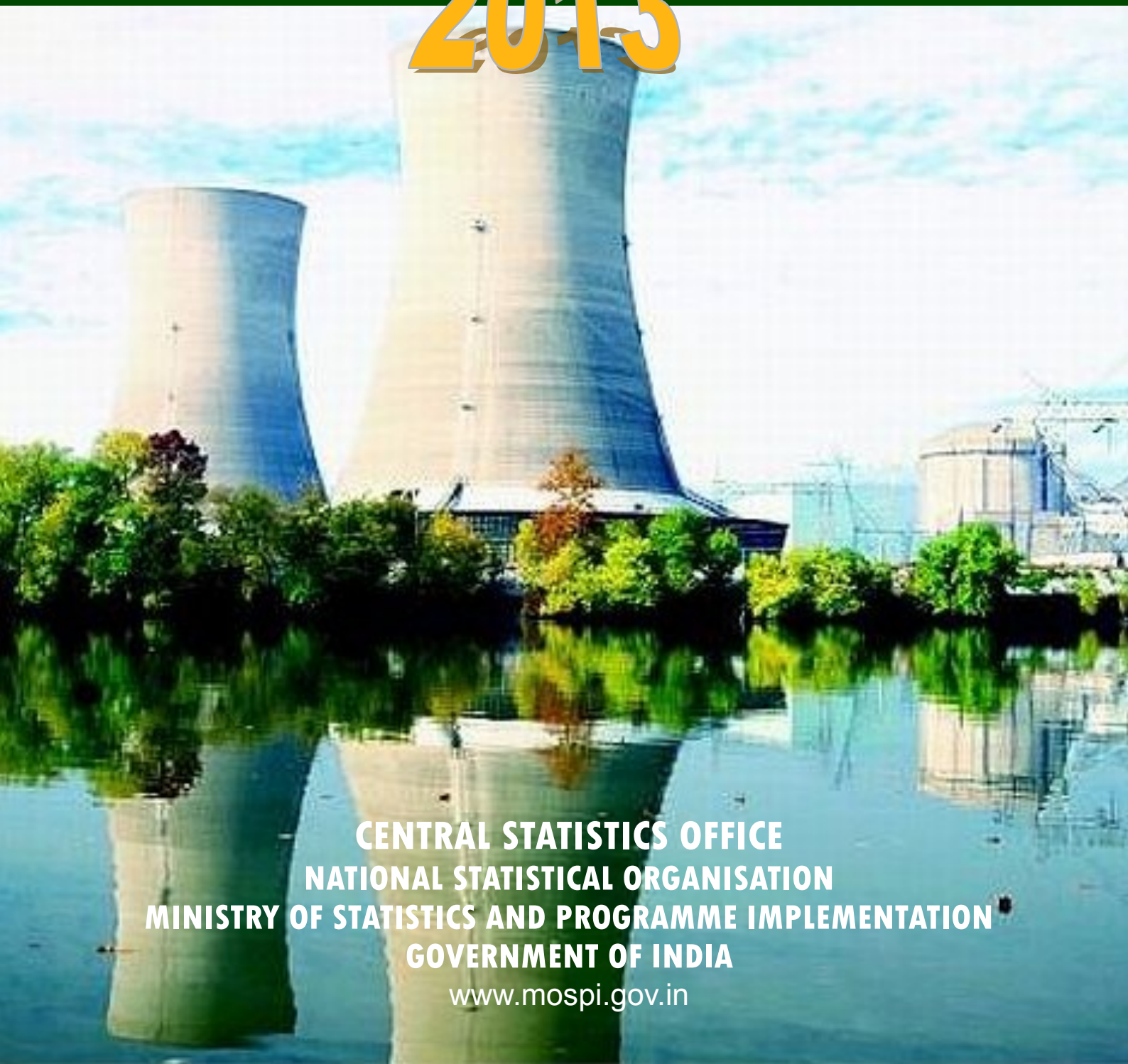
ENERGY STATISTICS

2013



CENTRAL STATISTICS OFFICE
NATIONAL STATISTICAL ORGANISATION
MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION
GOVERNMENT OF INDIA
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ENERGY STATISTICS

2013

(Twentieth Issue)

CENTRAL STATISTICS OFFICE
MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION
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NEW DELHI

FOREWORD

Energy is critical, directly or indirectly, in the entire process of evolution, growth and survival of all living beings and it plays a vital role in the socio-economic development and human welfare of a country. Energy has come to be known as a `strategic commodity' and any uncertainty about its supply can threaten the functioning of the economy, particularly in developing economies. Achieving energy security in this strategic sense is of fundamental importance not only to India's economic growth but also for the human development objectives that aim at alleviation of poverty, unemployment and meeting the Millennium Development Goals (MDGs). Holistic planning for achieving these objectives requires quality energy statistics that is able to address the issues related to energy demand, energy poverty and environmental effects of energy growth.

This publication titled "Energy Statistics" is brought out every year by Central Statistics Office (CSO) and the present one is the 20th in the series. The publication contains the latest data available from the concerned line Ministries of the Government of India, in respect of different energy sources 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. An overview of the energy deficit scenario and development perspective has been included in this publication as new feature

Analytical indicators viz. Growth Rates, Compound Annual Growth Rates (CAGR), Percentage Distributions, has been provided in relevant tables to increase the utility of the publication. An energy balance (Table 7.2) included in the publication gives a more complete picture of the gap between supply and use of energy by various sectors/industries. However, Energy Balance is still in evolution stage and needs more work to be at par with international requirements for compilation of energy balances.

I take this opportunity to convey my thanks to the cooperation of 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, Ministry of Commerce and Industry who have timely provided the requisite information for this publication. I wish to put on record my thankfulness to the team of officers in the Economic Statistics Division for their dedicated services in bringing out this publication in time.

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. I hope that "Energy Statistics 2013" shall fulfill the expectations of all.

(V.K.Arora)
ADDITIONAL DIRECTOR GENERAL (CSO)

New Delhi
March 2013.

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OVERVIEW

1. The Indian economy has experienced unprecedented economic growth over the last decade. Today, India is the ninth largest economy in the world, driven by a real GDP growth of 8.7% in the last 5 years (7.5% over the last 10 years). In 2010 itself, the real GDP growth of India was the 5th highest in the world. This high order of sustained economic growth is placing enormous demand on its energy resources. The demand and supply imbalance in energy is pervasive across all sources requiring serious efforts by Government of India to augment energy supplies as India faces possible severe energy supply constraints.

2. A projection in the Twelfth Plan document of the Planning Commission indicates that total domestic energy production of 669.6 million tons of oil equivalent (MTOE) will be reached by 2016-17 and 844 MTOE by 2021-22. This will meet around 71 per cent and 69 per cent of expected energy consumption, with the balance to be met from imports, projected to be about 267.8 MTOE by 2016-17 and 375.6 MTOE by 2021-22.

3. India's energy basket has a mix of all the resources available including renewables. The dominance of coal in the energy mix is likely to continue in foreseeable future. At present India's coal dependence is borne out from the fact that 54 % of the total installed electricity generation capacity is coal based and 67% of the capacity planned to be added during the 11 Five year Plan period 2007-12, is coal based. Furthermore, over 70 % of the electricity generated is from coal based power plants. Other renewables such as wind, geothermal, solar, and hydroelectricity represent a 2 percent share of the Indian fuel mix. Nuclear holds a one percent share.

4. The share of Coal and petroleum is expected to be about 66.8 per cent in total commercial energy produced and about 56.9 per cent in total commercial energy supply by 2021-22. The demand for coal is projected to reach 980 MT during the Twelfth Plan period, whereas domestic production is expected to touch 795 MT in the terminal year (2016-17). Even though the demand gap will need to be met through imports, domestic coal production will also need to grow at an average rate of 8 per cent compared to about 4.6 per cent in the Eleventh Five Year Plan. The share of crude oil in production and consumption is expected to be 6.7 per cent and 23 per cent respectively by 2021-22.

5. In 2011-12, India was the fourth largest consumer in the world of Crude Oil and Natural Gas, after the United States, China, and Russia. India's energy demand continued to rise inspite of slowing global economy. Petroleum demand in the transport sector is expected to grow rapidly in the coming years with rapid expansion of vehicle ownership. While India's domestic energy resource base is substantial, the country relies on imports for a considerable amount of its energy use, particularly for Crude Petroleum.

6. Combustible renewables and waste constitute about one fourth of Indian energy use. This share includes traditional biomass sources such as firewood and dung, which are used by more than 800 million Indian households for cooking.

7. India faces a significant challenge in providing access to adequate, affordable and clean sources of energy, especially cooking fuel to a large section of the population, most of who live in rural areas. As per the 2011 Census, almost 85% of rural households were dependent on traditional biomass fuels for their cooking energy requirements. National Sample Survey 2009-10 reveals the continued dependence on firewood in rural areas for cooking, with percentage of households depending on firewood remaining at 76.3% in 2009-10 – a drop of only 2 percentage points since 1993-94 – even though the percentage using LPG has increased from about 2% to 11.5% over the same period. On the other hand, the incidence of dependence on firewood for cooking in urban areas has fallen from about 30% to 17.5% between 1993-94 and 2009-10 – a drop of more than 12 percentage points – and the incidence of dependence on kerosene has plunged from 23.2% to 6.5% during the same period – a 72% fall, while the percentage of urban households using LPG has more than doubled from under 30% to 64.5%. In other words, the growth in prevalence of use of LPG in urban areas has been balanced by a decline in use of kerosene, in the first place, and firewood and chips, in the second. In rural areas, the rise in LPG use has been mainly at the expense of dung cake, followed by kerosene and 'other' sources. Further, as per the NSSO Reports (55th, 61st and 66th Rounds), there has been an increase in biomass fuel use in terms of absolute quantity consumed over the past decade among rural households. This is an area of concern given the considerable health impacts of burning biomass fuels apart from being a hindrance to achieving developmental goals, i.e. ensuring a minimum standard of living and provisioning of basic minimum needs. Thus, a transition to cleaner forms of energy in terms of access to electricity and other modern energy forms would have implications not only on energy security, but also with respect to enabling gender equality and bring about greater development and social progress.

