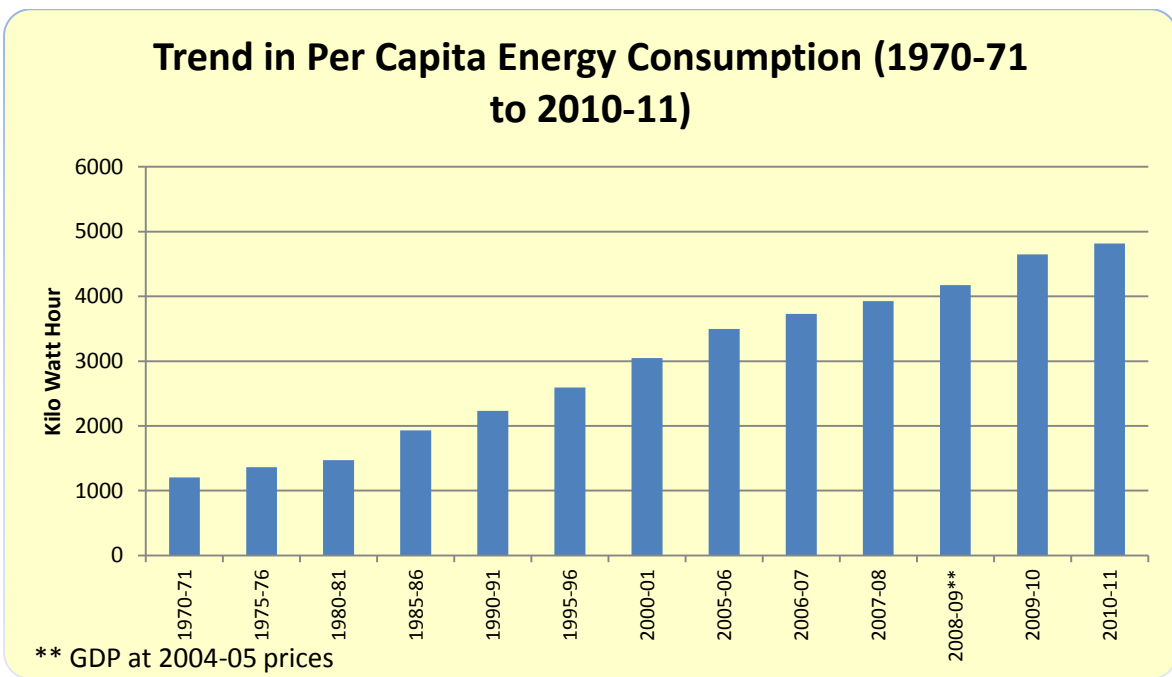


Figure 6.2.1

Table 6.3 : Trends in Consumption of Conventional Energy in India (Peta Joules)

(in Peta Joules) @

Year	Coal & Lignite	Crude Petroleum **	Natural Gas	Electricity *	Total
1	2	3	4	5	6= 2 to 5
1970-71	1,491	770	25	1,574	3,859
1975-76	1,929	933	43	2,169	5,074
1980-81	2,288	1,082	59	2,965	6,393
1985-86	3,051	1,797	191	4,432	9,470
1990-91	3,800	2,168	492	6,853	13,312
1995-96	5,059	2,459	697	9,973	18,188
2000-01	5,396	4,331	1,073	11,398	22,198
2005-06	6,828	5,448	1,195	14,828	28,298
2006-07	7,289	6,136	1,208	16,407	31,040
2007-08	8,675	6,536	1,189	18,028	34,428
2008-09	9,383	6,732	1,223	18,992	36,329
2009-10	10,043	8,071	1,791	20,448	40,354
2010-11(p)	10,179	8,632	1,974	21,879	42,664
Growth rate of 2010-11 over 2009-10(%)	1.36	6.94	10.21	7.00	5.73
CAGR 1970-71 to 2010-11(%)	4.80	6.07	11.25	6.63	6.04

* Includes thermal, hydro & nuclear electricity from utilities.

** Crude oil in terms of refinery crude throughput.

Sources:

1. Office of Coal Controller, Ministry of Coal
2. Ministry of Petroleum & Natural Gas.
3. Central Electricity Authority.

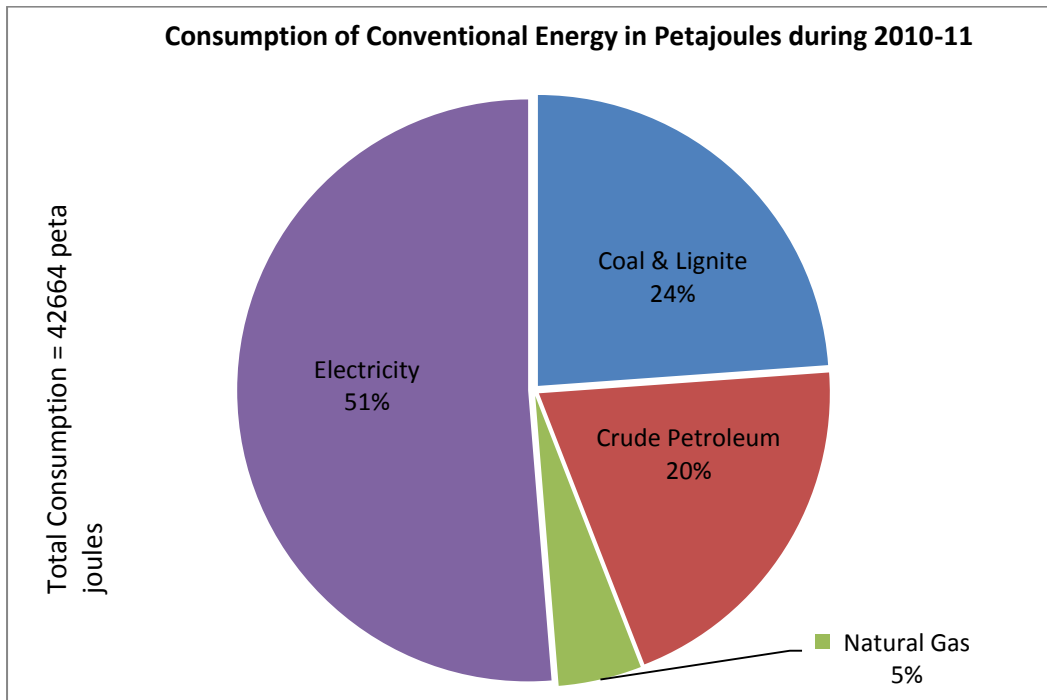


Figure 6.3

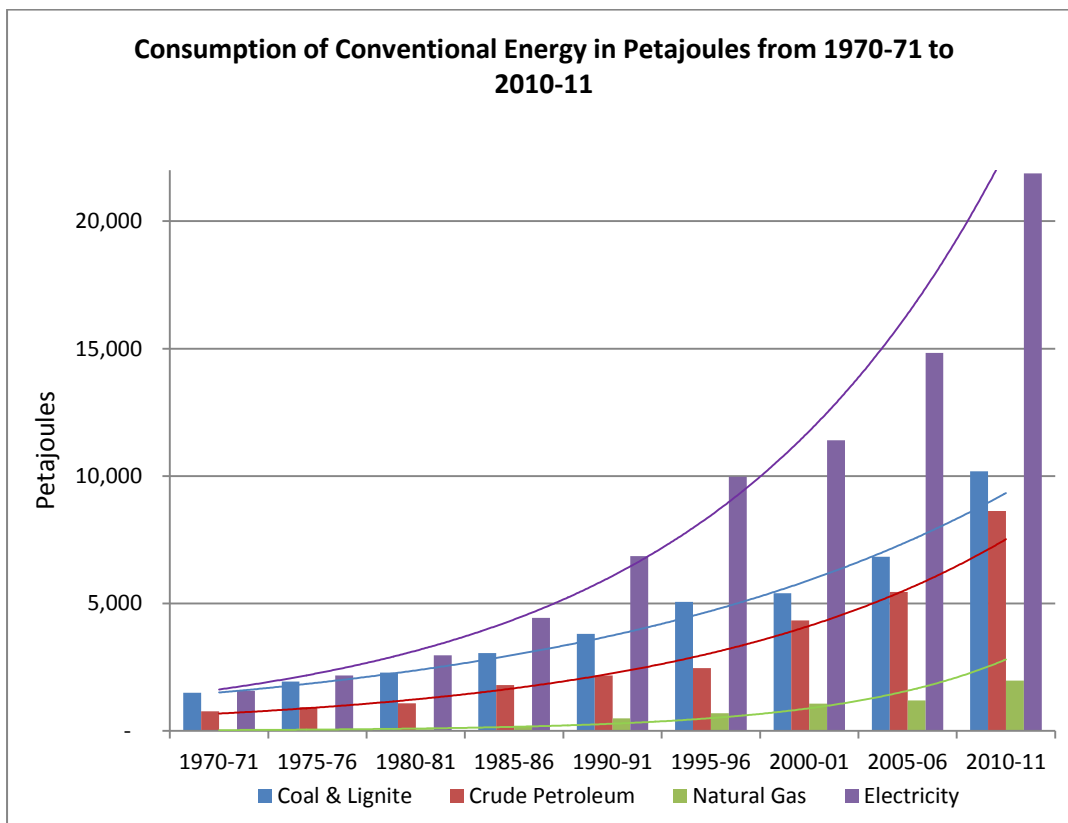


Figure 6.3(A)

Table 6.4 : Trends in Industrywise Consumption of Raw Coal in India

(Million tonnes)

Year	Electricity	Steel & Washery	Cement	Railways	Paper	Cotton @	Others *	Total
1	2	3	4	5	6	7	8	9=2 to 8
1970-71	13.21	13.53	3.52	15.58	0.27	1.45	23.67	71.23
1975-76	23.04	18.88	4.44	14.30	1.26	2.23	28.01	92.16
1980-81	38.15	21.01	4.75	11.81	2.14	1.97	29.48	109.31
1985-86	68.64	24.82	8.04	9.61	2.66	2.36	39.40	155.53
1990-91	113.71	30.91	10.43	5.24	2.81	2.58	47.68	213.36
1995-96	184.49	39.08	11.06	0.27	3.22	1.18	44.73	284.04
2000-01	252.94	30.73	15.33	0.00	2.71	1.04	36.56	339.31
2005-06	316.49	32.42	18.08	0.00	2.77	0.29	63.21	433.26
2006-07	331.58	34.90	19.67	0.00	2.50	0.30	73.25	462.32
2007-08	360.74	39.02	21.35	0.00	2.64	0.37	78.55	502.66
2008-09	381.06	38.85	19.85	0.00	2.16	0.21	105.24	547.37
2009-10	419.28	49.07	21.61	0.00	2.34	0.27	95.24	587.81
2010-11(p)	417.07	43.93	15.93	0.00	2.43	0.28	113.35	592.99
Growth rate of 2010-11 over 2009-10(%)	-0.53	-10.47	-26.29	-	4.15	1.10	19.01	0.88
CAGR 1970-71 to 2010-11(%)	8.78	2.91	3.75	-	5.51	-3.97	3.89	5.30

* Includes jute, bricks, coal for soft coke, colliery, fertilisers & other industries consumption.

@ From 1996-97 and onwards Cotton includes 'Rayon' also.

Source : Office of the Coal Controller, Ministry of Coal

Table 6.5 : Trends in Industrywise Consumption of Lignite in India

(Million tonnes)

Year	Electricity	Steel & Washery	Cement	Railways	Paper	Cotton @	Others *	Total#
1	2	3	4	5	6	7	8	9=2 to 8
1970-71	-	-	-	-	-	-	-	3.39
1975-76	-	-	-	-	-	-	-	3.03
1980-81	-	-	-	-	-	-	-	5.10
1985-86	-	-	-	-	-	-	-	7.68
1990-91	-	-	-	-	-	-	-	14.20
1995-96	-	-	-	-	-	-	-	22.30
2000-01	19.76	-	0.09	-	0.16	1.40	3.41	24.82
2005-06	23.36	-	0.79	-	0.23	1.11	4.86	30.34
2006-07	23.92	-	0.77	-	0.22	0.84	5.06	30.80
2007-08	26.76	-	0.96	-	0.35	0.77	5.83	34.66
2008-09	25.71	-	0.34	-	0.36	-	6.01	32.42
2009-10	28.14	-	0.38	-	1.82	-	4.09	34.43
2010-11(p)	29.90	-	0.36	-	-	1.18	6.25	37.69
Growth rate of 2010-11 over 2009-10(%)	6.24	-	6.24	-	-	-	52.81	9.45

* Includes jute, bricks, coal for soft coke, colliery, chemicals, fertilisers & other industries consumption.

And from 2008-09 onwards cotton is included in others.

@ From 1996-97 and onwards Cotton includes 'Rayon' also.

Note: Industrywise breakup of consumption for the period 1970-71 to 1999-2000 are not readily available, hence estimated by production data as it is observed, approximately for lignite, production= despatch= consumption.

Source : Office of the Coal Controller, Ministry of Coal

Table 6.6 : Trends in Consumption of Petroleum Products in India

(Million Tonnes)

Year	Light Distillates			Middle Distillates			
	LPG	Petrol	Naphtha	Kerosene	ATF	HSDO	LDO
1	2	3	4	5	6	7	8
1970-71	0.18	1.45	0.90	3.28	0.69	3.84	1.09
1975-76	0.34	1.28	1.84	3.10	0.90	6.60	0.88
1980-81	0.41	1.52	2.33	4.23	1.13	10.35	1.12
1985-86	1.24	2.28	3.11	6.23	1.45	14.89	1.12
1990-91	2.42	3.55	3.45	8.42	1.68	21.14	1.51
1995-96	3.92	4.68	4.15	9.93	2.08	32.26	1.31
2000-01	7.02	6.61	11.67	11.31	2.25	37.96	1.40
2005-06	10.46	8.65	12.19	9.54	3.30	40.19	0.88
2006-07	10.85	9.29	13.89	9.51	3.98	42.90	0.72
2007-08	12.17	10.33	13.29	9.37	4.54	47.67	0.67
2008-09	12.19	11.26	13.88	9.30	4.46	51.67	0.55
2009-10	13.12	12.82	10.24	9.30	4.63	56.32	0.46
2010-11(P)	14.33	14.19	10.69	8.93	5.08	59.99	0.46
Growth rate of 2010-11 over 2009-10(%)	9.20	10.72	4.41	-4.04	9.77	6.52	-0.44
CAGR 1970-71 to 2010-11(%)	11.33	5.72	6.21	2.47	4.99	6.94	-2.11

(p) : Provisional

Contd...

Table 6.6 (Contd.) : Trends in Consumption of Petroleum Products in India

Year	Heavy Ends				(Million' Tonnes)		
	Fuel Oils	Lubricants	Bitumen	Petroleum Coke	Refinery Fuel	Others*	Total
	9	10	11	12	13	14	15=2 to 14
1970-71	4.66	0.55	0.78	0.11	1.22	0.39	19.14
1975-76	5.78	0.44	0.69	0.15	1.23	0.46	23.67
1980-81	7.47	0.59	1.06	0.14	1.37	0.56	32.26
1985-86	7.90	0.70	1.13	0.16	2.49	0.67	43.36
1990-91	8.99	0.89	1.58	0.29	2.71	1.14	57.75
1995-96	11.16	0.96	2.01	0.32	3.24	2.05	78.07
2000-01	12.65	1.12	2.77	0.45	6.90	4.87	106.97
2005-06	12.83	2.08	3.51	4.93	9.14	4.66	122.35
2006-07	12.62	1.90	3.83	5.44	10.92	5.83	131.67
2007-08	12.72	2.29	4.51	5.95	11.75	5.45	140.70
2008-09	12.44	2.15	4.71	5.87	11.91	4.94	145.31
2009-10	11.59	2.66	4.92	6.75	11.61	5.40	149.80
2010-11(p)	10.88	2.51	4.57	5.49	15.87	4.68	157.66
Growth rate of 2010-11 over 2009-10(%)	-6.14	-5.61	-7.18	-18.71	36.75	-13.20	5.24
CAGR 1970-71 to 2010-11(%)	2.09	3.79	4.41	10.08	6.45	6.28	5.28

(p) : Provisional

* : Includes those of light & middle distillates and heavy ends and sales through private parties.