8. 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 Can be well analyzed by the indicators of installed capacity and capacity utilization, respectively. The power sector in India had an installed capacity of 236.38 Gigawatt (GW) as of March 2012 recording an increase of 14% over that of March 2011. Captive power plants generate an additional 36.5 GW. Thermal power plants constitute 66% of the installed capacity, hydroelectric about 19% and rest being a combination of wind, small hydro-plants, biomass, waste-to-electricity plants, and nuclear energy. India generated about 855 BU electricity during 2011-12 fiscal.

9. As of March 2012, the per capita total consumption in India was estimated to be 879 kWh. India's electricity sector is amongst the world's most active players in renewable energy utilization, especially wind energy As of March 2012, India had an installed capacity of about 24.9 GW of new and renewable technologies-based electricity. During the Eleventh Five Year Plan, nearly 55,000 MW of new generation capacity was created, yet there continued to be an overall energy deficit of 8.7 per cent and peak shortage of 9.0 per cent. Resources currently allocated to energy supply are not sufficient for narrowing the gap between energy needs and energy availability.

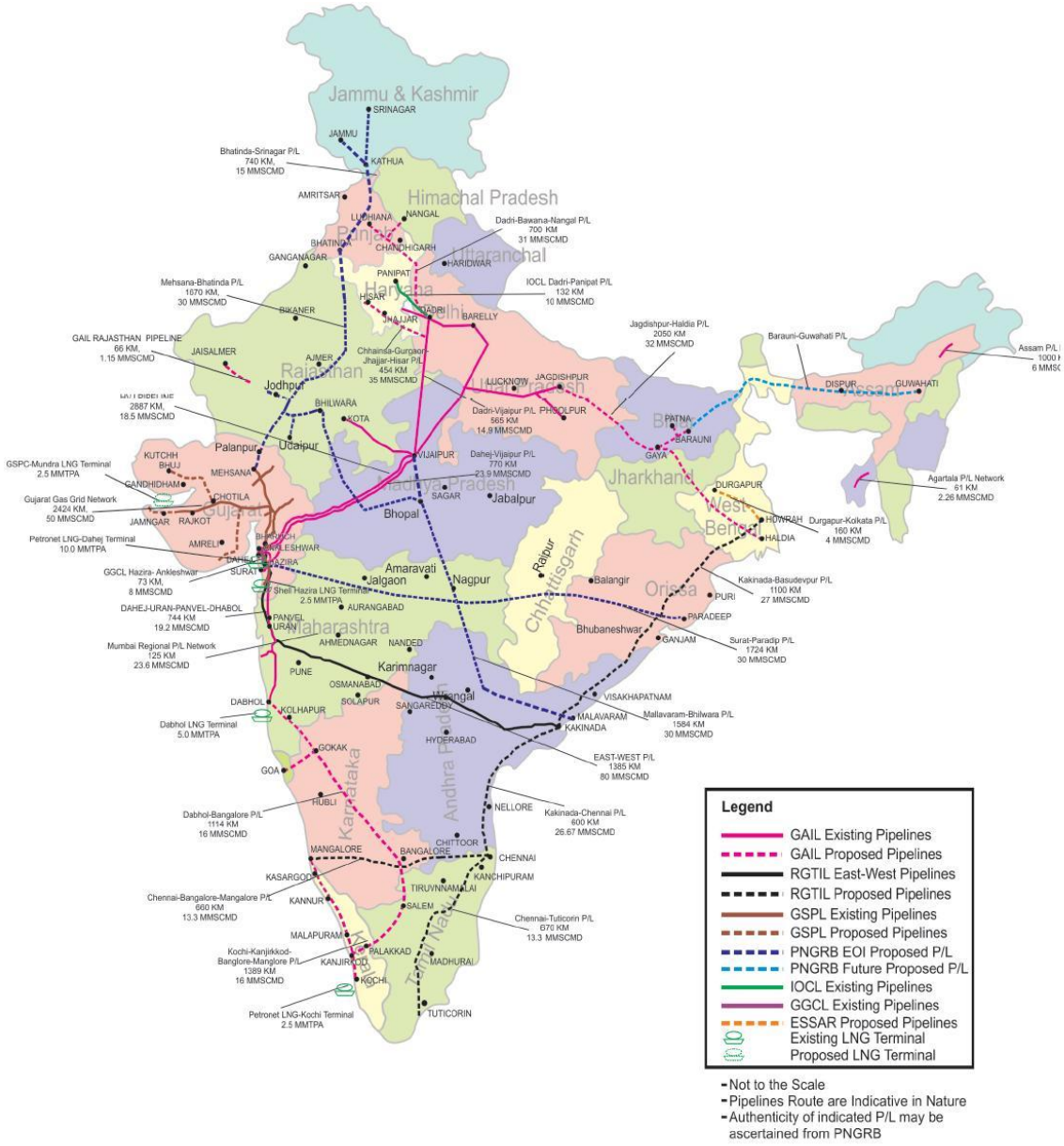
10. As per the 2011 Census, 55.3% rural households had access to electricity. However, NSS results shows that in the year 1993-94, 62% households in rural India were using kerosene as primary source of energy for lighting. In 2009-10, on the other hand, 66% households were

found using electricity for lighting. Thus electricity has, during the intervening years, evidently replaced kerosene as the most common fuel used for lighting by rural households. This substitution of kerosene by electricity appears to have been most rapid during 1993-94 to 1999-2000, when about 11% households seem to have switched to electricity. The substitution appears to have slowed down since then, with 8% more households switching over to electricity during the seven or eight years after 1999-2000, and picked up pace again thereafter, with another 9% of rural households added to the category of electricity users since 2006-07. Indeed, this may widen as the economy moves to a higher growth trajectory. India's success in resolving energy bottlenecks therefore remains one of the key challenges in achieving the projected growth outcomes. Further, India's excessive reliance on imported crude oil makes it imperative to have an optimal energy mix that will allow it to achieve its long-run goal of sustainable development.

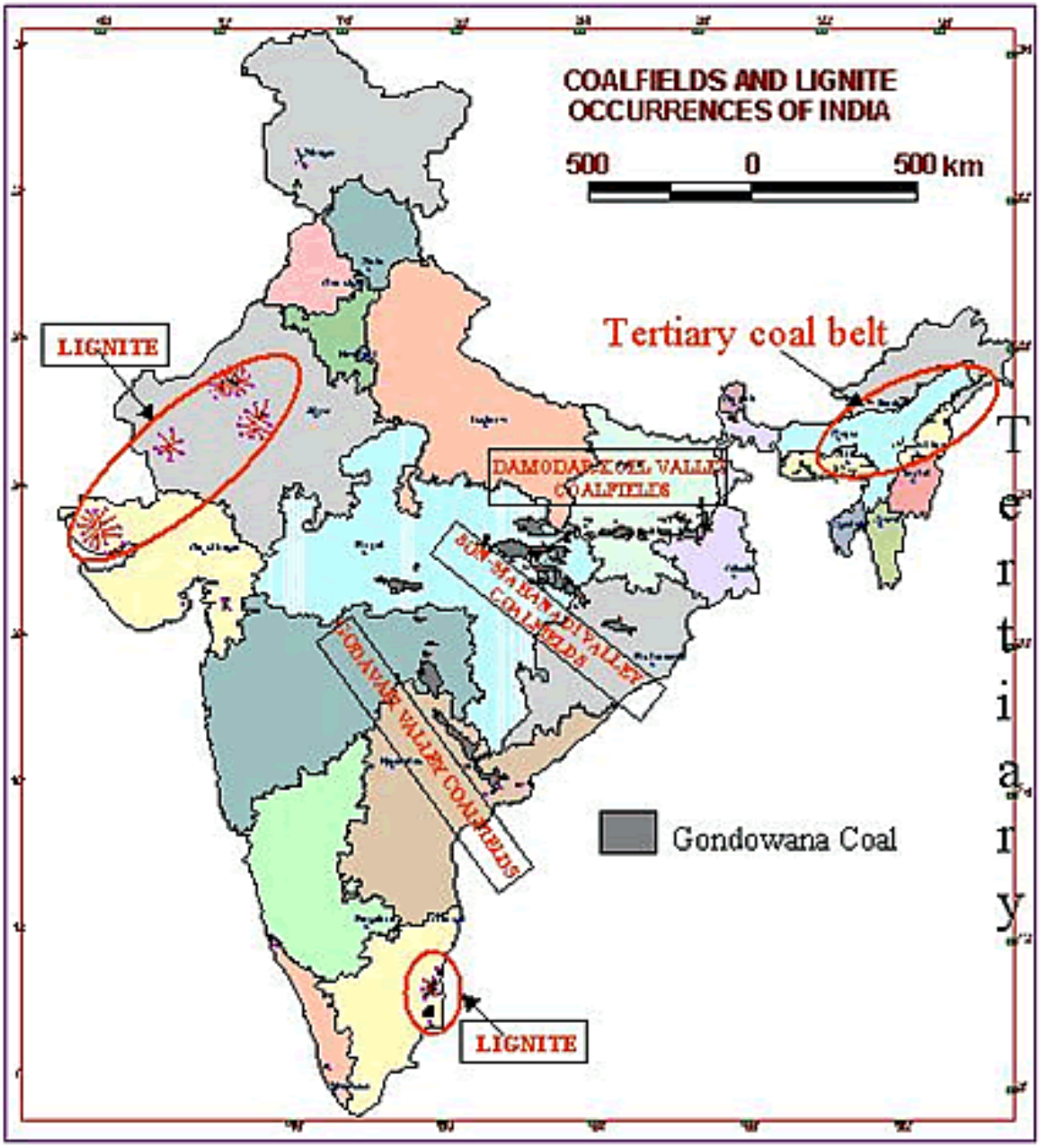
11. Energy exploration and exploitation, capacity additions, clean energy alternatives, conservation, and energy sector reforms will, therefore, be critical for energy security. Energy conservation has also emerged as one of the major issues in recent years. Conservation and efficient utilization of energy resources play a vital role in narrowing the gap between demand and supply of energy. Improving energy efficiency is one of the most desirable options for bridging the gap in the short term.