Source: Ministry of Petroleum & Natural Gas.

Table 6.7 : Sector-wise (end use) Consumption of Selected Petroleum Products in India

('000 tonnes)

Petroleum Product	Year	Transport	Plantation	Power Generation	Industry	Misc. Services	Private Sales	Total
1	2	3	4	5	6	7	8	9=3 to 8
High Speed Diesel Oil	2001-02	4,161	572	300	1,839	29,645	31	36,548
	2002-03	4,054	262	253	1,686	30,279	110	36,644
	2003-04	3,838	390	262	1,570	30,814	199	37,073
	2004-05	3,917	411	426	1,562	31,771	1,564	39,651
	2005-06	4,264	431	498	964	30,151	3,884	40,192
	2006-07	4,316	499	433	1,234	34,133	2,279	42,894
	2007-08	5,003	504	313	1,241	40,577	31	47,669
	2008-09	5,292	490	336	1,310	44,221	62	51,711
	2009-10	5,365	594	303	1,502	48,385	94	56,243
	2010-11(p)	5,416	616	166	1,439	52,241	112	59,990
Growth rate of 2010-11 over 2009-10(%)		0.95	3.70	-45.21	-4.19	7.97	19.15	6.66
CAGR 1970-71 to 2010-11(%)		1.66	0.46	-3.63	-1.52	3.60	8.36	3.15

('000 tonnes)

Petroleum Product	Year	Transport	Plantation	Power Generation	Industry	Misc. Services	Private Sales	Total
1	2	3	4	5	6	7	8	9=3 to 8
Light Diesel Oil	2001-02	90	51	165	621	312	390	1629
	2002-03	40	56	173	754	390	650	2063
	2003-04	57	46	147	727	250	438	1665
	2004-05	49	37	88	621	290	391	1476
	2005-06	52	28	65	325	362	49	881
	2006-07	53	13	67	244	343	0	720
	2007-08	35	3	77	200	351	0	666
	2008-09	15	4	175	155	203	0	552
	2009-10	6	3	152	143	154	0	458
	2010-11(p)	5	2	137	127	185	0	456
Growth rate of 2010-11 over 2009-10(%)		-16.67	-33.33	-9.87	-11.25	20.13	-	-0.46
CAGR 1970-71 to 2010-11(%)		-16.53	-18.32	-1.16	-9.44	-3.21	-	-7.65

Contd...

Table 6.7 (Contd.) : Sector-wise (End Use) Consumption of Selected Petroleum Products in India

('000 tonnes)

Petroleum Product	Year	Transport	Plantation	Power Generation	Industry	Misce. Services	Private Sales	Total
1	2	3	4	5	6	7	8	9=3 to 8
Furnace Oil	2001-02	308	322	551	5,057	847	1,366	8,451
	2002-03	263	376	488	4,714	1,100	1,086	8,027
	2003-04	339	252	371	4,364	1,881	1,105	8,312
	2004-05	352	**	314	1,562	5,827	1,099	9,154
	2005-06	478	0	302	1,828	5,613	700	8,921
	2006-07	502	0	254	1,830	5,600	1,071	9,257
	2007-08	315	0	281	1,634	6,401	839	9,470
	2008-09	469	55	749	2,843	4,391	913	9,420
	2009-10	560	68	688	3,134	4,155	499	9,104
	2010-11(p)	780	70	823	2,774	3,986	463	8,896
Growth rate of 2010-11 over 2009-10(%)		39.29	2.94	19.62	-11.49	-4.07	-7.21	-2.28
CAGR 1970-71 to 2010-11(%)		5.98	-9.10	2.54	-3.68	10.16	-	0.32

('000 tonnes)

Petroleum Product	Year	Transport	Plantation	Power Generation	Industry	Misce. Services	Private Sales	Total
1	2	3	4	5	6	7	8	9=3 to 8
Low Sulphur Heavy Stock	2001-02	0	21	1,403	2,735	372	0	4,531
	2002-03	0	44	1,639	2,694	334	0	4,711
	2003-04	0	5	1,569	2,263	796	0	4,633
	2004-05	0	0	1,238	1,453	1,713	0	4,404
	2005-06	0	0	560	1,390	1,957	0	3,907
	2006-07	0	0	298	1,358	1,705	0	3,361
	2007-08	0	0	344	1,304	1,600	0	3,248
	2008-09	0	1	1,347	1,293	526	0	3,167
	2009-10	2	936	0	1,225	321	0	2,484
	2010-11(p)	0	0	469	1,030	482	0	1,981
Growth rate of 2010-11 over 2009-10(%)		-	-	-	-15.92	50.16	-	-20.25
CAGR 1970-71 to 2010-11(%)		-	-	-6.62	-5.92	1.63	-	-5.04

(p) : Provisional, @ : LSHS sales through pvt. parties included in FO sales. Break-up not available.

** : Included in Miscellaneous services. Break-up is not available.

Source: Ministry of Petroleum & Natural Gas.

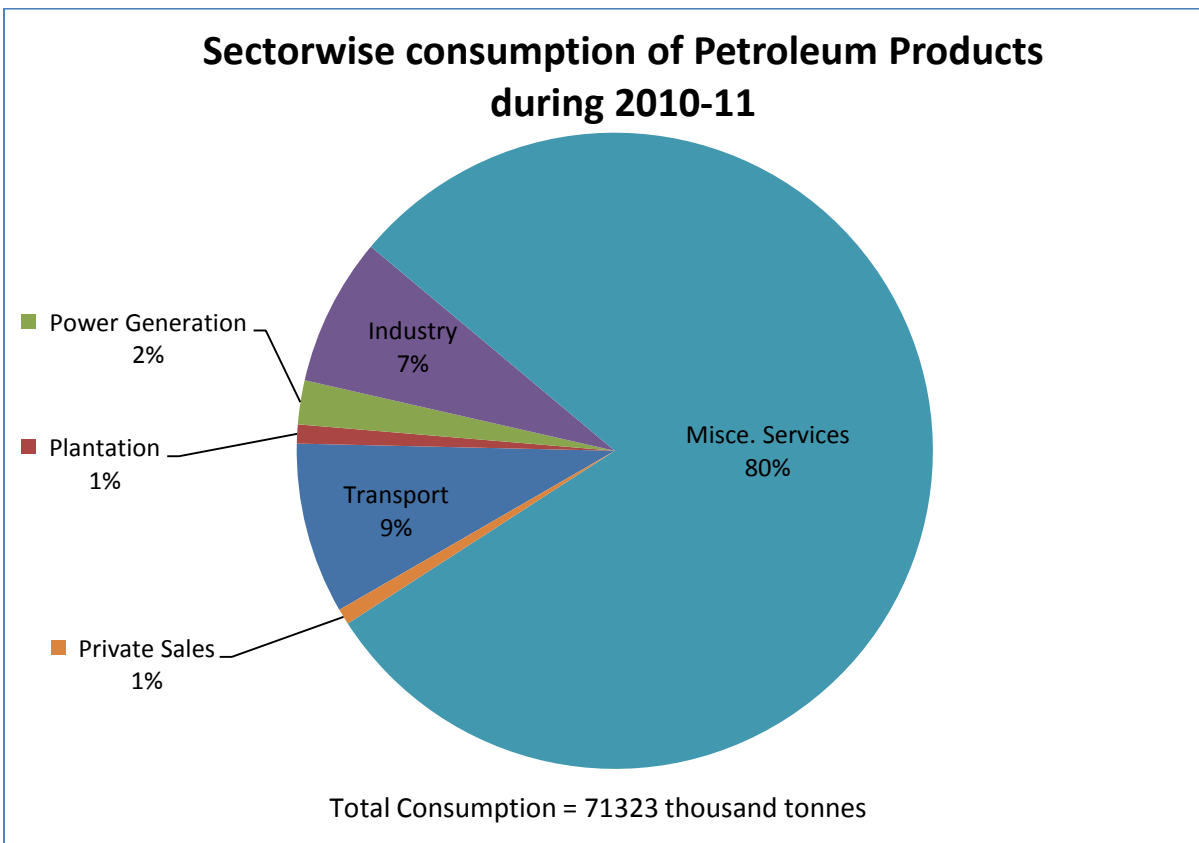


Figure 6.7

Table 6.8 : Industry-wise Off-take of Natural Gas in India

(Billion Cubic Metres)

Year	Energy Purposes							Non-energy Purposes				Grand Total
	Power Generation	Industrial Fuel	Tea Plantation	Domestic Fuel	Captive Use/ LPG Shrinkage	Others	Total	Fertilizer Industry	Petro Chemicals	Others @	Total	
1	2	3	4	5	6	7	8=2 to 7	9	10	11	12=9 to 11	13=8+12
1970-71	0.26	0.12	0.02	-	0.07	-	0.46	0.19	-	-	0.19	0.65
1975-76	0.37	0.14	0.03	0.01	0.10	-	0.66	0.46	-	0.00	0.47	1.13
1980-81	0.49	0.16	0.05	0.01	0.18	-	0.89	0.61	0.01	0.02	0.63	1.52
1985-86	1.30	0.22	0.08	0.02	0.80	-	2.42	2.50	0.01	0.02	2.53	4.95
1990-91	3.63	0.83	0.09	0.05	1.78	-	6.38	5.61	0.41	0.37	6.39	12.77
1995-96	6.84	2.30	0.11	0.18	0.59	-	10.02	7.60	0.47	-	8.08	18.09
2000-01	8.80	2.87	0.15	0.34	5.00	0.04	17.20	8.48	0.78	1.40	10.66	27.86
2005-06	11.88	3.78	0.15	0.08	5.05	1.12	22.05	7.76	1.18	0.04	8.97	31.03
2006-07	11.96	3.21	0.17	0.44	5.03	0.04	20.86	8.50	1.38	0.64	10.51	31.37
2007-08	12.04	3.32	0.16	0.04	2.16	1.26	18.98	9.82	1.43	0.64	11.89	30.87
2008-09	12.60	5.91	0.15	0.10	1.89	1.54	22.19	9.08	1.11	0.35	10.54	32.73
2009-10	21.37	2.32	0.17	0.25	5.43	1.84	31.37	13.17	1.26	0.70	15.14	46.51
2010-11(p)	27.42	2.32	0.19	0.03	4.54	1.22	35.72	13.43	1.18	1.10	15.71	51.43
Growth rate of 2010-11 over 2009-10(%)	28.32	-0.22	15.57	-88.21	-16.38	-33.51	13.86	1.98	-6.41	56.19	3.80	10.59
CAGR 1970-71 to 2010-11(%)	12.02	7.58	6.43	-	10.79	-	11.20	10.99	-	-	11.41	11.26

@ : Excludes offtakes of natural gas by ONGC.

\$: Sales of City Gas Distribution Companies like IGL, MGL, Bhagyanagar Gas, TNGCL, BMC Green Gas, CUGL & GGCL. Includes Industrial sale, domestic sale and CNG sale.

**: Sponge iron use.

Source : Ministry of Petroleum & Natural Gas.

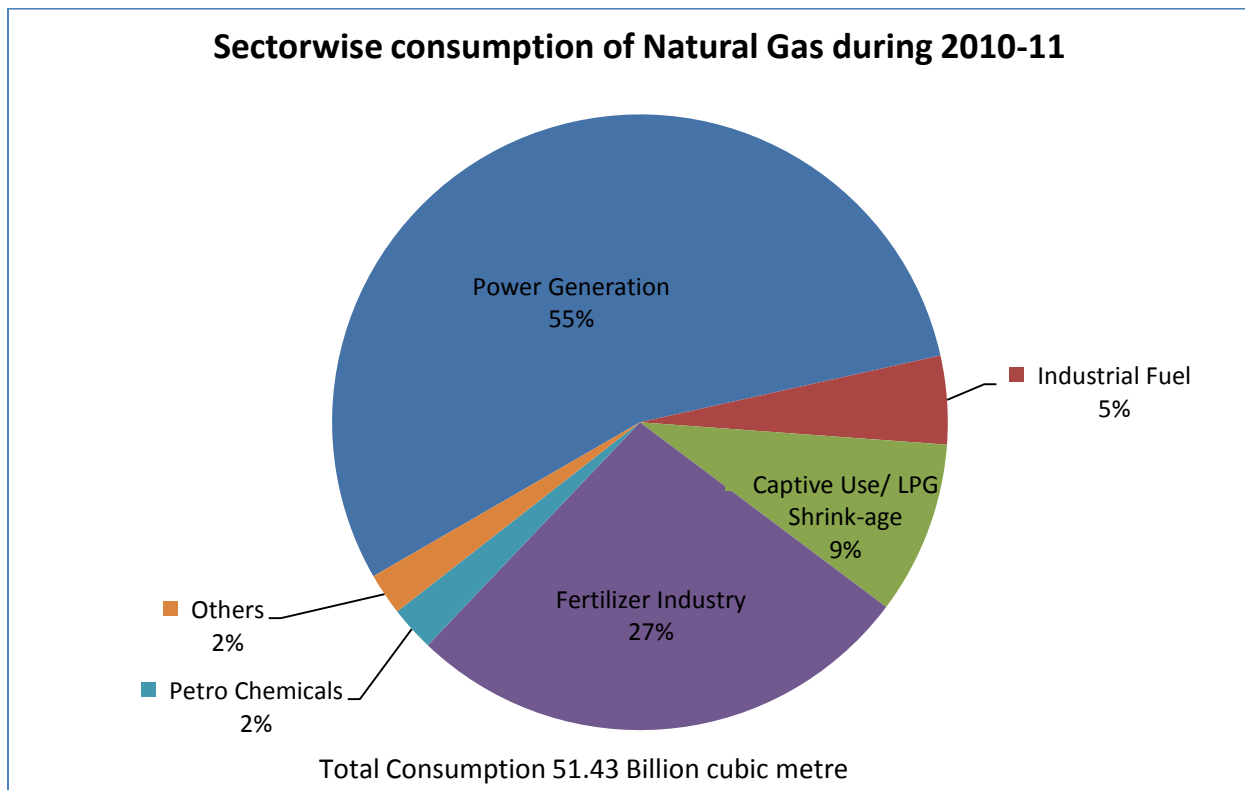


Figure 6.8

Table 6.9: Consumption of Electricity (from utilities) by Sectors in India

(Giga Watt hour) = (10⁶ x Kilo Watt hour)

Year	Industry	Agriculture	Domestic	Commercial	Traction & Railways	Others	Total Electricity Consumed
1	2	3	4	5	6	7	8=2 to 7
1970-71	29,579	4,470	3,840	2,573	1,364	1,898	43,724
1975-76	37,568	8,721	5,821	3,507	1,855	2,774	60,246
1980-81	48,069	14,489	9,246	4,682	2,266	3,615	82,367
1985-86	66,980	23,422	17,258	7,290	3,182	4,967	123,099
1990-91	84,209	50,321	31,982	11,181	4,112	8,552	190,357
1995-96	104,693	85,732	51,733	16,996	6,223	11,652	277,029
2000-01	107,622	84,729	75,629	22,545	8,213	17,862	316,600
2005-06	151,557	90,292	100,090	35,965	9,944	24,039	411,887
2006-07	171,293	99,023	111,002	40,220	10,800	23,411	455,749
2007-08	189,424	104,182	120,918	46,685	11,108	29,660	501,977
2008-09	209,474	109,610	131,720	54,189	11,425	37,577	553,995
2009-10(p)	236,752	120,209	146,080	60,600	12,408	36,595	612,645
2010-11(p)	272,589	131,967	169,326	67,289	14,003	39,218	694,392
Growth rate of 2010-11 over 2009-10(%)	15.14	9.78	15.91	11.04	12.85	7.17	13.34
CAGR 1970-71 to 2010-11(%)	5.57	8.61	9.67	8.29	5.84	7.67	6.98

Source : Central Electricity Authority.