ENERGY MAP OF INDIA

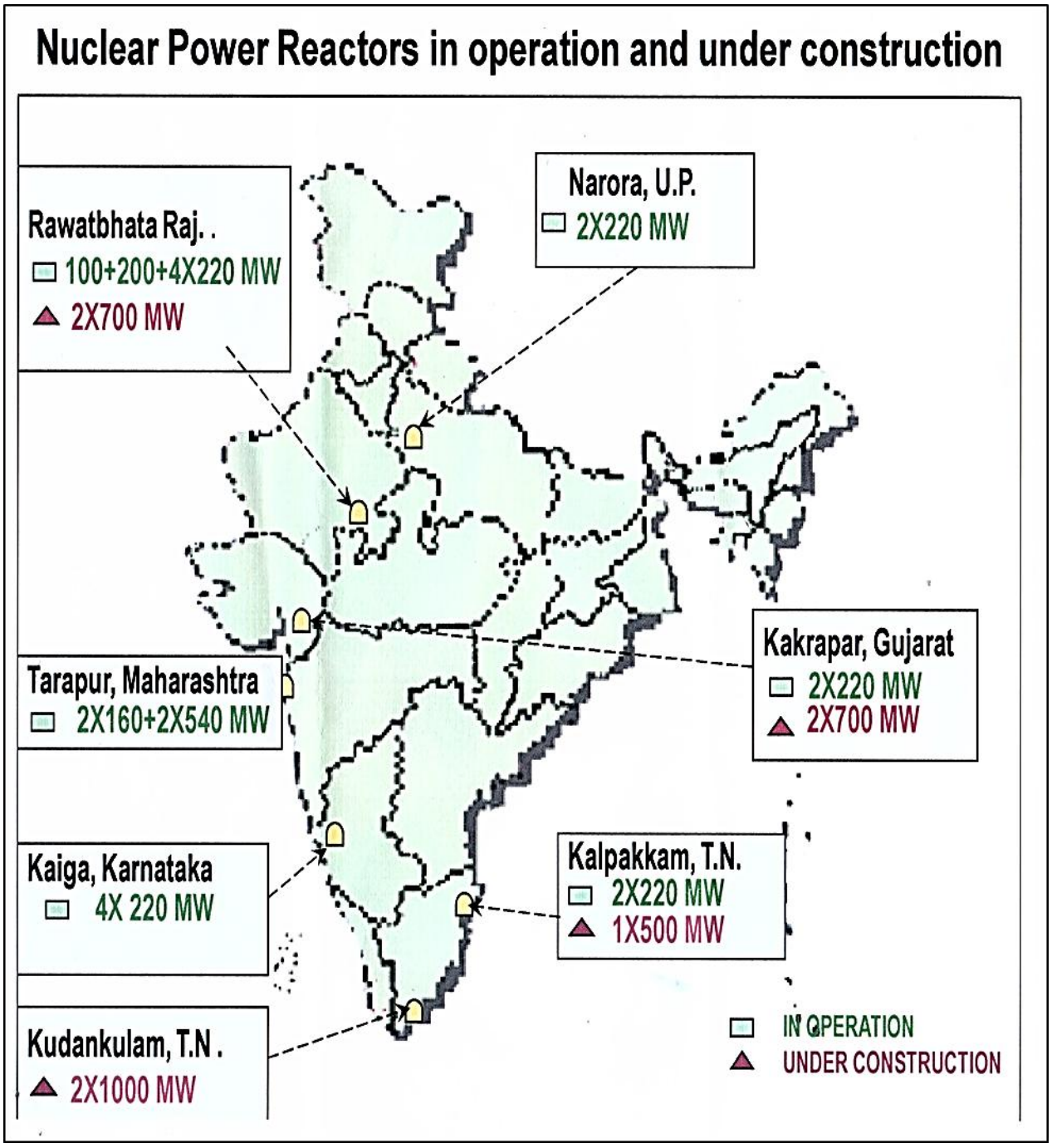
Gas Pipeline Network



Source**:** Petroleum & Natural Gas Regulatory Board (**PNGRB**)



Source: Geological Survey of India



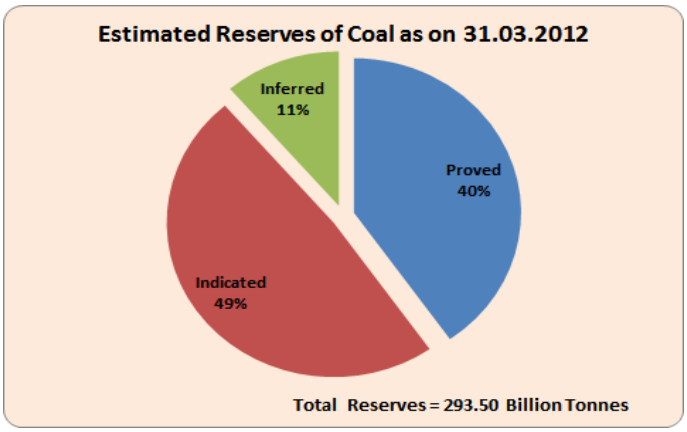
Source : Nuclear Power Corporation of India Limited(NPCIL).

RESERVES AND POTENTIAL FOR GENERATION

1.1 Coal and Lignite

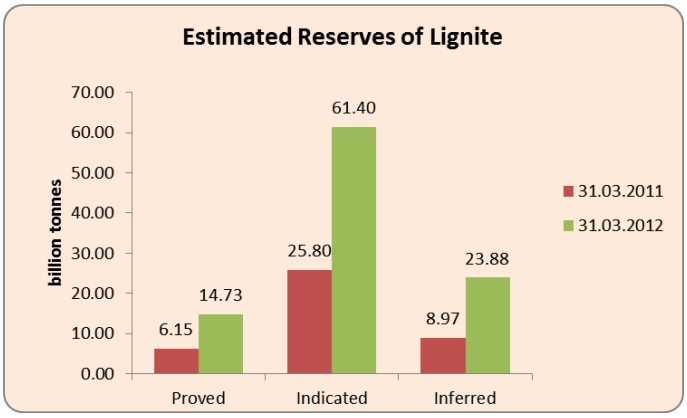
- Coal deposits are mainly confined to eastern and south central parts of the country. The states of Jharkhand, Odisha, Chhattisgarh, West Bengal, Andhra Pradesh, Maharashtra and Madhya Pradesh account for more than 99% of the total coal reserves in the country.

- As on 31.03.12 the estimated reserves of coal was around 293.5 billion tones, an addition of 7.64 billion over the last year (Table 1.1). The total estimated reserve of coal in India as on 31.03.11 was around 285.86 billion tonnes.



- There has been an increase of 2.67% in the estimated coal reserves during the year 2011-12 with Madhya Pradesh accounting for the maximum increase of 5.41 %.

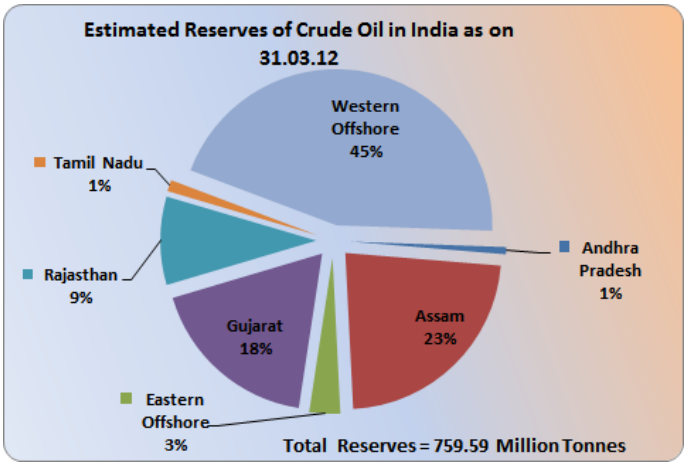
- The estimated reserve of lignite as on 31.03.12 was 41.96 billion tonnes against 40.91 billion tonnes as on 31.03.11. (Table 1.1(A)).



- The increase in the estimated reserve of lignite during the year 2011-12 was 1.22%, Tamil Nadu accounting for the maximum increase of 2.99% .

1.2 Petroleum and Natural gas

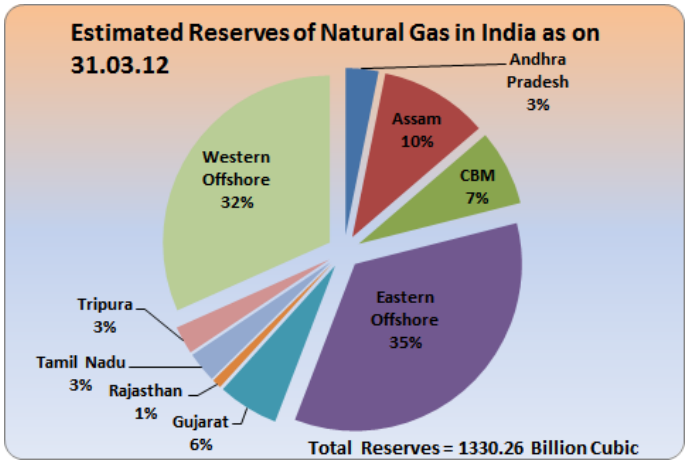
- The estimated reserves of crude oil in India as on 31.03.2012 stood at 759.59 million tonnes (MT). (Table 1.2).



- Geographical distribution of Crude oil indicates that the maximum reserves are in the Western Offshore (44.46%) followed by Assam (22.71%), whereas the maximum reserves of Natural Gas are in the Eastern Offshore (34.73%) followed by Western offshore (31.62%).

- There was an increase of 0.29% in the estimated reserve of crude oil for the country as a whole during 2011-12. There was an increase of estimated Crude Oil reserves by 7.09% in Andhra Pradesh followed by Tamil Nadu (4.48%).

- The estimated reserves of natural gas in India as on 31.03.2012 stood at 1330.26 billion cubic meters (BCM) (Table 1.2).

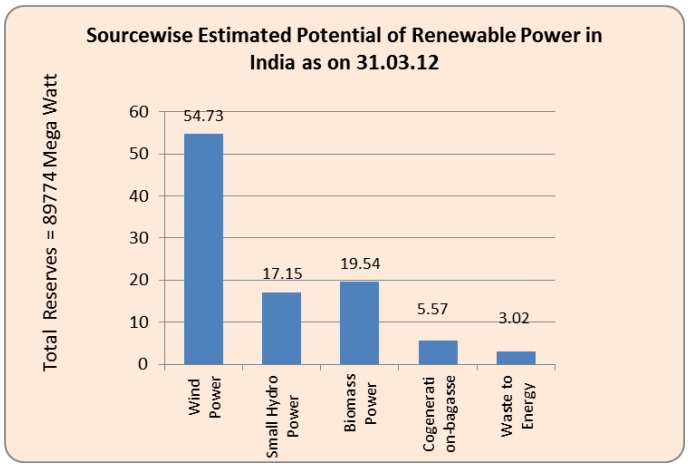


- In case of Natural Gas, the increase in the estimated reserves over the last year was 4.08%. The maximum contribution to this increase has been from Cold Bed Methane(CBM) (11.32%), followed by Tripura (8.95%).

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 31.03.12 is estimated at 89774 MW (Table 1.3). This includes wind power potential of 49130 MW (54.73%), SHP (small-hydro power) potential of 15399 MW (17.15%), Biomass power potential of 17,538 MW(19.54%) and 5000 MW (5.57%) from bagasse-based cogeneration in sugar mills.



- The geographic distribution of the estimated potential reveals that Gujarat has the highest share of about 13.91% (12,489 MW), followed by Karnataka with 12.3% share (11,071 MW) and Maharashtra with 10.69% share (9,596 MW), mainly on account of wind power potential.

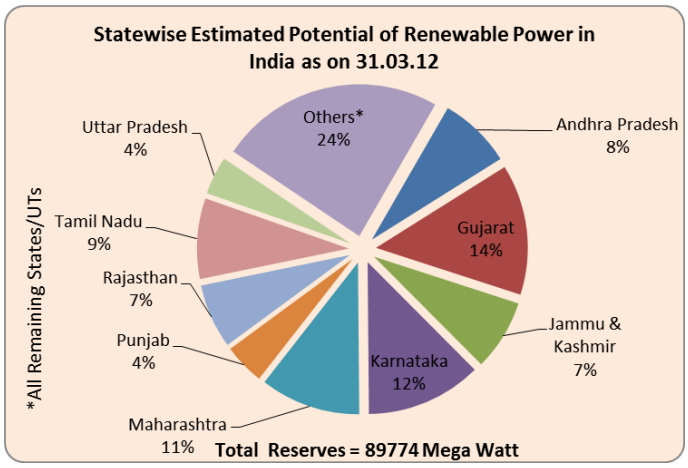


Table 1.1 :Statewise Estimated Reserves of Coal in India as on 31.03.2011 and 31.03.2012

(In billion tonnes)

States/ UTs	Proved		Indicated		Inferred		Total		Distribution (%)	
	31.03.2011	31.03.2012	31.03.2011	31.03.2012	31.03.2011	31.03.2012	31.03.2011	31.03.2012	31.03.2011	31.03.2012
Andhra Pradesh	9.30	9.57	9.73	9.55	3.03	3.03	22.05	22.16	**7.71**	**7.55**
Arunachal Pradesh	0.03	0.03	0.04	0.04	0.02	0.02	0.09	0.09	**0.03**	**0.03**
Assam	0.47	0.47	0.05	0.05	0.00	0.00	0.51	0.51	**0.18**	**0.17**
Bihar	0.00	0.00	0.00	0.00	0.16	0.16	0.16	0.16	**0.06**	**0.05**
Chhattisgarh	12.88	13.99	32.39	33.45	4.01	3.41	49.28	50.85	**17.24**	**17.32**
Jharkhand	39.76	40.16	32.59	33.61	6.58	6.58	78.94	80.36	**27.61**	**27.38**
Madhya Pradesh	8.87	9.31	12.19	12.29	2.06	2.78	23.13	24.38	**8.09**	**8.31**
Maharashtra	5.49	5.67	3.09	3.11	1.95	2.11	10.53	10.88	**3.68**	**3.71**
Meghalaya	0.09	0.09	0.02	0.02	0.47	0.47	0.58	0.58	**0.20**	**0.20**
Nagaland	0.01	0.01	0.00	0.00	0.31	0.31	0.32	0.32	**0.11**	**0.11**
Odisha	24.49	25.55	33.99	36.47	10.68	9.43	69.16	71.45	**24.19**	**24.34**
Sikkim	0.00	0.00	0.06	0.06	0.04	0.04	0.10	0.10	**0.04**	**0.03**
Uttar Pradesh	0.87	0.88	0.20	0.18	0.00	0.00	1.06	1.06	**0.37**	**0.36**
West Bengal	11.75	12.43	13.13	13.36	5.07	4.83	29.96	30.62	**10.48**	**10.43**
All India Total	**114.00**	**118.15**	**137.47**	**142.17**	**34.39**	**33.18**	**285.86**	**293.50**	**100.00**	**100.00**
Distribution (%)	**39.88**	**40.25**	**48.09**	**48.44**	**12.03**	**11.31**	**100.00**	**100.00**		

Table 1.1(A) :Statewise Estimated Reserves of Lignite in India as on 31.03.2011 and 31.03.2012

(In billion tonnes)

States/ UTs	Proved		Indicated		Inferred		Total		Distribution (%)	
	31.03.2011	31.03.2012	31.03.2011	31.03.2012	31.03.2011	31.03.2012	31.03.2011	31.03.2012	31.03.2011	31.03.2012
Gujarat	1.24	1.28	0.32	0.28	1.16	1.16	2.72	2.72	**6.65**	**6.49**
Jammu & Kashmir	0.00	0.00	0.02	0.02	0.01	0.01	0.03	0.03	**0.07**	**0.06**
Kerala	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	**0.02**	**0.02**
Pondicherry	0.00	0.00	0.41	0.41	0.01	0.01	0.42	0.42	**1.02**	**0.99**
Rajasthan	1.17	1.17	2.15	2.15	1.52	1.59	4.84	4.91	**11.82**	**11.69**
TamilNadu	3.74	3.74	22.90	22.90	6.26	7.24	32.89	33.88	**80.41**	**80.73**
West Bengal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
India	**6.15**	**6.18**	**25.80**	**25.76**	**8.97**	**10.02**	**40.91**	**41.96**	**100.00**	**100.00**
Distribution (%)	**15.02**	**14.73**	**61.47**	**61.40**	**21.92**	**23.88**	**100.00**	**100.00**		

Source:Office of Coal Controller, Ministry of Coal

Table 1.2 :Statewise Estimated Reserves@ of Crude Oil and Natural Gas in India as on in 31.03.2011 and 31.03.2012

States/ UTs	Crude Petroleum (million tonnes)				Natural Gas (billion cubic metres)			
	31.03.2011		31.03.2012		31.03.2011		31.03.2012	
	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)
Andhra Pradesh	5.22	**0.69**	5.59	**0.74**	40.58	**3.18**	42.30	**3.18**
Arunachal Pradesh	3.39	**0.45**	3.41	**0.45**	2.21	**0.17**	2.15	**0.16**
Assam	170.33	**22.49**	172.54	**22.71**	139.64	**10.93**	139.82	**10.51**
CBM	0.00	**0.00**	0.00	**0.00**	87.63	**6.86**	97.54	**7.33**
Eastern Offshore[1]	26.18	**3.46**	24.12	**3.18**	438.03	**34.27**	462.03	**34.73**
Gujarat	137.43	**18.14**	135.72	**17.87**	78.96	**6.18**	78.19	**5.88**
Nagaland	2.69	**0.36**	2.69	**0.35**	0.12	**0.01**	0.12	**0.01**
Rajasthan	75.33	**9.95**	68.87	**9.07**	12.04	**0.94**	12.13	**0.91**
Tamil Nadu	8.48	**1.12**	8.86	**1.17**	36.88	**2.89**	39.30	**2.95**
Tripura	0.08	**0.01**	0.07	**0.01**	33.09	**2.59**	36.05	**2.71**
Western Offshore[2]	328.27	**43.34**	337.72	**44.46**	408.88	**31.99**	420.63	**31.62**
Total	**757.40**	**100.00**	**759.59**	**100.00**	**1278.06**	**100.00**	**1330.26**	**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 Mathane) for Natural Gas

Source: Ministry of Petroleum & Natural Gas

Table 1.3 :Sourcewise and Statewise Estimated Potential of Renewable Power in India as on 31.03.2012

(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	1334	8	0	0	1543	1.72
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	230	11	0	2	287	0.32
Mizoram	0	167	1	0	2	170	0.19
Nagaland	3	197	10	0	0	210	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**	**15399**	**17538**	**5000**	**2707**	**89774**	**100.00**
Distribution (%)	**54.73**	**17.15**	**19.54**	**5.57**	**3.02**	**100.00**	

* Industrial waste
Source: Ministry of New and Renewable Energy

INSTALLED CAPACITY AND CAPACITY UTILIZATION

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 is around 131.24 Million tonne per year (MTY) as on 31.3.2012(Table 2.1). As on 31.03.12, a total of 52 washeries, both PSUs and Private, were operating in the country 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 31.03.12 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 in Jamnagar and Vadinar respectively.