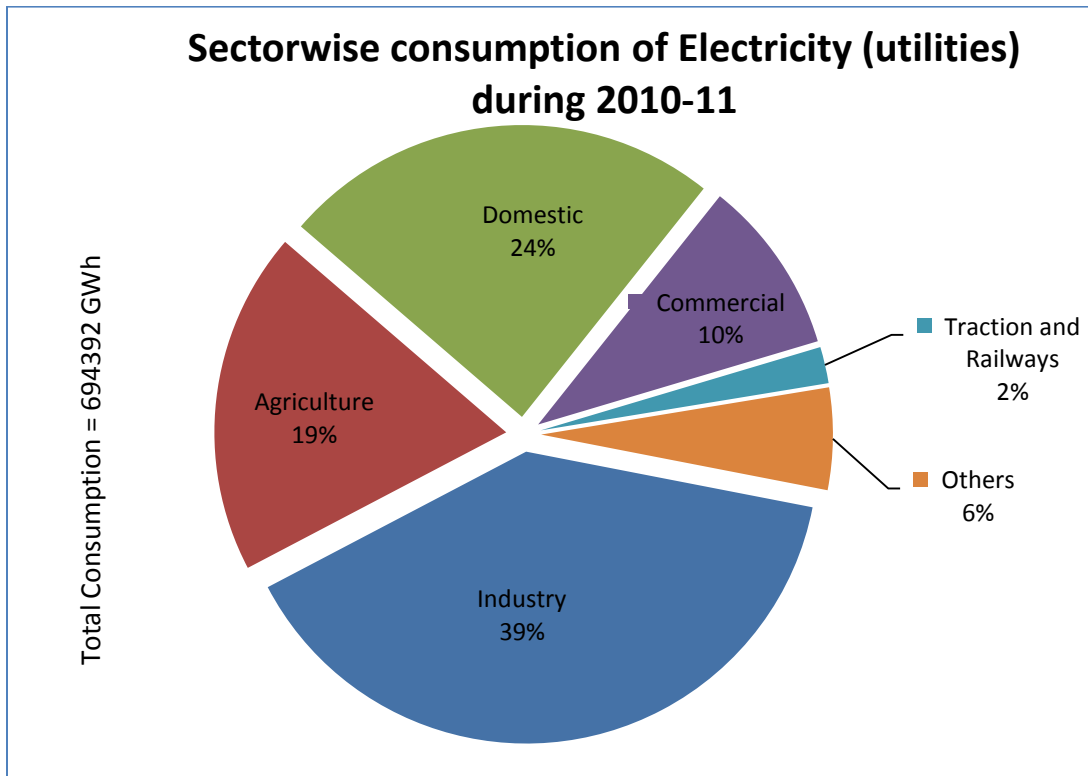


Figure 6.9

Table 6.10 : Electricity Generated(from Utilities), Distributed, Sold and Lost in India

(Giga Watt hour) = (10⁶ x Kilo Watt hour)

Year	Gross Electricity Generated from Utilities	Consumption in Power Station Auxiliaries	Net Electricity Generated from Utilities	Purchases from Non-Utilities + Imported from Other Countries	Net Electricity Available for Supply	Sold to Ultimate Consumers & Other Countries	Loss in transmission	Loss in transmission (%)
1	2	3	4=2-3	5	6=4+5	7	8=6-7	9
1970-71	55,828	2,863	52,965	66	53,031	43,724	9,307	17.55
1975-76	79,231	4,556	74,675	121	74,796	60,246	14,550	19.45
1980-81	110,844	7,230	103,614	120	103,734	82,367	21,367	20.60
1985-86	170,350	13,157	157,193	107	157,300	123,106	34,194	21.74
1990-91	264,329	19,604	244,725	2,216	246,941	190,420	56,521	22.89
1995-96	379,877	27,220	352,657	3,784	356,441	277,078	79,363	22.27
2000-01	501,204	34,932	466,272	5,596	471,868	316,795	155,073	32.86
2005-06	623,819	41,970	581,849	10,345	592,194	412,096	180,098	30.41
2006-07	670,654	43,577	627,077	11,931	639,008	455,964	183,044	28.65
2007-08	722,626	45,531	677,095	12,685	689,780	502,267	187,513	27.18
2008-09	746,626	47,573	699,053	13,487	712,540	527,564	184,976	25.96
2009-10	796,281	49,706	746,576	15,359	761,934	610,457	151,477	19.88
2010-11(p)	844,846	52,380	792,466	16,989	809,455	663,392	146,063	18.04
Growth rate of 2010-11 over 2009-10(%)	6.10	5.38	6.15	10.62	6.24	8.67	-3.57	-9.24
CAGR 1970-71 to 2010-11(%)	6.85	7.35	6.82	14.50	6.87	6.86	6.95	0.07

Source : Central Electricity Authority.

Chapter 7: Energy Commodity Balance

7.1 Definition

The major sources for commercial energy in India are coal, oil products, natural gas and electricity. Non-energy producing sectors derive energy from the resources available in primary form such as coal, crude oil, natural gas, hydro-power and nuclear power. Some of the energy resources are converted into other (final) energy products that are used for purposes other than energy generation.

Coal is also used as a final product or intermediate for power generation. Similarly, natural gas is also used directly or as an intermediate in power generation. Many petroleum products, such as HSDO, Naphtha etc. are used as a final product by the non-energy producing sectors and also used for power generation.

This indicates that the same energy source can be used in various forms at various stages of consumption. This creates a possibility of over-estimation or under-estimation of energy consumption in totality as well as for different sources.

The Energy Commodity Balance Statistics provide a crystal clear picture of usage of each form of energy commodity at each stage of consumption and therefore are the most authentic estimate of energy usage.

7.2 Components

Two major components of the energy balance statistics are Total Primary Energy Supply and Total Final Consumption of energy commodity.

Total Primary Energy Supply, consists of total supply of coal, crude oil, natural gas, nuclear energy and renewable energies including imports, net of exports and stock changes. Some part of these resources is used directly and the rest converted into electricity or other forms of energy resources. Final consumption refers to quantities of coal, petroleum products, natural gas and electricity used for consumption as the final product by the non-energy producing sectors. The Energy Commodity Balances further provide information on final consumption by various sectors.

Energy balances can be calculated on the basis of external energy used per kilogram of product, or raw material processed, or on dry solids or some key component. The energy consumed in food production includes direct energy which is fuel and electricity used on the farm, and in transport and in factories, and in storage, selling, etc.; and indirect energy which is used to actually build the machines, to make the packaging, to produce the electricity and the oil and so on. Food itself is a major energy source, and energy balances can be determined for animal or human feeding; food energy input can be balanced against outputs in heat and mechanical energy and chemical synthesis.

With the help of IEA(International Energy Agency), an Energy Balance has been attempted for the first time for India and is given at Table 7.2, but it is still in evolution stage and needs more work to be able to give a clearer picture. In this balance, the commodity balance given in Table 7.1 has been converted to

energy balance in which the production and consumption is given in thousand tonnes of oil equivalent (ktoe) on a net calorific value basis. Non-availability of data for all types of fuel that are being used in India- both purchased and free- is the main bottle neck in arriving at a balanced energy balance.

The balance given in Table 7.2 is not a final Energy balance of India but is a beginning and is to be developed further..

Table 7.1 : Energy Commodity Balance for the years 2009-10 and 2010-11(p)

Supply	Coal (000 tonnes)		Lignite (000 tonnes)		LPG (000 tonnes)		Naphtha (000 tonnes)	
	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11
Production	532042	532694	32421	34071	8091	7538	17105	17531
From Other Sources					2249	2167		
Imports	73255	68918			2718	4484	1734	2063
Exports	2454	4409			131	154	9911	10655
Intl. marine bunkers								
Stock changes	-17547	-7329	-575	748	1484	1926	981	1025
Domestic Supply	585296	589874	32996	34819	12162	13794	9909	9964
Transfer								
Statistical difference	-2514	-3117	576	389	-2535	-534	-330	-727
Transformation	436562	434115	27542	27920				
Electricity plants	419276	417071	27542	27920				
CHP plants								
Heat plants								
Blast furnaces/ gas works	2125	1257						
Coke/pat.fuel/BKB plants								
Petroleum refineries	15161	15787						
Petrochemical industry								
Liquefaction plants								
Other Transform. sector								
Energy Sector	435	425					1045	1967
Coal mines	435	425						
Fuel mining and extraction								
Petroleum refineries								
Elec., CHP and heat plants								
Pumped storage (elec.)								
Other energy sector								
Distribution losses								
Final Consumption	587810	592991	32420	34430	13121	14328	10239	10691
Industry Sector	147859	155313	4878	6510	988	1036	4255	4001
Iron and Steel	49074	43934		270	83	97	109	121
Chemical and Petrochemical	578	509	700	110	8	10	1495	1289
Non-Ferrous Metals	742	1167						
Non-Metallic Minerals			956	1053				
Transport Equipment								
Machinery					22	31		
Mining and Quarrying								
Food and Tobacco								
Paper, Pulp and Print	2335	2432	365	469				
Wood and Wood Products								
Cement	21613	15931	342	480				
Textile and Leather	272	275	2068	2559	3	9		
Brick	494	274						
Non-specified (Industry)	72751	90791	447	1569	872	889	2651	2591
Transport Sector					225	578		
International aviation								
Domestic aviation								
Road								
Rail								
Pipeline transport								
Domestic navigation								
Non-specified					225	578		
Other Sectors	2954	3138			11908	12714	4939	4723
Residential	328	197			11364	12029		
Comm. And public services								
Agriculture/forestry	2626	2941						
Fishing								
Non-specified					544	685	4939	4723
Non-Energy Use								
in industry/transf./energy of								
which : feedstock								
in transport								
in other sectors								

Table 7.1(contd) : Energy Commodity Balance for the years 2009-10 and 2010-11(p)

Supply	Kerosene (000 tonnes)		Diesel (000 tonnes)		Heavy fuel oil (000 tonnes)		Electricity (GWH)	
	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10
Production	8545	7702	73753	78631	18346	20519	796281	844846
From Other Sources							109693	114224
Imports	985	1381	2531	1996	896	1013	5359	5610
Exports	46	33	18451	20335	5155	6734	58	62
Intl. marine bunkers								
Stock changes			200	-800	-7368	-8415		
Domestic Supply	9484	9050	57633	61092	21455	23213	911275	964618
Transfer								
Statistical difference	180	122	856	647	-1741	-3538	300818	301226
Transformation			3857	4256	4572	5375	47407	52380
Electricity plants			3857	4256	4572	5375	47407	52380
CHP plants								
Heat plants								
Blast furnaces/ gas works								
Coke/pat.fuel/BKB plants								
Petroleum refineries								
Petrochemical industry								
Liquefaction plants								
Other Transform. sector								
Energy Sector			455	303			21536	27589
Fuel mining and extraction			455	303				
Petroleum refineries								
Elec., CHP and heat plants								
Pumped storage (elec.)								
Other energy sector								
Distribution losses							151477	146063
Final Consumption	9304	8928	56777	60445	23196	26751	610457	663392
Industry Sector	43	56	15831	14631	9497	11065	212521	237539
Iron and steel			491	582	2354	2473		
Chemical and petroleum			393	465	3291	3759		
Non-ferrous metals								
Non-metallic minerals								
Transport equipment			12348	11475				
Machinery								
Mining & Quarrying			1154	1085	1009	1745		
Food and tobacco								
Paper, pulp and print								
Wood and wood products								
Construction								
Textile and leather			149	113	98	102		
Non-specified	43	56	1296	911	2745	2986	230445	237539
Transport Sector			22014	26246	1576	2341	72634	60543
International aviation								
Domestic aviation								
Road			20365	23530	521	783		
Rail			1028	1987	36	143	12569	17217
Pipeline transport								
Domestic navigation			621	729	658	986		
Non-specified					361	429	77156	43326
Other Sectors	9261	8872	14620	15009	7551	7970	407836	431405
Residential	9131	8804					144907	156894
Comm. And public services							59614	59614
Agriculture/forestry			11405	12507	674	1047	120583	117536
Fishing								
Non-specified	130	68	3215	2502	6877	6923	102776	97361
Non-Energy Use								
in industry/transf./energy of								
which : feedstock								
in transport								
in other sectors								

BKB- Brown Coal/ Peat Briquettes

CHP- Combined Heat and Power Plants

Statistical Difference= Estimated Production - Estimated Consumption

Final consumption = Transformation+Energy sector+Total Industrial Consumption+Consumption by Other sectors+Non energy Use

Table 7.2 : Energy Balance of India for 2010-11(p)**

in Kilotonne of Oil Equivalent (ktoe)

	Coal	Crude Oil	Oil Products	Natural Gas	Nuclear
Production	250771.7	38780.3		43237.9	4856.7
Imports	47707.3	167192.9	15676.2	10683.7	
Exports	-2300.6		-57638.4		
International marine bunkers			-8079.8		
International aviation bunkers			-4459.1		
Stock changes	-3529.7		-150.4		
Total primary energy supply	292648.8	205973.2	-54651.5	53921.5	4856.7
Transfers		-3721.8			
Statistical differences	25283.3	7965.0	35050.4	-5012.2	
Main producer electricity plants	-197733.6		-11676.6	-17685.8	-4856.7
utoproducer electricity plants	-24348.0			-5527.5	
Gas works	-42.7				
Oil refineries		-210216.4	210919.6		
Coal transformation	-11121.7				
Energy industry own use	-209.3		-18549.0	-4497.4	
Losses					
Final consumption	84476.9		161092.9	21198.6	
Industry	76525.6		31271.4	6517.1	
Iron and steel	22708.4		3216.0		
Chemical and petrochemical	325.1		5486.9		
Non-ferrous metals	519.3		5.2		
Non-metallic minerals	7329.3				
Transport equipment			11848.9		
Machinery			35.0		
Mining and quarrying			2797.6		
Paper, pulp and print	1189.2				
Construction	109.4				
Textile and leather	705.8		225.0		
Non-specified (industry)	43639.1		7656.9	6517.1	
Transport			50640.7	1992.3	
Road			40272.5	1992.3	
Domestic aviation			5410.4		
Rail			2192.3		
Domestic navigation			1700.7		
Non-specified (transport)			1064.9		
Other	7951.3		58603.5	160.6	
Residential	1594.1		22799.9	22.3	
Commercial and public services			0.0		
Agriculture/forestry			13940.1	138.2	
Non-specified (other)	6357.2		21863.5		
Non-energy use			20577.3	12528.7	
Non-energy use industry/transformation/energy			20577.3	12528.7	
Memo: feedstock use in petchemical industry			5076.3	12528.7	
Elect. output in GWh	615454.0		26099.0	111206.0	18636.0
Elec output-main activity producer	556025.0		13960.0	82283.0	18636.0
ele plants					
Elec output-autoproducer	59429.0		12139.0	28923.0	
electricity plants					

Table 7.2(contd) : Energy Balance of India for 2010-11(p)**

in Kilotonne of Oil Equivalent (ktoe)

	Hydro	Solar, Wind, Others	Biofuels & Waste	Electricity	Total
Production	9194.2	1846.7	165421.9		514109.4
Imports				482.5	241742.6
Exports					-59933.7
International marine bunkers					-8079.8
International aviation bunkers					-4459.1
Stock changes					-3680.1
Total primary energy supply	9194.2	1846.7	165421.9	487.8	679699.3
Transfers					-3721.8
Statistical differences				1966.8	65253.3
Main producer electricity plants	-9174.5	-1505.0	-686.4	68480.2	-174838.3
Autoproducer electricity plants	-19.7	-39.6	-457.5	8867.3	-21525.0
Gas works					-42.7
Oil refineries					703.2
Coal transformation					-11121.7
Energy industry own use				-4504.7	-27760.4
Losses				-12561.5	-12561.5
Final consumption		302.2	164278.0	62735.9	494084.5
Industry			28539.5	20428.4	163282.0
Iron and steel					25924.5
Chemical and petrochemical					5811.9
Non-ferrous metals					524.5
Non-metallic minerals					7329.3
Transport equipment					11848.9
Machinery					35.0
Mining and quarrying					2797.6
Paper, pulp and print					1189.2
Construction					109.4
Textile and leather					930.8
Non-specified (industry)			28539.5	20428.4	106781.0
Transport			163.9	5206.7	58003.5
Road			163.9		42428.6
Domestic aviation					5410.4
Rail				1480.7	3672.9
Domestic navigation					1700.7
Non-specified (transport)				3726.0	4790.9
Other		302.2	135574.6	37100.8	239693.0
Residential			129300.2	13492.9	167209.5
Commercial and public services			6274.4	5126.8	11401.2
Agriculture/forestry				10108.1	24186.4
Non-specified (other)		302.2		8373.0	36895.9
Non-energy use					33105.9
Non-energy use industry/transformation/energy					33105.9
Memo: feedstock use in petchemical industry					17605.0
Elect. output in GWh	106909.0	17960.0	1995.0		898259.0
Elec output-main activity producer ele plants	106680.0	17500.0	1197.0		796281.0
Elec output-autoproducer electricity plants	229.0	460.0	798.0		101978.0

SOURCE program for Energy balance has been developed by International Energy Agency, Paris.