- Total installed crude oil refining capacity in the country at the end of March 2012 was around 198 million tonnes per annum. There was an increase of 5.75% over the previous year to the installed refining capacity.

- Total processing of crude oil in the country increased from 2,06,003 thousand metric tonnes (TMT) during 2010-11 to 21142 TMT during 2011-12 registering a increase of 2.63 %.

- Capacity utilization of the refineries was 109.9% during 2010-11 which decreased to 106.7% during 2011-12. In the Public Sector the maximum increase in capacity utilization (19.1%) was at NRL, Nimuligarh, Assam.

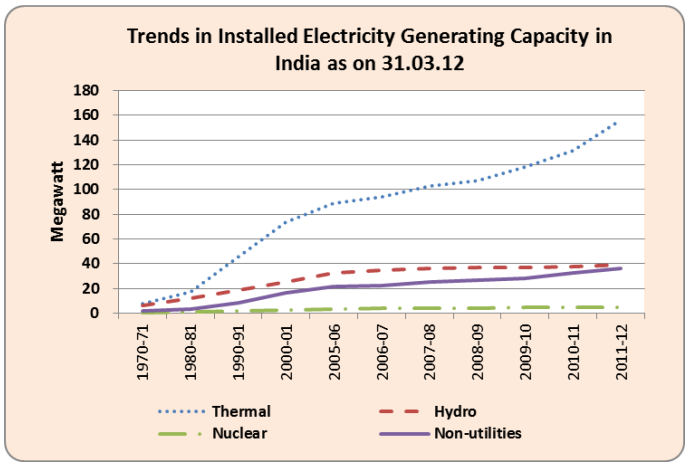
- In the Private Sector the highest decrease (66.3 %) in capacity utilization was at Essar Oil Ltd., Vadinar.

- Indian Oil Corporation, the state owned corporation had highest refining capacity of 54,200 TMTY. All units of IOC together processed 55,621 TMT during 2011-12 as compared to 52,964 TMT during 2010-11. The capacity utilization of these refineries was 102.6% during 2011-12 as against 97.7% during 2010-11.

- All the private refineries taken together processed 90,515 TMT during 2011-12 as compared to 90,692 TMT during 2010-11. The capacity utilization of these refineries during 2010-11 and 2011-12 stood at 128.6% and 115.9% 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 2,36,387 MW as on 31.03.2012, registering a compound annual growth rate (CAGR) of 6.58% (Table 2.3).



- There has been an increase in generating capacity of 29,861 MW over the last one year, which is 14.46% more than the capacity of last year.

- The highest rate of annual growth (18.91%) from 2010-11 to 2011-12 in installed capacity was for Thermal power followed by Hydro Power (3.79%).

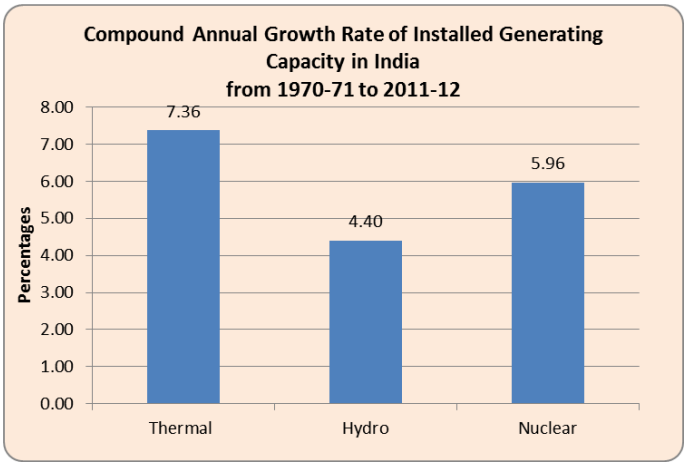
- The total Installed capacity of power utilities in the country increased from 14,709 MW in 1970-71 to 1,99,877MW as on 31.3.2012, with a CAGR of 6.41 % over the period.

- At the end of March 2012, thermal power plants accounted for an overwhelming 66% of the total installed capacity in the country, with an installed capacity of 1,56,107 MW. The share of Nuclear energy was only 2.02% (4.78 MW).

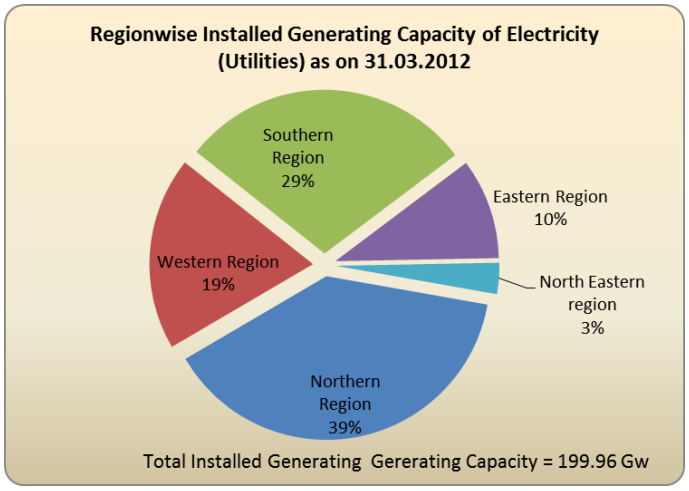
- Hydro power plants come next with an installed capacity of 38,990 MW, accounting for 16.49% of the total installed Capacity.

- Non-utilities accounted for 15.45% (36510 MW) of the total installed generation capacity.

- The highest CAGR (7.36%) was in case of Thermal utilities followed by Nuclear (5.96%) and Hydro (4.4%).



- The geographical distribution of Installed generating capacity of electricity as on 31.03.12 (Table 2.4) indicates that Western Region (both central and state sector) accounted for the highest share (32.20%) followed by Southern Region (26.38%), Northern Region (26.97%), Eastern Region (13.22%) and North Eastern Region (1.22%).



- Region wise growth in the installed capacity during 2011-12 reveals that Eastern Region registered the highest growth of about 18.21%, followed by Northern Region(10.1%) and Western Region (6.65%).

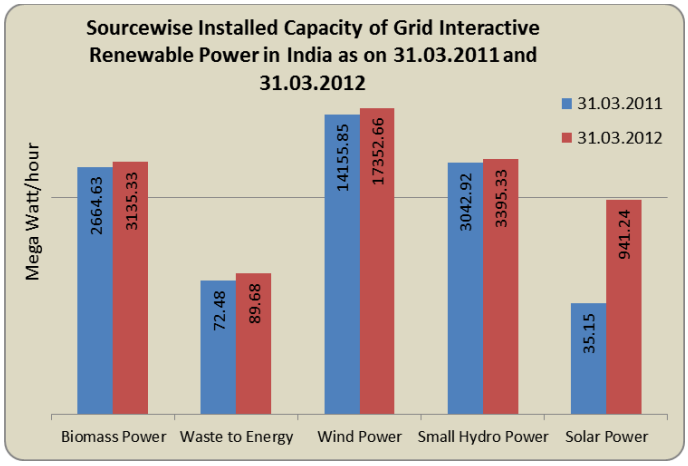
- Among the States in the Western Region that accounted for the highest growth of 20.22%, Gujarat registered the highest (44.92%) followed by Maharashtra (18.36%).

- Among all the states H.P. registered highest growth (92.95%) in the installed capacity followed by Jharkhand (62.11%) and Gujarat (44.9%).

2.4 *Grid Interactive Renewable Power*

- The total installed capacity of grid interactive renewable power, which was 19,971.03 MW as on 31.03.2011 had gone up to 24,914.24 MW as on 31.03.2012 indicating growth of 24.75% during the period (Table 2.5).

- Out of the total installed generation capacity of renewable power as on 31-03-2012, wind power accounted for about 69.65%, followed by small hydro power (13.63%) and Biomass power (12.58%).



- Tamil Nadu had the highest installed capacity of grid connected renewable power (7,664.03 MW) followed by Maharashtra (3,644.05 MW) and Gujarat (3,607.27 MW), mainly on account of wind power.

- As on 31.03.2012 out of total Biogas plants installed (45.45 lakh) (Table 2.6), maximum number of such plants installed were in Maharashtra (8.24lakh) followed by Andhra Pradesh, Uttar Pradesh, Karnataka and Gujarat each with more than 4 lakh biogas plants.

- Out of 1,221.26 MW Solar Cookers installed as on 31.03.2012, 824.09 MW were installed in Gujarat and 222.9 MW in Rajasthan.

- As on 31.03.2012 there were 1,352 water pumping Wind mills systems installed and 7,286 remote villages and 1,874 hamlets were electrified.

Table 2.1: Installed Capacity of Coal Washeries in India as on 31.03.12

Sl. No.	Washery & Operator	State of Location	Capacity (MTY) 31.03.2012
	COKING COAL :		
1	Dudga-II, CIL	Jharkhand	2.00
2	Bhojudih, CIL	West Bengal	1.70
3	Patherdih, CIL	Jharkhand	1.60
4	Moonidih, CIL	Jharkhand	1.60
5	Sudamdih, CIL	Jharkhand	1.60
6	Mahuda, CIL	Jharkhand	0.63
7	Kathara, CIL	Jharkhand	3.00
8	Swang, CIL	Jharkhand	0.75
9	Rajrappa, CIL	Jharkhand	3.00
10	Kedla, CIL	Jharkhand	2.60
11	Nandan, CIL	Madhya Pradesh	1.20
	(A) CIL		**19.68**
12	Durgapur, SAIL	West Bengal	1.50
13	DCOP, DPL	West Bengal	1.35
14	Chasnala, IISCO	Jharkhand	1.50
15	Jamadoba, TISCO	Jharkhand	0.90
16	West Bokaro-II, TISCO	Jharkhand	1.80
17	West Boakaro-III,TISCO	Jharkhand	2.10
18	Bhelatand	Jharkhand	0.86
	(B) PSU & Private		**10.01**
	TOTAL (A + B)		**29.69**
	NON-COKING COAL		
1	Dugda-I,CIL	Jharkhand	2.50
2	Madhuban,CIL	Jharkhand	2.50
3	Gidi,CIL	Jharkhand	2.50
4	Piparwar,CIL	Jharkhand	6.50
5	Kargali,CIL	Jharkhand	2.72
6	Bina,CIL	Uttar Pradesh	4.50
	(A) CIL		**21.22**
7	Dipka, Aryan coal beneficiation pvt. ltd.	Chattisgarh	12.00
8	Gevra, -do-	Chattisgarh	5.00
9	Panderpauni, -do-	Maharashtra	3.00
10	Chakabuwa, Aryan Energy private ltd.	Chattisgarh	4.00
11	Indaram, Aryan Coal Benefication Pvt.Ltd.	Andhra Pradesh	-
12	Talcher, Aryan Energy Pvt. Ltd.	Odisha	2.00

Table 2.1(Contd.): Installed Capacity of Coal Washeries in India as on 31.03.12

Sl. No.	Washery & Operator	State of Location	Capacity 31.03.2012
13	Wani, Kartikay Coal washeries pvt. ltd.(Aryan)	Maharashtra	2.50
14	Korba, ST-CLI Coal washeries ltd.	Chattisgarh	5.20
15	Ramagundam, Gupta coalfield & washeries ltd.	Andhra Pradesh	2.40
16	Sasti, Gupta coalfield & washeries ltd.	Maharashtra	2.40
17	Wani, Gupta coalfield & washeries ltd.	Maharashtra	1.92
18	Umrer, Gupta coalfield & washeries ltd.	Maharashtra	0.75
19	Bhandara, Gupta coalfield & washeries ltd.	Maharashtra	0.75
20	Gondegaon, Gupta coalfield & washeries ltd.	Maharashtra	2.40
21	Majri, Gupta coalfield & washeries ltd.	Maharashtra	2.40
22	Bilaspur, Gupta coalfield & washeries ltd.	Chattisgarh	3.50
23	Ghugus, Gupta coalfield & washeries ltd.	Maharashtra	2.40
24	Talcher, Global coal Mining (P) Ltd.	Odisha	2.50
25	Ib Valley, Global coal Mining (P) Ltd.	Odisha	3.25
26	Ramagundam, Global coal Mining (P) Ltd.	Andhra Pradesh	1.00
27	Wani, Bhatia International Ltd.	Maharashtra	3.73
28	Ghugus, Bhatia International Ltd.	Maharashtra	4.00
29	Jharsuguda, Bhatia International Ltd.	Odisha	1.50
30	Tamnar, Jindal Steel & Power Ltd.	Chattisgarh	6.00
31	Wani, Indo Unique Flame Ltd.	Maharashtra	2.40
32	Nagpur, Indo Unique Flame Ltd.	Maharashtra	0.60
33	Punwat, Indo Unique Flame Ltd.	Maharashtra	2.40
34	Dharamsthal, BLA Industries	Madhya Pradesh	0.33
	(B) Private		**80.33**
	TOTAL (A+B)		**101.55**
	Gross Total (Coking+Non-Coking)		**131.24**

Source:Office of Coal Controller, Ministry of Coal

Table 2.2: Installed Capacity and Capacity Utilization of Refineries of Crude Oil during 2010-11 and 2011-12

Sl. No	Refinery	Installed Capacity as on 31.03.2011 (TMTPA)	Installed Capacity as on 31.03.2012 (TMTPA)	Refinery Crude Throughput (TMT)		Capacity Utilisation (%)		
				2010-11	2011-12	2010-11	2011-12	Change in utilisation
A	**Public Sector Refineries**	**116886**	**120066**	**115311**	**120906**	**98.7**	**100.7**	**2.0**
I	**IOC REFINERIES**	**54200**	**54200**	**52964**	**55621**	**97.7**	**102.6**	**4.9**
	IOC, Guwahati, Assam	1000	1000	1118	1058	111.8	105.8	-6.0
	IOC, Barauni, Bihar	6000	6000	6207	5730	103.5	95.5	-8.0
	IOC, Koyali, Gujarat	13700	13700	13561	14253	99.0	104.0	5.1
	IOC, Haldia, West Bengal	7500	7500	6878	8072	91.7	107.6	15.9
	IOC, Mathura, Uttar Pradesh	8000	8000	8880	8202	111.0	102.5	-8.5
	IOC, Digboi, Assam	650	650	651	622	100.2	95.7	-4.5
	IOC, Panipat, Haryana	15000	15000	13660	15496	91.1	103.3	12.2
	IOC, Bongaigaon, Assam	2350	2350	2009	2188	85.5	93.1	7.6
II	**BPCL REFINERIES**	**21500**	**21500**	**21719**	**22827**	**101.0**	**106.2**	**5.2**
	BPCL, Mumbai, Maharashtra	12000	12000	13020	13355	108.5	111.3	2.8
	BPCL, Kochi, Kerala	9500	9500	8699	9472	91.6	99.7	8.1
III	**HPCL REFINERIES**	**14800**	**14800**	**14838**	**16202**	**100.3**	**109.5**	**9.2**
	HPCL, Mumbai, Maharashtra	6500	6500	6638	7520	102.1	115.7	13.6
	HPCL, Visakh, Andhra Pradesh	8300	8300	8200	8682	98.8	104.6	5.8
IV	**CPCL REFINERIES**	**11500**	**11500**	**10807**	**10564**	**94.0**	**91.9**	**-2.1**
	CPCL, Chennai, Tamil Nadu	10500	10500	10104	9953	96.2	94.8	-1.4
	CPCL, Narimanam, Tamil Nadu	1000	1000	703	611	70.3	61.1	-9.2
V	NRL, Numaligarh, Assam	**3000**	**3000**	**2252**	**2825**	**75.1**	**94.2**	**19.1**
VI	ONGC, Tatipaka, Andhra Pradesh	**66**	**66**	**69**	**69**	**104.5**	**104.5**	**0.0**
VII	MRPL, Mangalore, Karnataka	**11820**	**15000**	**12662**	**12798**	**107.1**	**85.3**	**-21.8**
B	**PRIVATE REFINERIES**	**70500**	**78100**	**90692**	**90515**	**128.6**	**115.9**	**-12.7**
I	RPL, Jamnagar, Gujarat	33000	33000	34517	35423	104.6	107.3	2.7
II	RPL(SEZ), Jamnagar, Gujarat	27000	27000	41302	41449	153.0	153.5	0.5
III	ESSAR Oil Ltd. Vadinar	10500	18100	14873	13643	141.6	75.4	-66.3
	Total (A+B)	**187386**	**198166**	**206003**	**211421**	**109.9**	**106.7**	**-3.25**

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 in Non-utilities in India from 1970-71 to 2011-12

(Mega Watt) = (10^3 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	131,279	37,567	4,780	173,626	-	32,900	32,900	206,526
31.3.2012(p)	156,107	38,990	4,780	199,877	-	36,510	36,510	236,387
Growth rate of 2011-12over 2010-11(%)	**18.91**	**3.79**	**0.00**	**15.12**	-	**10.97**	**10.97**	**14.46**
CAGR 1970-71 to 2011-12(%)	**7.36**	**4.40**	**5.96**	**6.41**	-	**7.87**	**7.79**	**6.58**

* 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 =((Current Value/Base Value)^(1/nos. of years)-1)*100

Source : Central Electricity Authority.