**The balance given is not a final Energy balance of India but is a beginning and is to be developed

Chapter 8: Whole Sale Price Index of Energy Commodities

8.1 *The Wholesale Price Index of Petroleum Products*

The base year of the Wholesale Price Index was changed from 1993-94 to 2004-05 from the year 2005-06. Wholesale Price Index of Petroleum Products except lubricants recorded a increase ranging from 10% to 27% from 2009-10 to 2010-11. The maximum increase was observed in Kerosene (27.3%) followed by Aviation Turbine Fuel (20.4%).The wholesale price index for decreased for Coking Coal by 0.5% and Electricity only recorded a modest increase of 5.4% during this period.

8.2 *Intra-Year Movement of WPI*

The yearly movement of index shows that from 2005-06 to 2009-10, the WPI of Kerosene has not changed mainly due to administered prices, whereas for Electricity and Lubricants the WPI has increased continuously from 2005-06 in almost all other products also.

Table 8.1 : Wholesale Price Index of Energy Commodities in India

(1993-94=100)

Year	Petroleum Products							Liquified Petrol- eum Gas	Coking Coal	Coke	Lignite	Elect- ricity
	Petrol	Kero- sene	Aviation Turbine Fuel	High Speed Diesel Oil	Light Diesel Oil	Furn- ance Oil	Lubri- cants					
1	2	3	4	5	6	7	8	9	10	11	12	13
1981-82	36.2	68.2	34.4	46.2	45.0	48.1	30.3	46.8	28.9	39.6	34.7	31.4
1985-86	43.7	83.0	44.2	54.1	56.0	58.4	36.6	55.8	45.9	61.4	65.7	43.9
1990-91	67.9	98.4	66.7	71.7	62.6	64.8	55.2	61.8	67.1	64.2	84.4	63.1
1995-96	106.5	100.0	99.7	108.8	109.4	99.4	105.0	109.5	106.2	105.2	111.7	127.8
2000-01	154.2	270.2	144.2	228.8	232.2	203.5	142.6	248.2	158.9	134.2	229.0	200.0
2005-06*	113.6	99.9	132.0	119.7	123.4	131.2	101.9	106.1	106.7	152.7	85.7	102.6
2006-07	125.3	99.9	151.6	130.2	143.8	148.4	131.8	106.1	106.7	152.7	88.5	105.3
2007-08	119.1	99.9	157.4	125.6	162.3	166.0	145.8	106.1	111.4	155.4	99.1	106.2
2008-09	128.3	99.9	194.5	135.8	178.3	197.9	171.1	117.2	119.0	234.4	140.0	106.4
2009-10	119.3	99.9	137.0	133.0	161.5	187.6	174.5	111.9	126.3	234.4	134.9	107.4
2010-11	143.0	127.2	164.9	151.7	192.5	223.7	192.6	125.9	139.2	233.1	144.1	113.2
Increase in 2010-11 over 2009-10(%)	19.85	27.32	20.35	14.10	19.21	19.25	10.35	12.56	10.22	-0.54	6.84	5.37

* From 2005-06 WPI is with 2004-05 as the base year.

Source :Office of the Economic Advisor, Ministry of Commerce & Industry.

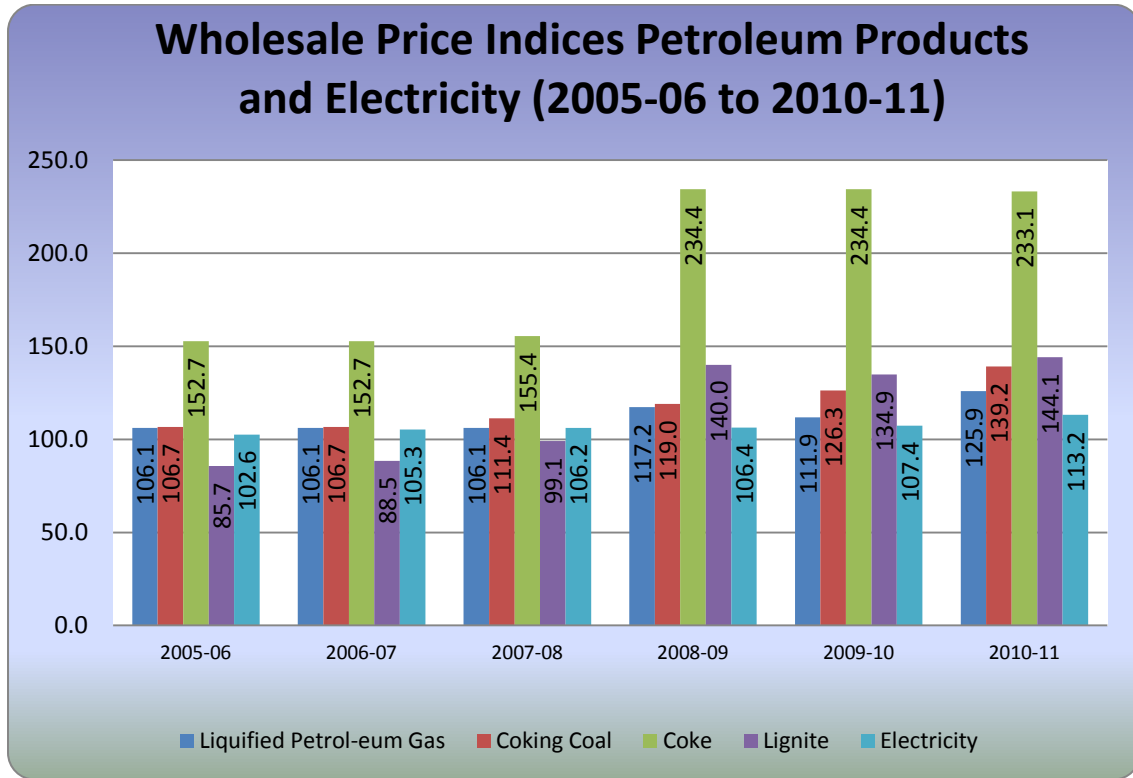


Figure 8.1

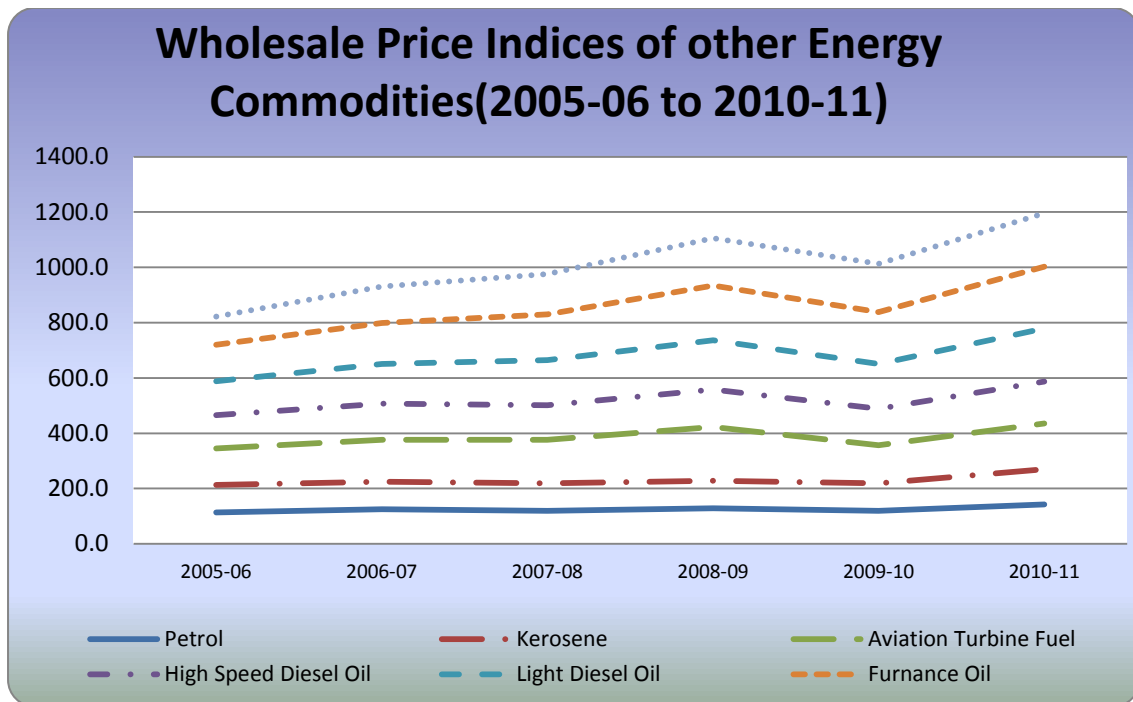


Figure 8.1(A)

Chapter 9: World Production and Consumption of Crude Oil & Natural Gas

9.1 Production and consumption of crude oil

The total estimated production of crude oil in the world has increased from about 3910 MT in 2005-06 to about 3831 MT during 2009-10, and increased to 3914 MT during 2010-11 (Table 9.1). The production increased by 2.2% from 2009-10 to 2010-11. Geographical distribution of total world production during 2010-11 across major regions reveals that Middle East accounted for the highest share (30.3%), followed by Europe & Eurasia (22%), North America (17%), Africa (12%), Asia Pacific (10%) and South & Central America (9%). Distribution of total world production according to countries shows that Russian Federation and Saudi Arabia were the first and second highest producers with 12.9% and 12%, respectively. They were followed by USA (8.7%), Iran (5.2%), China (5.2%), Canada (4.2%), Mexico (3.7%), United Arab Emirates (3.3%), Venezuela (3.2%), Kuwait and Iran (3.1% each). India accounted for only 1% of the world production.

A notable feature of world production of crude oil during 2010-11 is that only Europe and Eurasia experienced negative growth rate whereas the rest of the regions experienced positive growth rates over 2009-10. The increase of growth in these reflects an increase in the total world production of crude oil by 2.2%.

The World Crude oil consumption increased by 3.1% from 2009-10 to 2010-11 (Table 9.2). Major region-wise consumption shows that Asia Pacific accounted for the highest share (32%) of total world consumption, followed by North America (26%), and Europe & Eurasia (23%). African countries accounted for the lowest share in the world consumption (4%). Country-wise distribution of consumption reveals that the United States was the largest consumer of crude oil, consuming 21% of the world consumption during 2010-11. China was the second largest consumer (10.6%), followed by Japan (5%), India (3.9%) and Russian Federation (3.7%). India was, thus, the fourth largest consumer of crude oil in the world and the third largest crude oil consumer in the Asia-Pacific region after China and Japan.

9.2 Production and Consumption of Natural Gas

The total world production of Natural Gas increased from 2600 million tone oil equivalent (Mtoe) in 2006-07 to 2881 Mtoe in 2010-11. The production has increased by 7.3% from 2009-10 to 2010-11 (Table 9.3). Distribution of production of natural gas over major regions shows that Europe & Eurasia (32.6%) and North America (26%) are the highest and the second highest producers, together accounting for 58.6% of the total world production. Country-wise, USA was the largest producer of natural gas (19.3%) in the world during 2010-11, followed by the Russian Federation (18.4%) and Canada (5%). India's share in the total world production of natural gas during 2009-10 was only 1.6% (45.8 Mtoe).

The growth in production of natural gas from 2009-10 to 2010-11 was highest in Middle East (13.2%), followed by Asia Pacific (10.5%), Europe & Eurasia (7.6%). The total world consumption of natural gas has increased from 2566 Mtoe in 2006-07 to 2858 Mtoe in 2010-11 (Table 9.4). The world consumption of natural gas increased by 7.4% from 2009-10 to 2010-11.

While United States was the largest consumer of natural gas, consuming 21.7% of the world consumption during 2010-11, Europe & Eurasia accounted for 35.8% of the total world consumption. Country-wise distribution of consumption of natural gas indicates that USA was the largest consumer (21.7%), followed by Russian federation (13%). India with a consumption of 55.7 Mtoe accounted for only 1.9% of total world consumption.