Table 2.4 : Regionwise and Statewise Installed Generating Capacity of Electricity (Utilities) in India as on 31.03.2011 and 31.03.2012

(In GW)

States/UTs	Hydro		Thermal		Nuclear		New & Renewable**		Total		Growth* Rate(2010-11to 2011-12)
	31.03.11	31.03.12	31.03.11	31.03.12	31.03.11	31.03.12	31.03.11	31.03.12	31.03.11	31.03.12	
Delhi	0.00	0.00	1.51	1.54	0.00	0.00	0.00	0.02	1.51	1.56	3.48
Haryana	0.88	0.88	3.44	3.85	0.00	0.00	0.11	0.12	4.43	4.86	9.64
Himachal Prd.	0.97	2.07	0.00	0.00	0.00	0.00	0.38	0.53	1.35	2.60	92.95
Jammu & Kashmir	0.78	0.78	0.18	0.18	0.00	0.00	0.13	0.13	1.09	1.09	0.11
Punjab	2.23	2.23	2.66	2.66	0.00	0.00	0.33	0.35	5.21	5.24	0.47
Rajasthan	0.99	0.99	4.33	4.60	0.00	0.00	1.47	2.37	6.78	7.95	17.21
Uttar Pradesh	0.52	0.52	4.67	7.12	0.00	0.00	0.61	0.69	5.81	8.33	43.44
Uttrakhand	1.65	1.65	0.00	0.00	0.00	0.00	0.15	0.19	1.80	1.84	2.21
Central Sector NR	5.79	5.99	11.59	12.84	1.62	1.62	0.00	0.00	19.01	20.46	7.63
Sub-Total (NR)	13.82	15.12	28.38	32.79	1.62	1.62	3.17	4.39	46.99	53.93	14.76
Chhatisgarh	0.12	0.12	3.66	3.89	0.00	0.00	0.25	0.27	4.03	4.29	6.36
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	10.34	14.73	0.00	0.00	2.00	3.50	13.11	19.00	44.92
Madhya Pradesh	1.70	1.70	2.81	2.81	0.00	0.00	0.27	0.48	4.78	4.99	4.39
Maharashtra	3.33	3.33	11.05	13.39	0.00	0.00	2.81	3.63	17.19	20.35	18.36
Central Sector WR	1.52	1.52	11.01	12.33	1.84	1.84	0.00	0.00	14.37	15.69	9.18
Sub-Total (WR)	7.45	7.45	38.92	47.20	1.84	1.84	5.36	7.91	53.56	64.39	20.22
Andhra Pradesh	3.70	3.73	7.73	8.38	0.00	0.00	0.77	0.89	12.19	13.00	6.62
Karnataka	3.60	3.60	3.91	5.01	0.00	0.00	2.62	3.18	10.13	11.80	16.44
Kerala	1.88	1.88	0.43	0.43	0.00	0.00	0.15	0.16	2.46	2.47	0.68
Lakshadweep	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	-7.00
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	2.12	2.12	4.66	4.66	0.00	0.00	5.81	7.34	12.59	14.12	12.11
Central Sector SR	0.00	0.00	8.75	10.00	1.32	1.32	0.00	0.00	10.07	11.32	12.41
Sub-Total (SR)	11.30	11.34	25.52	28.52	1.32	1.32	9.34	11.57	47.48	52.75	11.09
A & N Island	0.00	0.00	0.06	0.06	0.00	0.00	0.01	0.01	0.07	0.07	0.00
Bihar	0.00	0.00	0.53	0.53	0.00	0.00	0.07	0.08	0.60	0.61	2.01
Jharkhand	0.13	0.13	1.55	2.60	0.00	0.00	0.00	0.00	1.68	2.73	62.11
Odisha	2.06	2.06	1.62	2.22	0.00	0.00	0.08	0.10	3.76	4.38	16.42
Sikkim	0.00	0.00	0.01	0.01	0.00	0.00	0.05	0.05	0.05	0.06	9.60
West Bengal	0.98	0.98	6.23	6.48	0.00	0.00	0.16	0.16	7.37	7.62	3.40
Central Sector ER	0.71	0.71	9.02	10.27	0.00	0.00	0.00	0.00	9.73	10.98	12.85
Sub-Total (ER)	3.88	3.88	19.02	22.17	0.00	0.00	0.36	0.40	23.26	26.44	13.67
Arunachal Prd.	0.00	0.00	0.02	0.02	0.00	0.00	0.08	0.08	0.09	0.09	0.00
Assam	0.10	0.10	0.34	0.38	0.00	0.00	0.03	0.03	0.47	0.51	7.89
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	0.24	0.00	0.00	0.00	0.00	0.03	0.03	0.19	0.27	43.34
Mizoram	0.00	0.00	0.05	0.05	0.00	0.00	0.04	0.04	0.09	0.09	0.00
Nagaland	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	-6.52
Tripura	0.00	0.00	0.15	0.15	0.00	0.00	0.02	0.02	0.17	0.17	0.00
Central Sector NER	0.86	0.86	0.38	0.38	0.00	0.00	0.00	0.00	1.24	1.24	0.00
Sub-Total (NER)	1.12	1.20	0.99	1.02	0.00	0.00	0.22	0.22	2.33	2.45	5.03
Total States	**28.68**	**29.90**	**72.08**	**85.88**	**0.00**	**0.00**	**18.45**	**24.49**	**119.21**	**140.27**	**17.67**
Total Central	**8.89**	**9.09**	**40.75**	**45.82**	**4.78**	**4.78**	**0.00**	**0.00**	**54.41**	**59.68**	**9.69**
Total All India	**37.57**	**38.99**	**112.82**	**131.70**	**4.78**	**4.78**	**18.45**	**24.49**	**173.63**	**199.96**	**15.17**

**:- 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 31.03.2011 and 30.03.2012

(In MW)

States/ Uts	Biomass Power		Waste to Energy		Wind Power	
	31.03.11	31.03.12	31.03.11	31.03.12	31.03.11	31.03.12
Andhra Pradesh	363.25	363.25	43.16	43.16	191.50	245.55
Arunachal Pradesh	-	-	-	-	-	-
Assam	-	-	-	-	-	-
Bihar	9.50	15.50	-	-	-	-
Chhattisgarh	231.90	249.90	-	-	-	-
Goa	-	-	-	-	-	-
Gujarat	0.50	20.50	-	-	2176.43	2966.28
Haryana	35.80	35.80	-	-	-	-
Himachal Pradesh	-	-	-	-	-	-
Jammu & Kashmir	-	-	-	-	-	-
Jharkhand	-	-	-	-	-	-
Karnataka	365.18	441.18	1.00	1.00	1726.85	1933.50
Kerala	-	-	-	-	35.00	35.10
Madhya Pradesh	1.00	8.50	2.70	3.90	275.90	376.40
Maharashtra	403.00	603.70	5.72	5.72	2316.75	2733.30
Manipur	-	-	-	-	-	-
Meghalaya	-	-	-	-	-	-
Mizoram	-	-	-	-	-	-
Nagaland	-	-	-	-	-	-
Odisha	-	20.00	-	-	-	-
Punjab	74.50	90.50	9.25	9.25	-	-
Rajasthan	73.30	83.30	-	-	1525.00	2070.65
Sikkim	-	-	-	-	-	-
Tamil Nadu	488.20	532.70	5.65	5.65	5904.12	6987.58
Tripura	-	-	-	-	-	-
Uttar Pradesh	592.50	644.50	5.00	5.00	-	-
Uttaranchal	10.00	10.00	-	-	-	-
West Bengal	16.00	16.00	-	-	4.30	4.30
Andaman & Nicobar	-	-	-	-	-	-
Chandigarh	-	-	-	-	-	-
Dadar & Nagar Haveli	-	-	-	-	-	-
Daman & Diu	-	-	-	-	-	-
Delhi	-	-	-	16.00	-	-
Lakshadweep	-	-	-	-	-	-
Puducherry	-	-	-	-	-	-
All India Total	**2664.63**	**3135.33**	**72.48**	**89.68**	**14155.85**	**17352.66**
Distribution (%)	**13.34**	**12.58**	**0.29**	**0.36**	**56.82**	**69.65**

Table 2.5 (contd):Statewise and Sourcewise Installed Capacity of Grid Interactive Renewable Power as on 31.03.2011 and 30.03.2012

(In MW)

States/ Uts	Small Hydro Power		Solar Power		Total		Growth* Rate(2010-11 to 2011-12)
	31.03.11	31.03.12	31.03.11	31.03.12	31.03.11	31.03.12	
Andhra Pradesh	191.43	217.83	2.10	21.75	791.44	891.54	12.65
Arunachal Pradesh	78.84	79.23	0.03	0.03	78.87	79.26	0.49
Assam	27.11	31.11	-	-	27.11	31.11	14.75
Bihar	59.80	64.30	-	-	69.30	79.80	15.15
Chhattisgarh	19.05	20.25	-	4.00	250.95	274.15	9.24
Goa	0.05	0.05	-	-	0.05	0.05	0.00
Gujarat	15.60	15.60	5.00	604.89	2197.53	3607.27	64.15
Haryana	70.10	70.10	-	16.80	105.90	122.70	15.86
Himachal Pradesh	393.47	527.66	-	-	393.47	527.66	34.10
Jammu & Kashmir	129.33	130.53	-	-	129.33	130.53	0.93
Jharkhand	4.05	4.05	-	4.00	4.05	8.05	98.77
Karnataka	783.35	882.45	6.00	9.00	2882.38	3267.13	13.35
Kerala	136.87	149.67	0.03	0.84	171.90	185.61	7.98
Madhya Pradesh	86.16	86.16	0.10	2.10	365.86	477.06	30.39
Maharashtra	275.13	281.33	4.00	20.00	3004.60	3644.05	21.28
Manipur	5.45	5.45	-	-	5.45	5.45	0.00
Meghalaya	31.03	31.03	-	-	31.03	31.03	0.00
Mizoram	36.74	36.47	-	-	36.74	36.47	-0.73
Nagaland	28.67	28.67	-	-	28.67	28.67	0.00
Odisha	64.30	64.30	-	13.00	64.30	97.30	51.32
Punjab	154.50	154.50	2.33	9.33	240.58	263.58	9.56
Rajasthan	23.85	23.85	5.15	197.65	1627.30	2375.45	45.97
Sikkim	52.11	52.11	-	-	52.11	52.11	0.00
Tamil Nadu	96.55	123.05	5.05	15.05	6499.57	7664.03	17.92
Tripura	16.01	16.01	-	-	16.01	16.01	0.00
Uttar Pradesh	25.10	25.10	0.38	12.38	622.98	686.98	10.27
Uttaranchal	134.62	170.82	0.05	5.05	144.67	185.87	28.48
West Bengal	98.40	98.40	1.15	2.05	119.85	120.75	0.75
Andaman & Nicobar	5.25	5.25	0.10	0.01	5.35	5.26	-1.68
Chandigarh	-	-	-	-	0.00	0.00	-
Dadar & Nagar Haveli	-	-	-	-	0.00	0.00	-
Daman & Diu	-	-	-	-	0.00	0.00	-
Delhi	-	-	2.14	2.53	2.14	18.53	765.89
Lakshadweep	-	-	0.75	0.75	0.75	0.75	0.00
Puducherry	-	-	0.79	0.03	0.79	0.03	-96.20
All India Total	**3042.92**	**3395.33**	**35.15**	**941.24**	**19971.03**	**24914.24**	**24.75**
Distribution (%)	**15.24**	**13.63**	**0.14**	**3.78**	**100.00**	**100.00**	