Table 9.1: Country-wise Estimates of Production of Crude Oil*

Country/ Region	(Million tonnes)						% Change 2010-11 over 2009- 10	2010-11 % Share of World's Total Production
	2006-07	2007-08	2008-09	2009-10	2010-11			
North America								
USA	310.2	309.8	304.9	328.6	339.1	3.2	8.7	
Canada	153.4	159.5	157.7	156.1	162.8	4.3	4.2	
Mexico	183.1	172.7	157.7	147.5	146.3	-0.8	3.7	
Total North America	646.7	642.0	620.4	632.2	648.2	2.5	16.6	
South and Central America								
Argentina	35.8	34.9	34.1	33.8	32.5	-3.8	0.8	
Brazil	89.2	90.4	93.9	100.4	105.7	5.3	2.7	
Colombia	27.5	27.6	30.5	34.1	39.9	16.9	1.0	
Ecuador	27.7	26.5	26.2	25.2	25.2	0.0	0.6	
Peru	5.1	5.1	5.3	6.4	6.9	8.2	0.2	
Trinidad & Tobago	8.3	7.2	6.9	6.8	6.5	-4.3	0.2	
Venezuela	144.2	133.9	131.5	124.8	126.6	1.4	3.2	
Other S. & Cent. America	7.1	7.2	7.1	6.7	6.6	-1.6	0.2	
Total S. & Cent. America	345.0	332.7	335.5	338.2	350.0	3.5	8.9	
Europe and Eurasia								
Azerbaijan	32.5	42.8	44.7	50.6	50.9	0.5	1.3	
Denmark	16.7	15.2	14.0	12.9	12.2	-5.8	0.3	
Italy	5.8	5.9	5.2	4.6	5.1	11.7	0.1	
Kazakhstan	66.1	68.4	72.0	78.2	81.6	4.4	2.1	
Norway	128.7	118.6	114.1	108.8	98.6	-9.4	2.5	
Romania	5.0	4.7	4.7	4.5	4.3	-4.7	0.1	
Russian Federation	480.5	491.3	488.5	494.2	505.1	2.2	12.9	
Turkmenistan	9.2	9.8	10.2	10.4	10.7	2.8	0.3	
United Kingdom	76.6	76.8	71.7	68.2	63.0	-7.7	1.6	
Uzbekistan	5.4	4.9	4.8	4.5	3.7	-17.8	0.1	
Other Europe & Eurasia	21.5	21.3	20.2	19.6	18.2	-7.0	0.5	
Total Europe & Eurasia	847.9	859.7	850.2	856.5	853.3	-0.4	21.8	
Middle East								
Iran	208.2	209.7	209.9	201.5	203.2	0.9	5.2	
Iraq	98.1	105.2	119.3	119.8	120.4	0.6	3.1	
Kuwait	132.7	129.9	137.2	121.7	122.5	0.6	3.1	
Oman	35.7	34.5	35.9	38.7	41.0	5.9	1.0	
Qatar	50.9	53.6	60.8	57.9	65.7	13.5	1.7	
Saudi Arabia	514.3	494.2	515.3	464.7	467.8	0.7	12.0	
Syria	21.6	20.6	19.8	18.6	19.1	2.7	0.5	
United Arab Emirates	139.0	135.1	137.3	126.3	130.8	3.5	3.3	
Yemen	17.9	16.3	14.4	13.5	12.5	-7.9	0.3	
Other Middle East	1.4	1.6	1.5	1.7	1.7	0.6	0.0	
Total Middle East	1220.0	1200.8	1251.5	1164.4	1184.6	1.7	30.3	

Contd....

Table 9.1(Contd.):Country-wise Estimates of Production of Crude Oil*

Country/ Region	(Million tonnes)						2010-11 % Share of World's Total
	2006-07	2007-08	2008-09	2009-10	2010-11	% Change 2010-11 over 2009-10	
Africa							
Algeria	86.2	86.5	85.5	77.9	77.7	-0.3	2.0
Angola	69.6	82.5	92.2	87.4	90.7	3.8	2.3
Cameroon	4.4	4.2	4.3	6.2	6.4	3.5	0.2
Chad	8.0	7.5	6.7	13.9	15.1	8.1	0.4
Rep. of Congo (Brazzaville)	13.5	11.5	12.9	35.3	35.0	-0.6	0.9
Egypt	33.7	34.1	34.6	15.2	13.6	-10.8	0.3
Equatorial Guinea	18.0	18.6	17.4	11.5	12.2	6.5	0.3
Gabon	11.7	11.5	11.8	77.1	77.5	0.5	2.0
Libya	84.9	85.0	85.3	99.1	115.2	16.2	2.9
Nigeria	117.8	112.1	103.1	23.6	23.9	1.5	0.6
Sudan	16.3	23.1	23.7	4.0	3.8	-4.7	0.1
Tunisia	3.3	4.6	4.2	7.7	7.1	-8.0	0.2
Other Africa	3.2	4.2	3.9	458.9	478.2	4.2	12.2
Total Africa	470.4	484.4	484.9	458.9	478.2	4.2	12.2
Asia Pacific							
Australia	23.4	24.1	23.8	21.9	23.8	8.9	0.6
Brunei	10.8	9.5	8.5	8.2	8.4	2.5	0.2
China	183.7	186.7	195.1	189.5	203.0	7.1	5.2
India	35.8	36.1	36.1	35.4	38.9	9.8	1.0
Indonesia	49.9	47.4	49.9	47.9	47.8	-0.3	1.2
Malaysia	33.5	34.2	34.6	33.1	32.1	-3.1	0.8
Thailand	11.8	12.5	13.3	13.7	13.8	0.9	0.4
Vietnam	17.8	16.4	15.4	16.8	18.0	6.9	0.5
Other Asia Pacific	13.2	13.9	14.7	14.3	13.6	-4.7	0.3
Total Asia Pacific	379.8	380.8	391.5	380.8	399.4	4.9	10.2
TOTAL WORLD	3910.0	3901.4	3934.7	3831.0	3913.7	2.2	100.0

* Includes crude oil, shale oil, oil sands and NGLs (the liquid content of natural gas where this is recovered separately). Excludes liquid fuels from other sources such as biomass & coal derivatives.

^ Less than 0.05.

Note: Annual changes and shares of total are calculated using million tonnes per annum figures.

Source : Ministry of Petroleum & Natural Gas.

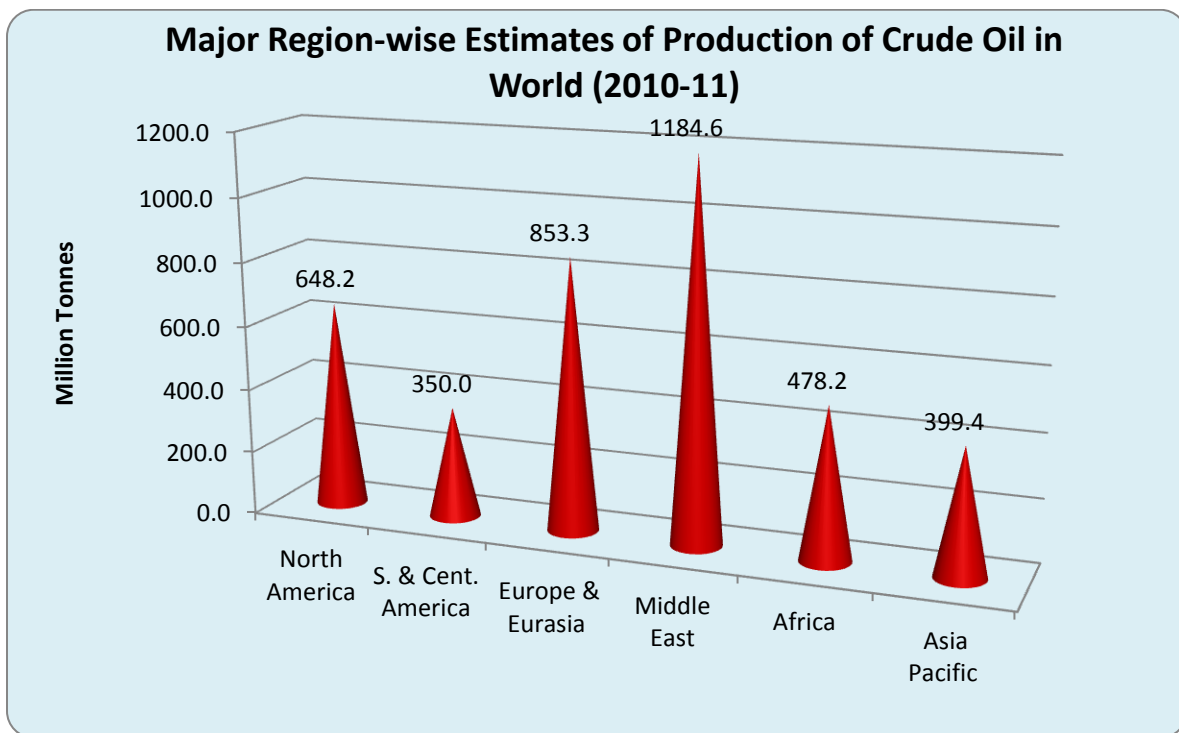


Figure 9.1

Table 9.2 : COUNTRY-WISE ESTIMATES OF CONSUMPTION OF CRUDE OIL*

Country/ Region	(Million tonnes)						2010-11 % Change over 2009- 10	2010-11 % Share of World's Total Consumption
	2006-07	2007-08	2008-09	2009-10	2010-11			
North America								
US	943.8	942.3	875.8	833.2	850.0	2.0	21.1	
Canada	99.6	102.8	102.5	97.1	102.3	5.4	2.5	
Mexico	86.8	89.4	91.7	88.5	87.4	-1.2	2.2	
Total North America	1130.2	1134.5	1070.0	1018.8	1039.7	2.1	25.8	
South and Central America								
Argentina	20.5	23.0	25.9	23.7	25.7	8.5	0.6	
Brazil	92.1	99.0	107.1	107.0	116.9	9.3	2.9	
Chile	12.3	16.1	16.8	15.6	14.7	-6.0	0.4	
Colombia	10.7	10.4	10.6	10.5	11.0	4.1	0.3	
Ecuador	8.2	8.9	9.4	10.1	10.6	5.0	0.3	
Peru	6.8	7.1	8.0	8.1	8.4	3.6	0.2	
Venezuela	27.4	26.7	2.2	2.1	2.1	4.4	0.1	
Other S. & Cent. America	60.4	61.2	32.9	33.7	35.2	4.7	0.9	
Total S. & Cent. America	238.3	252.4	271.4	268.6	282.0	5.0	7.0	
Europe and Eurasia								
Austria	14.2	13.4	13.5	13.0	13.0	0.2	0.3	
Azerbaijan	4.8	4.5	3.5	3.2	3.3	4.0	0.1	
Belarus	8.0	7.3	8.1	9.3	6.6	-29.3	0.2	
Belgium & Luxembourg	41.1	41.0	40.8	33.4	35.0	4.8	0.9	
Bulgaria	5.2	5.1	5.4	5.6	4.2	-25.6	0.1	
Czech Republic	9.8	9.7	9.9	9.7	9.2	-5.0	0.2	
Denmark	9.3	9.3	9.5	8.5	8.7	2.0	0.2	
Finland	10.6	10.6	10.5	9.9	10.4	4.9	0.3	
France	93.0	91.4	90.8	87.5	83.4	-4.7	2.1	
Germany	123.6	112.5	118.9	113.9	115.1	1.1	2.9	
Greece	22.2	21.7	21.4	20.2	18.5	-8.7	0.5	
Hungary	7.8	7.7	7.5	7.1	6.7	-5.2	0.2	
Republic of Ireland	9.3	9.4	9.0	8.0	7.6	-5.0	0.2	
Italy	86.7	84.0	80.4	75.1	73.1	-2.7	1.8	
Kazakhstan	11.4	11.5	12.8	12.1	12.5	3.2	0.3	
Lithuania	2.8	2.8	3.1	2.6	2.7	3.0	0.1	
Netherlands	52.2	53.8	51.1	49.4	49.8	0.9	1.2	
Norway	10.0	10.2	10.2	10.3	10.7	3.5	0.3	
Poland	23.3	24.2	25.3	25.3	26.3	3.9	0.7	
Portugal	14.4	14.4	13.6	12.8	12.6	-1.6	0.3	
Romania	10.3	10.3	10.4	9.2	9.1	-1.4	0.2	
Russian Federation	127.1	126.3	141.4	135.2	147.6	9.2	3.7	
Slovakia	4.0	4.1	3.9	3.7	3.7	-0.3	0.1	
Spain	78.1	78.8	79.0	75.7	74.5	-1.6	1.8	
Sweden	15.5	14.7	15.7	14.6	14.5	-0.1	0.4	
Switzerland	12.6	11.3	12.1	12.3	11.4	-7.1	0.3	
Turkey	29.5	30.5	30.9	28.2	28.7	1.7	0.7	
Turkmenistan	5.3	5.0	5.3	5.4	5.6	3.6	0.1	
Ukraine	14.1	15.5	14.8	13.3	11.6	-13.2	0.3	
United Kingdom	82.3	79.2	77.9	74.4	73.7	-1.0	1.8	
Uzbekistan	5.0	4.8	4.8	4.8	5.0	2.8	0.1	
Other Europe & Eurasia	26.3	27.7	29.9	28.5	28.3	-0.7	0.7	
Total Europe & Eurasia	970.4	954.0	971.5	922.2	922.9	0.1	22.9	

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Table 9.2(Contd.) : COUNTRY-WISE ESTIMATES OF CONSUMPTION OF CRUDE OIL

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	(Million tonnes)	
						% Change 2010-11 over 2009-10	2010-11 % Share of World's Total Consumption
Middle East							
Iran	82.4	82.5	87.4	85.1	86.0	1.0	2.1
Israel	11.9	12.4	12.2	11.5	11.2	-2.2	0.3
Kuwait	15.2	15.3	16.3	17.2	17.7	2.8	0.4
Qatar	4.6	5.4	6.2	6.2	7.4	18.1	0.2
Saudi Arabia	92.3	98.2	107.2	117.2	125.5	7.1	3.1
United Arab Emirates	28.3	30.0	32.0	29.8	32.3	8.4	0.8
Other Middle East	67.4	70.2	73.6	77.3	80.2	3.8	2.0
Total Middle East	302.3	314.1	334.9	344.3	360.2	4.6	8.9
Africa							
Algeria	11.5	12.9	14.0	14.9	14.9	-0.1	0.4
Egypt	28.7	30.6	32.6	34.4	36.3	5.4	0.9
South Africa	25.3	26.2	25.3	24.7	25.3	2.7	0.6
Other Africa	68.2	71.1	74.8	77.0	79.0	2.6	2.0
Total Africa	133.7	140.8	146.8	150.9	155.5	3.0	3.9
Asia Pacific							
Australia	41.5	41.8	42.5	42.2	42.6	0.8	1.1
Bangladesh	4.5	4.6	4.7	4.8	4.8	0.4	0.1
China	351.2	369.3	376.0	388.2	428.6	10.4	10.6
China Hong Kong SAR	15.0	16.1	14.6	14.0	16.1	15.2	0.4
India	120.4	133.4	144.1	151.0	155.5	2.9	3.9
Indonesia	58.3	59.5	59.1	59.2	59.6	0.7	1.5
Japan	238.0	229.7	222.1	198.7	201.6	1.5	5.0
Malaysia	23.4	24.8	24.8	24.5	25.3	3.3	0.6
New Zealand	7.2	7.2	7.3	6.8	6.9	0.1	0.2
Pakistan	17.6	19.2	19.3	20.6	20.5	-0.6	0.5
Philippines	13.3	14.0	12.3	13.1	13.1	0.1	0.3
Singapore	45.1	49.0	52.0	56.1	62.2	10.9	1.5
South Korea	104.5	107.1	101.9	103.0	105.6	2.5	2.6
Taiwan	48.4	50.2	45.0	44.1	46.2	4.7	1.1
Thailand	50.1	49.2	49.0	49.9	50.2	0.5	1.2
Vietnam	12.0	13.3	14.1	14.1	15.6	10.4	0.4
Other Asia Pacific	12.8	13.5	13.0	13.4	13.5	0.9	0.3
Total Asia Pacific	1163.5	1201.9	1201.9	1203.8	1267.8	5.3	31.5
TOTAL WORLD	3945.3	4007.3	3996.5	3908.7	4028.1	3.1	100.0

Notes: Growth rates are adjusted for leap years.

* Inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of fuel ethanol and biodiesel is also included.

Differences between these world consumption figures and world production statistics are accounted for by stock changes, consumption of non-petroleum additives and substitute fuels, and unavoidable disparities in the definition, measurement or conversion of oil supply and demand data.

Source : Ministry of Petroleum & Natural Gas.

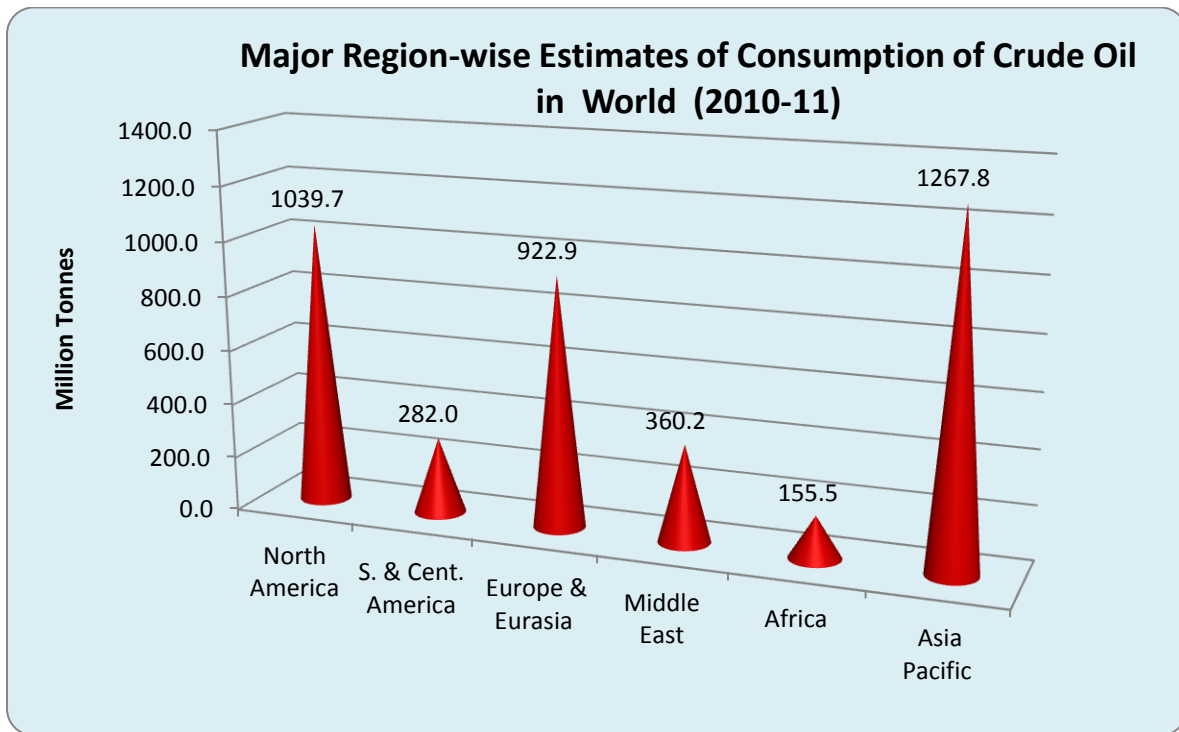


Figure 9.2

Table 9.3: Country-wise Estimates of Production of Natural Gas*

(Million tonnes oil equivalent)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	% Change 2010-11 over 2009-10	2010-11 % Share of World's Total Production
North America							
USA	479.3	499.6	521.7	531.6	556.8	4.7	19.3
Canada	169.6	164.3	158.8	147.5	143.8	-2.5	5.0
Mexico	46.3	48.2	48.8	49.4	49.8	0.7	1.7
Total North America	695.3	712.0	729.3	728.5	750.4	3.0	26.0
South and Central America							
Argentina	41.5	40.3	39.7	37.2	36.1	-3.0	1.3
Bolivia	11.6	12.4	12.9	11.1	12.9	16.8	0.4
Brazil	10.2	10.1	12.4	10.5	13.0	23.5	0.5
Colombia	6.3	6.8	8.2	9.5	10.1	7.2	0.4
Peru	1.6	2.4	3.1	3.1	6.5	108.4	0.2
Trinidad & Tobago	32.8	35.1	35.4	36.5	38.1	4.4	1.3
Venezuela	28.3	26.6	27.0	25.8	25.7	-0.7	0.9
Other S. & Cent. America	3.7	3.5	3.4	2.9	2.6	-9.9	0.1
Total S. & Cent. America	136.0	137.2	141.8	136.7	145.1	6.2	5.0
Europe and Euroasia							
Azerbaijan	5.5	8.8	13.3	13.3	13.6	2.2	0.5
Denmark	9.4	8.3	9.1	7.6	7.4	-3.0	0.3
Germany	14.1	12.9	11.7	11.0	9.6	-12.7	0.3
Italy	9.1	8.0	7.6	6.6	6.8	3.6	0.2
Kazakhstan	21.5	24.1	26.8	29.3	30.3	3.3	1.1
Netherlands	55.4	54.5	60.0	56.4	63.5	12.4	2.2
Norway	78.9	80.7	89.4	93.4	95.7	2.5	3.3
Poland	3.9	3.9	3.7	3.7	3.7	0.5	0.1
Romania	10.7	10.4	10.3	10.1	9.8	-2.9	0.3
Russian Federation	535.6	532.8	541.5	474.9	530.1	11.6	18.4
Turkmenistan	54.3	58.9	59.5	32.7	38.1	16.4	1.3
Ukraine	16.9	16.9	17.1	17.3	16.7	-3.8	0.6
United Kingdom	72.0	64.9	62.7	53.7	51.4	-4.3	1.8
Uzbekistan	49.0	53.2	56.0	54.0	53.2	-1.5	1.8
Other Europe & Eurasia	10.3	9.7	9.2	8.8	9.0	3.0	0.3
Total Europe & Eurasia	946.5	947.9	977.8	872.8	938.8	7.6	32.6
Middle East							
Iran	97.7	100.7	104.7	118.0	124.7	5.6	4.3
Iraq	1.3	1.3	1.7	1.0	1.1	8.7	♦
Kuwait	11.3	10.9	11.5	10.1	10.4	3.5	0.4
Oman	21.3	21.6	21.7	22.3	24.4	9.4	0.8
Qatar	45.6	56.9	69.3	80.4	105.0	30.7	3.6
Saudi Arabia	66.2	67.0	72.4	70.6	75.5	7.0	2.6
Syria	5.1	5.0	4.8	5.1	7.0	37.3	0.2
United Arab Emirates	44.1	45.3	45.2	43.9	45.9	4.5	1.6
Yemen	-	-	-	0.7	5.6	704.6	0.2
Other Middle East	2.4	2.7	3.3	2.8	3.2	15.0	0.1
Total Middle East	305.2	322.1	345.9	366.4	414.6	13.2	14.4

Contd....

♦ Less than 0.05%

Table 9.3(Contd.): Country-wise Estimates of Production of Natural Gas*

(Million tonnes oil equivalent)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	% Change 2010-11 over 2009- 10	2010-11 % Share of World's Total Production
Africa							
Algeria	76.0	76.3	77.2	71.6	72.4	1.1	2.5
Egypt	49.2	50.1	53.1	56.4	55.2	-2.2	1.9
Libya	11.9	13.8	14.3	14.3	14.2	-0.6	0.5
Nigeria	25.6	31.5	31.5	22.3	30.3	35.7	1.1
Other Africa	9.4	11.1	14.2	14.7	16.1	9.4	0.6
Total Africa	172.1	182.8	190.4	179.3	188.1	4.9	6.5
Asia Pacific							
Australia	36.2	37.7	37.4	43.1	45.3	5.1	1.6
Bangladesh	13.8	14.6	16.1	17.8	18.0	1.3	0.6
Brunei	11.3	11.0	10.9	10.3	11.0	6.7	0.4
China	52.7	62.3	72.3	76.7	87.1	13.5	3.0
India	26.4	27.1	27.5	35.3	45.8	29.7	1.6
Indonesia	63.2	60.9	62.7	64.7	73.8	14.0	2.6
Malaysia	57.0	58.1	58.2	57.7	59.8	3.7	2.1
Myanmar	11.3	12.2	11.2	10.4	10.9	4.9	0.4
Pakistan	32.5	33.1	33.8	34.6	35.5	2.7	1.2
Thailand	21.9	23.4	25.9	27.8	32.7	17.4	1.1
Vietnam	6.3	6.4	6.7	7.2	8.4	16.7	0.3
Other Asia Pacific	12.8	15.2	16.0	16.1	15.6	-3.4	0.5
Total Asia Pacific	345.4	362.0	378.7	401.7	443.9	10.5	15.4
TOTAL WORLD	2600.4	2664.0	2763.8	2685.4	2880.9	7.3	100.0

* Excluding gas flared or recycled.

Source : Ministry of Petroleum & Natural Gas.

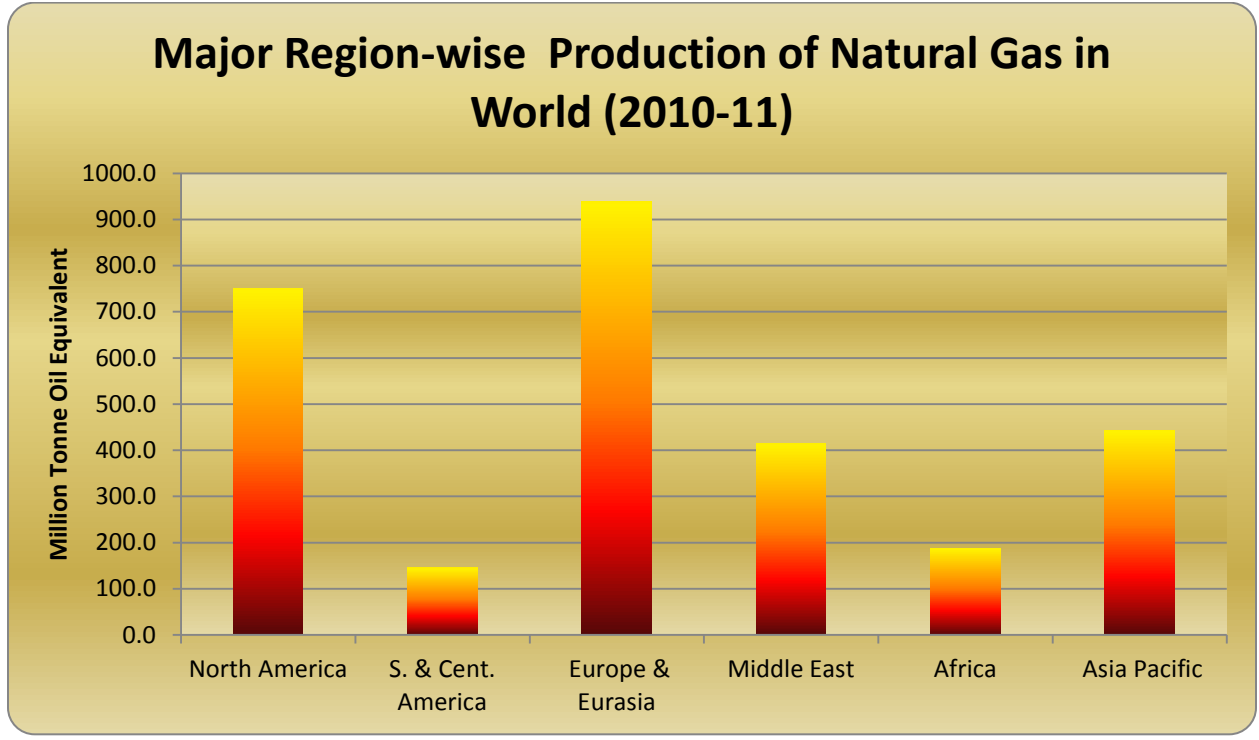


Figure 9.3

Table 9.4 : Country-wise Estimates of Consumption of Natural Gas

Country/ Region	(Million tonnes oil equivalent)						
	2006-07	2007-08	2008-09	2009-10	2010-11	% Change 2010-11 over 2009-10	2010-11 % Share of World's Total Consumption
North America							
USA	560.0	597.3	600.6	588.3	621.0	5.6	21.7
Canada	87.3	85.7	86.0	85.0	84.5	-0.6	3.0
Mexico	54.8	56.5	59.8	59.9	62.0	3.4	2.2
Total North America	702.1	739.5	746.4	733.1	767.4	4.7	26.9
South and Central America							
Argentina	37.6	39.5	40.0	38.8	39.0	0.4	1.4
Brazil	18.7	19.0	22.2	17.8	23.8	33.8	0.8
Chile	7.0	4.1	2.4	2.8	4.2	51.0	0.1
Colombia	6.3	6.7	6.8	7.8	8.2	4.3	0.3
Ecuador	0.7	0.5	0.4	0.4	0.4	-6.0	^
Peru	1.6	2.4	3.1	3.1	4.9	56.0	0.2
Trinidad & Tobago	18.2	18.2	19.7	18.8	19.8	5.5	0.7
Venezuela	28.3	26.6	28.3	27.5	27.6	0.6	1.0
Other S. & Cent. America	3.5	4.0	4.3	4.5	5.0	9.9	0.2
Total S. & Cent. America	121.9	121.2	127.2	121.6	132.9	9.3	4.7
Europe and Eurasia							
Austria	8.5	8.0	8.6	8.4	9.1	8.6	0.3
Azerbaijan	8.2	7.2	8.2	7.0	5.9	-15.9	0.2
Belarus	17.1	17.0	17.3	14.5	17.7	22.3	0.6
Belgium & Luxembourg	15.4	15.3	15.5	15.7	17.4	10.9	0.6
Bulgaria	2.9	2.9	2.9	2.1	2.3	10.1	0.1
Czech Republic	8.4	7.8	7.8	7.4	8.4	13.7	0.3
Denmark	4.6	4.1	4.1	4.0	4.5	12.2	0.2
Finland	3.8	3.5	3.6	3.2	3.5	9.9	0.1
France	37.9	38.2	39.4	38.0	42.2	11.1	1.5
Germany	78.5	74.6	73.1	70.2	73.2	4.2	2.6
Greece	2.8	3.4	3.6	3.0	3.3	8.2	0.1
Hungary	11.5	10.7	10.6	9.1	9.8	7.7	0.3
Republic of Ireland	4.0	4.3	4.5	4.3	4.8	10.8	0.2
Italy	69.7	70.0	70.0	64.4	68.5	6.4	2.4
Kazakhstan	25.3	23.8	24.5	22.1	22.7	2.9	0.8
Lithuania	2.9	3.3	2.9	2.5	2.8	14.3	0.1
Netherlands	34.3	33.3	34.7	35.0	39.2	12.1	1.4
Norway	4.0	3.8	3.9	3.7	3.7	-0.5	0.1
Poland	12.4	12.4	12.5	12.0	12.9	7.1	0.5
Portugal	3.7	3.9	4.2	4.2	4.5	6.7	0.2
Romania	16.3	14.5	14.3	11.9	12.0	0.6	0.4
Russian Federation	367.7	379.9	374.4	350.7	372.7	6.3	13.0
Slovakia	5.4	5.1	5.2	4.4	5.1	14.5	0.2
Spain	30.3	31.6	34.8	31.1	31.0	-0.3	1.1
Sweden	0.8	0.9	0.8	1.0	1.4	38.9	0.1
Switzerland	2.7	2.6	2.8	2.7	3.0	10.5	0.1
Turkey	27.4	32.5	33.8	32.1	35.1	9.2	1.2
Turkmenistan	16.5	19.1	18.5	17.9	20.4	13.5	0.7
Ukraine	60.3	56.9	54.0	42.3	46.9	11.0	1.6
United Kingdom	81.1	81.9	84.5	78.0	84.5	8.3	3.0
Uzbekistan	37.7	41.3	43.8	39.2	41.0	4.6	1.4
Other Europe & Eurasia	14.7	15.3	14.5	12.3	14.1	14.9	0.5
Total Europe & Eurasia	1016.5	1029.1	1033.4	954.5	1023.5	7.2	35.8

Contd...

Table 9.4(Contd.) : Country-wise Estimates of Consumption of Natural Gas*

(Million tonnes oil equivalent)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	% Change 2010-11 over 2009- 10	2010-11 % Share of World's Total Consumption
Middle East							
Iran	97.8	101.7	107.4	118.2	123.2	4.2	4.3
Israel	2.1	2.5	3.7	4.1	4.8	17.5	0.2
Kuwait	11.3	10.9	11.5	10.9	12.9	18.8	0.5
Qatar	17.6	17.4	17.4	18.0	18.4	2.0	0.6
Saudi Arabia	66.2	67.0	72.4	70.6	75.5	7.0	2.6
United Arab Emirates	39.0	44.3	53.5	53.2	54.5	2.5	1.9
Other Middle East	28.3	29.1	32.8	34.7	39.6	14.1	1.4
Total Middle East	262.3	272.8	298.7	309.7	329.0	6.2	11.5
Africa							
Algeria	21.4	21.9	22.8	24.5	26.0	6.0	0.9
Egypt	32.9	34.5	36.8	38.3	40.6	6.0	1.4
South Africa	3.1	3.1	3.4	3.0	3.4	13.8	0.1
Other Africa	22.0	25.4	27.2	23.2	24.4	5.5	0.9
Total Africa	79.3	85.0	90.1	89.0	94.5	6.1	3.3
Asia Pacific							
Australia	22.8	24.9	25.9	27.7	27.3	-1.2	1.0
Bangladesh	13.8	14.6	16.1	17.8	18.0	1.3	0.6
China	50.5	63.5	73.2	80.6	98.1	21.8	3.4
China Hong Kong SAR	2.6	2.5	2.9	2.8	3.4	24.3	0.1
India	33.5	36.1	37.2	45.9	55.7	21.5	1.9
Indonesia	29.9	28.2	30.0	33.6	36.3	7.8	1.3
Japan	75.4	81.2	84.4	78.7	85.1	8.1	3.0
Malaysia	30.4	30.1	30.4	30.3	32.2	6.2	1.1
New Zealand	3.3	3.6	3.4	3.5	3.7	4.2	0.1
Pakistan	32.5	33.1	33.8	34.6	35.5	2.7	1.2
Philippines	2.4	2.8	3.0	3.0	2.8	-5.8	0.1
Singapore	6.3	7.8	7.4	7.3	7.6	4.2	0.3
South Korea	28.8	31.2	32.1	30.5	38.6	26.5	1.4
Taiwan	10.0	10.6	10.5	10.2	12.7	24.3	0.4
Thailand	30.0	31.8	33.6	35.3	40.6	15.0	1.4
Vietnam	6.3	6.4	6.7	7.2	8.4	16.7	0.3
Other Asia Pacific	4.9	5.4	5.1	4.6	4.8	3.6	0.2
Total Asia Pacific	383.4	413.7	435.6	453.5	510.8	12.6	17.9
TOTAL WORLD	2565.6	2661.3	2731.4	2661.4	2858.1	7.4	100.0

^ Less than 0.05.

The difference between these world consumption figures and the world production statistics is due to variations in stocks at storage facilities and liquefaction plants, together with unavoidable disparities in the definition, measurement or conversion of gas supply and demand data.

Source : Ministry of Petroleum & Natural Gas.

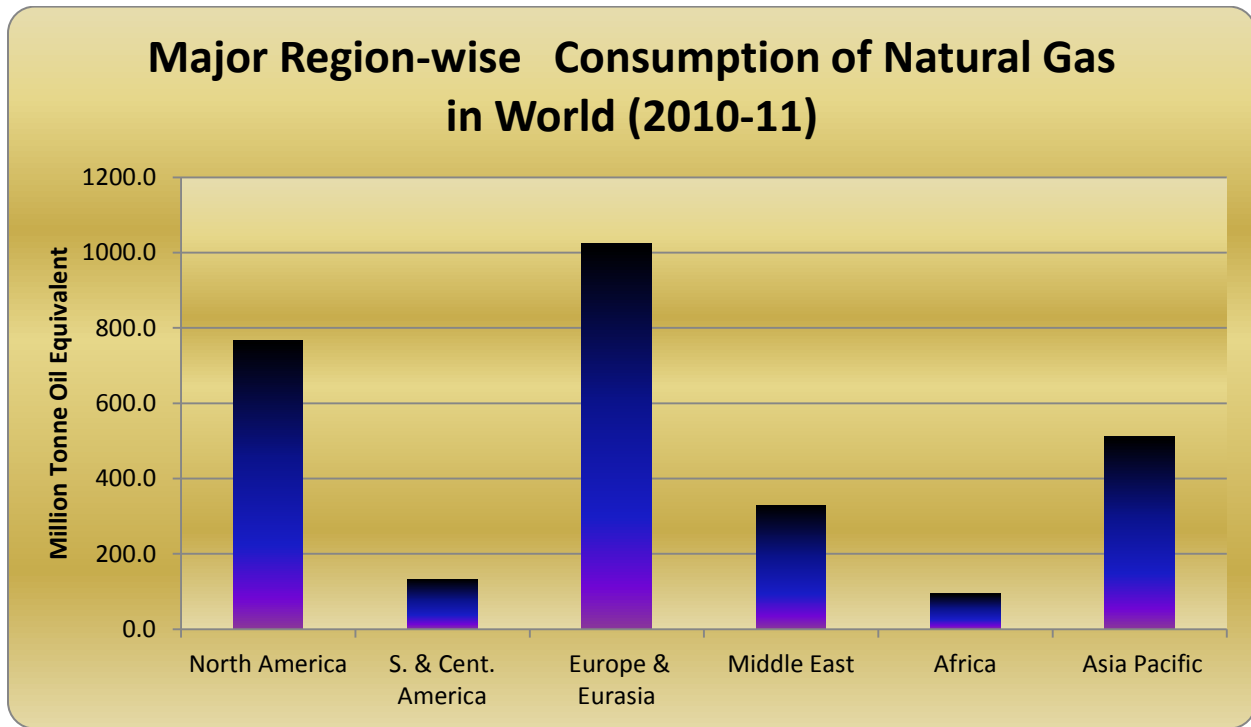


Figure 9.4

Definitions adopted by United Nations & India

1. Solid fuels

- i. **Hard Coal:** Coal has a high degree of coalification with a gross calorific value over 24 MJ/Kg.(5700 Kcal/kg) on an ash-free but moist basis. Included are fines, middling, slurry produced in the installations at pitheads.
- ii. **Lignite:** Brown coal is a coal with a low degree of coalification. It's gross calorific value is 5,700 K.cal./kg. or less on an ash-free but moist basis.
- iii. **Coke:** The solid product obtained from carbonization of coal or lignite at high temperature.

2. Liquid fuels

- i. **Crude petroleum** comprises of the liquid product obtained from oil wells consisting predominantly of non-aromatic hydrocarbons (paraffinic, cyclanic, etc.) provided that they have not been subjected to any further processes other than those of decantation, dehydration or stabilization (removal of certain dissolved hydrocarbon gases for convenience of transport or to which have been added only hydrocarbons previously recovered by physical methods during the course of the above processes. Data for crude petroleum include shale oil and field condensate but exclude natural gas liquids from plants and oils obtained from the distillation of solid fuels.
- ii. **Liquefied petroleum** gases include (i) hydrocarbons extracted by stripping of natural gas at crude petroleum and natural gas sources; (ii) hydrocarbons extracted by stripping of imported natural gas in installations of the importing country; and (iii) hydrocarbons produced both in refineries and outside refineries in the course of processing of crude petroleum or its derivatives. Included are mainly propane, butane, isobutane and ethane.
- iii. **Motor gasoline** comprises of a mixture of relatively volatile hydrocarbons with or without small quantities of additives, which have been blended to form a fuel suitable for use in spark-ignition internal combustion engines. Natural gasoline, aviation gasoline and naphtha's are excluded.
- iv. **Naphtha's** are refined or partly refined light distillates derived roughly between 27 and 221 degrees centigrade, which are to be further blended or mixed with other materials to make high grade motor gasoline or jet fuel, or to be used as raw materials for town gas or feed stocks to make various kinds of chemical products, or to be used as various solvents, depending on the character of naphtha's derived and the demands of various industries.
- v. **Kerosene** comprises mixtures of hydrocarbons with a flash point above 38 degrees centigrade, distilling less than 90 per cent in volume at 210 degrees centigrade, including losses. It is a refined crude petroleum fuel in volatility between motor gasoline and gas oil, free of gasoline's and heavy hydrocarbons such as gas oil and lubricating oil. It is used as a illuminant and as a fuel in certain types of spark-ignition engines such as those used for agricultural tractors and stationary engines. The data include those products, commonly named as burning oil, vaporizing oil, power kerosene and illuminating oil. Jet fuel, white spirit and naphtha's are excluded.

- vi. **Jet fuels** comprise of fuel meeting of the required properties for use in jet engines and aircraft-turbine engines, mainly refined from kerosene. Gasoline-type jet fuel (light hydrocarbons, also naphtha's type, intended for use in aviation gas-turbine units as opposed to piston power units) is included.
- vii. **Gas-diesel** oils comprise of gas oils (with a flash point in a closed vessel of at least 55 degrees centigrade and distilling 90 per cent or more in volume at 360 degrees centigrade), fuel oils (with a flash point in a closed vessel of between 55 and 190 degrees centigrade and needle penetration at 25 degrees centigrade of 400 or more), domestic fuel oil (with a viscosity of less than 12 centistokes at 20 degrees centigrade and an asphalt content of not less than 0.5 per cent). It is used as a fuel for internal combustion in diesel engines, as burner fuel in heating installations such as furnaces and for enriching water gas to increase its luminosity. The data refer to those products commonly called diesel fuel, diesel oil, gas oil, solar oil, etc.
- viii. **Residual fuel oil** comprises of mixtures of hydrocarbons with a viscosity of at least 49 centistokes at 20 degrees centigrade and an asphalt content of at least 1 per cent. It is crude petroleum residues, such as viscous residuum obtained by the refinery operations of crude petroleum after gasoline, kerosene and sometimes heavier distillates (such as gas oil or diesel oil) have been removed. It is commonly used by ships and industrial large scale heating installations as a fuel in furnaces of boilers. It is also known as mazout.
- ix. **Lubricants** are mixtures of hydrocarbons distilling less than 30 per cent in volume at 300 degrees centigrade with a flow point lower than 30 degrees centigrade. They are heavy liquid distillates obtained by refining crude petroleum and are used for lubricating purposes. They may be produced either from petroleum distillates or residues at refineries. Solid lubricants (e.g. grease) are excluded.
- x. **Petroleum coke** is a solid residue consisting mainly of carbon, obtained by the distillation of heavier petroleum oils; used mainly in metallurgical process (excluding those solid residues obtained from carbonization of coal).
- xi. **Bitumen (Asphalt)** is a brown to black solid or semi-solid material obtained as a residue in the distillation of crude petroleum. It is used mainly in road construction. Natural asphalt is excluded.
- xii. **Refinery gas** is a non-condensable gas collected in petroleum refineries (it is also known as still gas).

3. Gaseous fuels

- i. **Natural Gas** is a mixture of hydrocarbon compounds and small quantities of non-hydrocarbons existing in the gaseous phase, or in solution with oil in natural underground reservoirs. It may be sub-classified as associated gas (that originating from fields producing both liquid and gaseous hydrocarbons), dissolved gas, or non-associated gas (that originating from fields producing only hydrocarbons in gaseous form). Included are methane (CH₄) recovered from coal mines,

sewage gas and natural gas liquefied for transportation. Excluded, however, are gases used for re-pressuring and re-injection, as well as gas flared, vented or otherwise wasted, and shrinkage accruing to processing for the extraction of natural gas liquids.

- ii. **Coke-oven gas** is a by-product of the carbonization process in the production of coke in coke ovens.
- iii. **Bio-gas** is a by-product of the fermentation of biomass, principally animal wastes by bacteria. It consists mainly of methane gas and carbon dioxide.

4. Electricity

- i. **Installed capacity:** The net capacity measured at the terminals of the stations, i.e., after deduction of the power absorbed by the auxiliary installations and the losses in the station transformers.
- ii. **Utilities:** undertakings of which the essential purpose is the production, transmission and distribution of electric energy. These may be private companies, cooperative organisations, local or regional authorities, nationalised undertakings or governmental organisations.
- iii. **Hydro Electricity:** as energy value of electricity is obtained by dividing the electricity generation by the average efficiency of all hydro-power stations.
- iv. **Thermal Electricity** comprises conventional thermal plants of all types, whether or not equipped for the combined generation of heat and electric energy. Accordingly, they include steam-operated generating plants, with condensation (with or without extraction) or with back-pressure turbines, and plants using internal combustion engines or gas turbines whether or not these are equipped for heat recovery.
- v. **Nuclear Electricity** is defined as the heat released by the reactors during the accounting period and is obtained by dividing the generation of nuclear electricity by average efficiency of all nuclear power stations.
- vi. **Production** comprises gross production, i.e. the amount of electric energy produced, including that consumed by station auxiliaries and any losses in the transformers that are considered integral parts of the station. Included is the total production of electric energy produced by pump storage installations.
- vii. **Imports, exports** refer to the amounts of electric energy transferred to and from the countries concerned, which are measured at the metering points on the lines crossing the frontiers. Included are imports and exports of electric energy made by means of high voltage lines crossing frontiers as well as imports and exports of electric energy made by means of low-voltage lines for use in the immediate vicinity of the frontier, if the quantities so transferred are known.
- viii. **Station use & loss:** included are consumption by station auxiliaries and losses in transformers which are considered as integral parts of the electric energy generating plants.

- ix. **Losses in transport & distribution** comprise of the losses in transmission and distribution of electric energy and losses in transformers which are not considered as integral parts of the electric energy generating plants. Included also is the electric energy consumed in pumping for pump storage installations.

5. Non-commercial Energy Sources

- i. **Fuel wood** comprises of the volume of all wood (coniferous and non-coniferous) in the rough use for fuel purposes.
- ii. **Charcoal** comprises of the solid residue consisting mainly of carbon obtained by the destructive distillation of wood in the absence of air.
- iii. **Bagasse** is a cellulosic residue of the sugar-cane industry, which is often used as a fuel within the sugar milling industry.

Source: Energy Statistics: Definitions, Units of Measure and Conversion Factors-Studies in Methods Series 'F' No.44-UNITED NATIONS, NEW YORK – 1987

Annex II

Conversion Factors

1 kilogram	=	2.2046 pounds
1 Pound	=	454 gm.
1 Cubic metres	=	35.3 cubic feet (gas)
1 Metric ton	=	1 Tonne
	=	1000 kilogram
1 joule	=	0.23884 calories
1 mega joule	=	10^6 joules = 238.84×10^3 calories
1 giga joule	=	10^9 joules = 238.84×10^6 calories
1 tera joule	=	10^{12} joules = 238.84×10^9 calories
1 peta joule	=	10^{15} joules = 238.84×10^{12} calories

One million tonnes of coal in

1970-81	=	20.93 peta joules of energy.
1982-83	=	19.98 peta joules of energy.
1984-89	=	19.62 peta joules of energy.
1990-96	=	17.81 peta joules of energy.
1997-99	=	17.08 peta joules of energy.
1999-00	=	16.93 peta joules of energy.
2000-01	=	16.88 peta joules of energy.
2001-02	=	16.87 peta joules of energy.
2002-03	=	16.68 peta joules of energy.
2003-04	=	16.69 peta joules of energy.
2004-05	=	16.60 peta joules of energy.
2005-06	=	16.03 peta joules of energy.
2006-11	=	16.14 peta joules of energy.

One million tonnes of oil equivalent (MTOE)	=	41.87 peta joules of energy.
	=	4.1868×10^4 terajoule (TJ)
One billion	=	38.52 peta joules of energy.
One millior	=	38.52 tera joules of energy.
	=	.03852 peta joules of energy.
One billion	=	3.60 peta joules of energy.

Abbreviations

ATF	:	Aviation Turbine Fuel
HSDO	:	High Speed Diesel Oil
LDO	:	Light Diesel Oil
LSHS	:	Low Sulphur Heavy Stock
LPG	:	Liquefied Petroleum Gas
MS/MOGAS	:	Motor Spirit/Motor Gasoline
F.O.	:	Furnace Oil
M.T.O.	:	Mineral Turpentine Oil
PET-COKE	:	Petroleum Coke
SBPS	:	Special Boiling Point Spirit
SKO	:	Superior Kerosene Oil
CPEs	:	Centrally Planned Economies
N.C.W.	:	Non-communist World
O.P.E.C.	:	Organisation of Petroleum Exporting Countries
O.E.C.D.	:	Organisation for Economic Cooperation & Development
EMEs	:	Emerging Market Economies (includes countries of South & Central America, Africa, Middle-east, Non-OECD Asia & Non-OECD Europe)
MW	:	Megawatt
KW	:	Kilowatt
(P)	:	Provisional

Energy Data Collection Mechanisms-Country Practice

I. Coal and Coal Derivatives

I.1 Organisational set up: The Coal controller's Office is a subordinate office of M/o Coal having headquarter in Kolkata and five field offices at Dhanbad, Ranchi, Bilaspur and Nagpur. The Statistical Division of coal controller's Office, working under overall guidance of Coal Controller located at Kolkata is having a Deputy Director General and Deputy Director from Indian Statistical Service.

I.2. Current Activities: Statistics division of Coal Controller's Office (CCO) is looking after all work related to coal and lignite statistics. Major role of this division are as under:-

- Collection, compilation, analysis and dissemination of Coal Statistics
- Undertake Annual Survey of Coal and Lignite Industry to assess production, dispatch, stock at pithead etc.
- To monitor the progress of captive coal and lignite blocks
- To maintain a database of washeries in India

I.3 Future initiatives:- To develop a more robust database, Coal Controller's Office needs to conduct own survey on various aspect of coal statistics like reserve, production, dispatch, stock at pithead etc.

I.4. Details of data flows/ items:

- **Data items-** The organization is collecting data on the following items on regular basis:-

ITEMS	PERIODICITY
1. Reserve (from GSI)	Annual
2. Production (from coal/ lignite company)	Monthly
3. Despatches (from coal/ lignite company)	-do-
4. Pit head closing stock (")	-do-
5. Price (for non-captive coal mines)	-do-
6. Wagon Loading (Rail)(from CIL/ SCCL)	-do-
7. Import & Export (DGC&S)	-do-
8. Coal consumption in steel (from SAIL/RINL/TSL)	Monthly
9. Coal consumption in power & cement sector (from CEA etc.)	Annual
10. Captive coal & lignite mining	Monthly
11. Washery in India	Monthly
12. World Coal Statistics (from IEA)	Annual
13. Colliery-wise production data	Annual

- **Data sources and Act/ Order/ Rule etc.**

The data are collected from different coal/ lignite companies under the statutory power vested with the Coal Controller under the provisions of Collection of Statistics Act, 1953, the Colliery Control Rule, 2004 and Coal Mines (Conservation & Development) Act, 1974 and publications of CIL, SAIL and DGCIS.

- **Methodology of Data Collection**

Monthly Data- Data are collected from coal companies (pvt. And pub) on monthly basis on some major parameters.

Annual survey- Complete enumeration (through mailed questionnaire) and sample check by physical inspection in Annual Survey of Coal and Lignite Industries.

Coverage:- Entire coal and lignite producing sector.

Response:- 100%

- Details of data items being compiled and periodicity

ITEMS	PERIODICITY
1. Coal production data for PMO	Monthly
2. Data for Infrastructure Bulletin of MOSPI through MOC	Monthly
3. Data for IIP(Covering Washed Coal, Middlings, Hard Coke)	Monthly
4. Data for IIP of Mineral Sector (Coal & Lignite – state-wise)	Monthly
5. Provisional Coal Statistics	Annual
6. Coal Directory of India- Vol I & II	Annual
7. U. N. Annual energy Report- through CSO	Annual
8. IEA(for energy balance in case of non-OECD country: India)	Annual
9. Ad-hoc Reports	As and when required

I.5 Data Collection Problem

Main hindrance of Coal Controller Office is crunch of manpower. To conduct a new survey on coal sector, CCO does not have any trained/skilled statistical staff.

II. Petroleum and Natural Gas

The Ministry of Petroleum and Natural Gas is mandated to take measures for exploration and exploitation of petroleum resources including natural gas and coal bed methane, and also distribution, marketing and pricing of petroleum products.

II.1. Organizational set up and activities

Ministry of Petroleum has an Economic and Statistics Division headed by Economic Adviser. The Division provides economic inputs to the Divisions of the Ministry after detailed analysis of the plan and programmes. An exhaustive data base is maintained on production and trade of crude oil, natural gas, petroleum products and stages of capacity creation by the petroleum industry. The Economic and Statistics Division is involved in the plan formulation exercise of the public sector enterprises associated with petroleum exploration, production, refining and marketing. Also, all issues pertaining to foreign investment policy in the petroleum sector and issues relating to Double Taxation Avoidance Agreement (DTAA) on Income & Capital etc. are handled in the Division.

The Division brings out the following reports for monitoring the performance of Petroleum & Natural gas products:

Monthly & Quarterly Reports on Petroleum Statistics: Collection, compilation and submission of Reports on:

- (i) Production of Crude Oil, Natural Gas and Petroleum Products- to Ministries/Department/Committees etc. on monthly basis.
- (ii) Quarterly report on Production Performance- to Ministry of Statistics & Programme Implementation;
- (iii) Import/Export of Crude Oil and Petroleum Products- to the designated Ministries/Departments.
- (iv) Joint Oil Data Initiative Statistics - to United Nations Statistics Division.

Publication of Annual Basic Statistics on Petroleum & Natural Gas Products and Annual Indian Petroleum & Natural Gas Statistics

II.2. Details of the data flows and items

Data Collected: Production of Crude Oil, all Petroleum Products, Natural Gas, LNG, Imports/Exports of Oil & Petroleum products, Consumption of Petroleum Products and Refinery intake etc. on monthly basis and apart from these data other related data for publication of “Basic Statistics on Indian Petroleum & Natural Gas Products” and “Indian Petroleum & Natural Gas Statistics” being collected annually.

Periodicity & Data Sources: The data being collected on monthly, quarterly, annual basis from all Public Sector Undertakings and Private Oil Companies including oil refineries.

Methods of Data Collection: Data collected through electronic mail, FAX as well as hard copy by post.

Data Dissemination Methods: Monthly, Quarterly and Annual Progress Reports circulated to all concerned and also uploaded on Ministry's web site for the public user.

II.3. Provisions under which statutory returns are collected for the petroleum sector:

(i) For returns on crude oil and natural gas

- Principal Legislation:

THE OILFIELDS (REGULATION AND DEVELOPMENT) ACT, 1948
(53 of 1948) (8TH SEPTEMBER, 1948)

- Subordinate Legislation:

THE PETROLEUM AND NATURAL GAS RULES, 1959
(As amended from time to time)

Section 14: Royalty on petroleum and furnishing of returns and particulars:

(2) The lessee shall, within the first seven days of every month or within such further time as the Central Government or the State Government, as the case may be, may allow, furnish or cause to be furnished to the Central Government or the State Government as the case may be a full and proper return showing the quantity of all crude oil, casing head condensate and natural gas obtained during the preceding month from mining operations conducted pursuant to the lease. The monthly return required to be furnished shall be, as nearly as may be, in the form specified in the schedule annexed to these rules.

(ii) For returns on refinery output (petrol, diesel etc)

-Principal Legislation:

THE INDUSTRIES (DEVELOPMENT AND REGULATION) ACT, 1951, (ACT NO. 65 OF 1951)

-Subordinate Legislation:

Scheduled Industries (Submission of Production Returns) Rules, 1979.

Section 6: However, collection of data is also governed by the Gazette of India (Extraordinary) Part II-Section 3-Sub Section (i) order No.G.S.R.272(E) dated 16.04.1999 wherein clause 8 states that "Every oil refining company shall furnish to the Central Government or an agency nominated by Central Government any and every information that may be asked for in regard to the procurement, stocking, movements (onshore or offshore), transfers, imports, exports and sales of crude oil and or all products at such period, in such manner and from such of the sources, as may be specified from time to time".

III. Electricity

III.1 Organisational Setup

The Central Electricity Authority (CEA) is the nodal authority for supply of electricity data. It is a statutory organization under M/o Power. constituted under Section 3 of the repealed Electricity (Supply) Act, 1948. It was established as a part-time body in the year 1951 and made a full-time body in the year 1975.

With the objective of reforming the Power Sector, the Electricity Act, 2003 (No. 36 of 2003) has been enacted and the provisions of this Act have been brought into force with effect from 10th June, 2003.

III.2 Functions

As per section 73 of the Electricity Act, 2003, the Central Electricity Authority shall perform such functions and duties as the Central Government may prescribe or direct, and in particular to -

- a) advise the Central Government on the matters relating to the national electricity policy, formulate short-term and perspective plans for development of the electricity system and coordinate the activities of the planning agencies for the optimal utilization of resources to sub serve the interests of the national economy and to provide reliable and affordable electricity to all consumers;
- b) specify the technical standards for construction of electrical plants, electric lines and connectivity to the grid;
- c) specify the safety requirements for construction, operation and maintenance of electrical plants and electric lines;
- d) specify the Grid Standards for operation and maintenance of transmission lines;
- e) specify the conditions for installation of meters for transmission and supply of electricity;
- f) promote and assist in the timely completion of schemes and projects for improving and augmenting the electricity system;
- g) promote measures for advancing the skills of persons engaged in electricity industry;
- h) advise Central Government on any matter on which its advice is sought or make recommendation to that Government on any matter if, in the opinion of the Authority, the recommendation would help in improving the generation, transmission, trading, distribution and utilization of electricity;
- i) collect and record the data concerning the generation, transmission, trading, distribution and utilization of electricity and carry out studies relating to cost, efficiency, competitiveness and such like matters;
- j) make public from time to time the information secured under this Act, and provide for the publication of reports and investigations;
- k) promote research in matters affecting the generation, transmission, distribution and trading of electricity;
- l) carry out, or cause to be carried out, any investigation for the purpose of generating or transmitting or distributing electricity;
- m) advise any State Government, licensees or the generating companies on such matters which shall enable them to operate and maintain the electricity system under their ownership or control in an improved manner and where necessary, in coordination with any other Government, licensee or the generating company owning or having the control of another electricity system;
- n) advise the Appropriate Government and the Appropriate Commission on all technical matters relating to generation, transmission and distribution of electricity; and
- o) discharge such other functions as may be provided under this Act.

III.3. Details of the data Flows/ Items

In exercise of the powers conferred by section 177, read with section 74 and clause (i) of section 73 of the Electricity Act, 2003, the Central Electricity Authority published the regulations vide Extra Ordinary Gazette notification dated 19th April 2007, namely:- **Central Electricity Authority (Furnishing of Statistics, Returns and Information) Regulations,2007**

(a) Sources of Statistics, Returns and Information

All licensees, generating companies and person(s) mentioned below, but not limited to, shall furnish to the Authority such statistics, returns or other information relating to generation, transmission, distribution, trading and utilization of electricity at such times and in such form and manner as specified under these regulations-

☐ Licensees

- (i) Transmission Licensees;
- (ii) Distribution Licensees;
- (iii) Trading Licensees;
- (iv) Central Transmission Utility;
- (v) State Transmission Utilities;
- (vi) Appropriate Governments who are responsible for transmitting, distributing or trading of electricity;
- (vii) Damodar Valley Corporation established under sub-section (1) of section 3 of the Damodar Valley Corporation Act, 1948 (14 of 1948);
- (viii) Any person engaged in the business of transmission or supply of electricity under the provisions of the repealed laws or any act specified in the Schedule;
- (ix) Any person who intends to generate and distribute electricity in a rural area as notified by the State Government;
- (x) State Electricity Boards;
- (xi) Local authorities including Cantonment Boards;
- (xii) Deemed licensees and entities exempted from license.
- (xiii) Bhakra Beas Management Board.

☐ Generating companies

- (i) Generating companies established by appropriate Governments;
- (ii) Independent Power Producers;
- (iii) Appropriate Governments responsible for generating electricity;
- (iv) Bhakra Beas Management Board;
- (v) Any person engaged in the business of generating electricity under the provisions of the repealed laws or any act specified in the Schedule;
- (vi) Damodar Valley Corporation.

☐ Person(s) generating electricity for own use:

- (i) All captive power producers;
- (ii) Any other person including Co-operative Society, Association of persons, body of individuals, etc. engaged in generating electricity for its or his own use.

❑ Other entities

- (i) National Load Despatch Centre;
- (ii) Regional Load Despatch Centre(s);
- (iii) State Load Despatch Centre(s);
- (iv) Regional Power Committee(s);
- (v) High voltage or extra high voltage consumers of electricity.

(b) Formats for furnishing of statistics, returns or information –

The entities shall furnish the statistics, returns and information as per the formats annexed to these regulations titled “List of formats, frequency(ies) and target date(s)”. These formats can also be obtained from the website of the Central Electricity Authority. (website www.cea.nic.in)

(c) Time schedule for furnishing of statistics, returns or information –

The time schedule or targets for furnishing of statistics, returns or information is specified by the Authority on its prescribed formats.

(d) Frequency of submission of statistics, returns or information –

The frequency of submission i.e. daily, weekly, monthly, quarterly or annually is specified by the Authority in its prescribed formats.

(e) Manner of furnishing the statistics, returns or information –

The statistics, returns or information in the prescribed formats shall be furnished to the Authority preferably electronically or by post or courier or fax.

III.4 Data collection problems

The Central Electricity Authority is receiving data from various Public and Private Entities/ Utilities / Organizations/Industries. Though, it is mandatory to these organizations to furnish the correct, complete data in time, yet the following problems are being faced in collection of data.

1. Delay in furnishing data.
2. Furnishing incomplete/ incorrect data.
3. Non submission of data.

For smooth collection of the electricity data, CEA is installing electronic data collection system titled as Information Management System (IMS), where all the returns of electricity data can be directly furnished by concerned party (licensees, generating companies, entities etc.)

IV. New and Renewable Energy

IV.1. Nodal ministry

Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India at the National level for all matters relating to new and renewable energy. The Ministry has been facilitating the implementation of broad spectrum programmes including harnessing renewable power, renewable energy to rural areas for lighting, cooking and motive power, use of renewable energy in urban, industrial and commercial applications and development of alternate fuels and applications. In addition, it supports research, design and development of new and renewable energy technologies, products and services.

IV.2. Organisational setup

It is broadly organized into eight Groups dealing with 'Bio-Energy, Research & Development and TIFAD(Technology Information Forecasting, Assessment and Databank), Solar Energy', and Remote Village Electrification', Biomass and Wind Power', 'Energy for Urban, Industrial & Commercial Applications', 'Small Hydro and Information & Public Awareness', 'Hydrogen Energy' and 'Administration and Coordination'. In addition, the Ministry has an Integrated Finance Division, which is functioning under the Special Secretary and Financial Adviser. The Ministry is classified as a Scientific Ministry.

IV.3. Current responsibilities

Formulating policies and programmes for the development of new and renewable sources of energy;

- (a) Coordinating and intensifying research and development activities in new and renewable sources of energy;
- (b) Ensuring implementing of Government's policies in regard to all matters concerning new and renewable sources of energy.

IV.4. Data flows

The basic data being compiled includes year wise and month wise no. of systems installed, their capacities. locations, etc. and is obtained from various stakeholders i.e. State Government Departments/Nodal Agencies, NGOs, Private Entrepreneurs, etc. Annual statistical information regarding achievements under different programmes/schemes is being included in the yearly Annual Report of the Ministry.



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