Source: Ministry of New and Renewable Energy

Table 2.6 : Installation of Off-grid / Decentralised Renewable Energy Systems/ Devices as on 31.03.2012

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	489,559	6	613	4,186	2,662	41,360	776.97
2	Arunachal Pradesh	3,282	-	18	1,071	10,349	14,433	17.10
3	Assam	95,209	3	45	98	5,870	1,211	510.00
4	Bihar	129,523	46	139	955	6,528	50,117	775.60
5	Chhattisgarh	40,661	1	240	2,042	7,254	3,311	6632.72
6	Goa	3,976	-	15	707	393	1,093	1.72
7	Gujarat	420,686	879	85	2,004	9,231	31,603	374.60
8	Haryana	57,281	-	469	22,018	50,275	93,853	676.05
9	Himachal Pradesh	46,587	-	6	7,430	22,586	23,909	201.50
10	Jammu & Kashmir	2,739	-	39	5,806	42,133	43,822	308.85
11	Jharkhand	6,596	-	-	620	7,312	16,374	335.90
12	Karnataka	445,586	28	551	2,694	43,313	7,334	254.41
13	Kerala	133,887	79	810	1,735	32,327	54,367	57.70
14	Madhya Pradesh	324,737	-	87	7,158	3,304	9,444	575.00
15	Maharashtra	824,203	26	239	8,420	3,442	68,683	913.70
16	Manipur	2,128	-	40	928	3,865	4,787	216.00
17	Meghalaya	9,326	-	19	1,273	7,840	24,875	50.50
18	Mizoram	4,020	-	37	431	6,801	9,589	241.00
19	Nagaland	6,649	-	3	271	868	6,317	144.00
20	Odisha	253,054	-	56	5,834	5,156	9,882	84.52
21	Punjab	143,162	-	1,857	5,354	8,620	17,495	181.00
22	Rajasthan	68,121	222	1,667	6,852	126,199	4,716	3530.80
23	Sikkim	8,326	-	-	489	9,542	22,020	35.00
24	Tamil Nadu	219,392	60	829	6,350	7,804	16,818	609.77
25	Tripura	2,999	-	151	1,199	32,723	64,282	35.00
26	Uttar Pradesh	431,631	-	575	100,406	185,388	61,932	3179.72
27	Uttaranchal	14,704	-	26	8,568	91,307	64,023	180.03
28	West Bengal	355,496	-	48	8,726	135,067	17,662	829.00
29	Andaman & Nicobar	137	2	5	390	468	6,296	167.00
30	Chandigarh	97	-	12	898	275	1,675	0.00
31	Dadar & Nagar Haveli	169	-	-	-	-	-	0.00
32	Daman & Diu	-	-	-	-	-	-	0.00
33	Delhi	681	-	90	301	-	4,807	82.00
34	Lakshadweep	-	-	-	1,725	-	5,289	100.00
35	Puducherry	578	-	21	417	25	1,637	0.00
36	Others*	-	-	-	9,150	24,047	125,797	1354.00
	Total	**4,545,182**	**1,352**	**8,792**	**226,506**	**892,974**	**930,813**	**23,431.16**

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

Table 2.6(contd..) : Installation of Off-grid / Decentralised Renewable Energy Systems/ Devices as on 31.03.2012

Sl. No.	State/UT	Aerogen. Hybrid System	Solar Cooker	Biomass Gasifiers (Rural+ Industrial)	Waste to Energy	Remote Village Electrification Villages	
						Villages	Hamlets
		(KW)	(MW)	(Nos.)	(MW)	(Nos.)	(Nos.)
1	2	3	4	5	6	7	8
1	Andhra Pradesh	16.00	23.15	20514	6.55	-	-
2	Arunachal Pradesh	6.80	0.03	750	-	297	13
3	Assam	6.00		1,883	-	1,856	-
4	Bihar	-		9260	-		-
5	Chhattisgarh	-	4.00	1210	-	568	-
6	Goa	163.80	1.69	-	-	-	-
7	Gujarat	10.00	824.09	21230	10.79	38	-
8	Haryana	10.00	7.80	1963	4.00	-	286
9	Himachal Pradesh	-		-	-	21	-
10	Jammu & Kashmir	15.80		200	-	160	-
11	Jharkhand	-	16.00	500	-	493	-
12	Karnataka	39.20	14.00	7447	3.00	16	14
13	Kerala	8.00	0.03	-	-	-	607
14	Madhya Pradesh	24.00	11.75	8908	0.11	381	-
15	Maharashtra	1033.90	34.50	7,150	6.81	338	-
16	Manipur	110.00	-	-	-	237	3
17	Meghalaya	15.00	-	250	-	149	-
18	Mizoram	-	-	250	-	20	-
19	Nagaland	-	-	2,100	-	11	-
20	Odisha	-	13.00	270	0.02	602	-
21	Punjab	50.00	9.33	-	1.81	-	-
22	Rajasthan	14.00	222.90	2464	3.00	292	-
23	Sikkim	15.50	-	-	-	-	13
24	Tamil Nadu	24.50	17.06	11762	6.14	-	101
25	Tripura	2.00	-	1050		60	715
26	Uttar Pradesh	-	12.38	23530	24.91	98	86
27	Uttarakhand	4.00	5.05	1,100	3.07	472	34
28	West Bengal	74.00	2.00	26168	-	1,177	2
29	Andaman & Nicobar	-	-	-	-	-	-
30	Chandigarh	-	-	-	0.33	-	-
31	Dadar & Nagar Haveli	-	-	-	-	-	-
32	Daman & Diu	-	-	-	-	-	-
33	Delhi	-	2.53	-	-	-	-
34	Lakshaadweep	-	-	250	-	-	-
35	Puducherry	5.00	-	0	-	-	-
36	Others*	-	-	-	-	-	-
	Total	**1647.50**	**1221.26**	**150209**	**70.54**	**7286**	**1874**

* 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

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 2011-12 was 539.94 million tonnes (MTs) as compared to 532.69 MTs during 2010-11, registering a growth of 1.36% (Table 3.1).

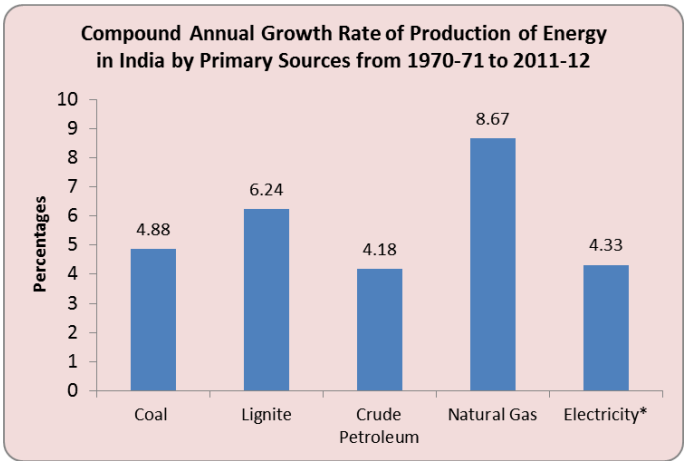
- The Lignite production during the same period increased by 12.19%.

- Considering the trend of production from 1970-71 to 2011-12, it is observed that coal production in India was about 72.95 MTs during 1970-71, which increased to 539.94 MTs during 2011-12, with a CAGR of 4.88%.

- During the same period the CAGR of Lignite was about 6.20%, with production increasing from 3.39 MTs in 1970-71 to 42.33% MTs in 2011-12.

- Production of crude petroleum increased from 6.82 MTs during 1970-71 to 38.09 MTs during 2011-12, a CAGR of about 4.18%.

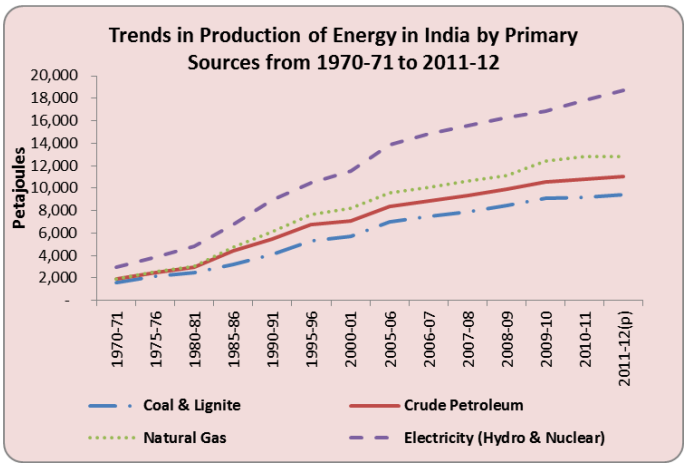
- The CAGRs for natural gas and electricity were 8.67% and 4.33%, respectively. Natural gas has experienced the highest CAGR among all the conventional sources of energy.



- 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 total production of energy from conventional sources increased from 17,857 peta joules during 2010-11 to 18,734 peta joules during 2011-12, showing an increase of 4.91%.

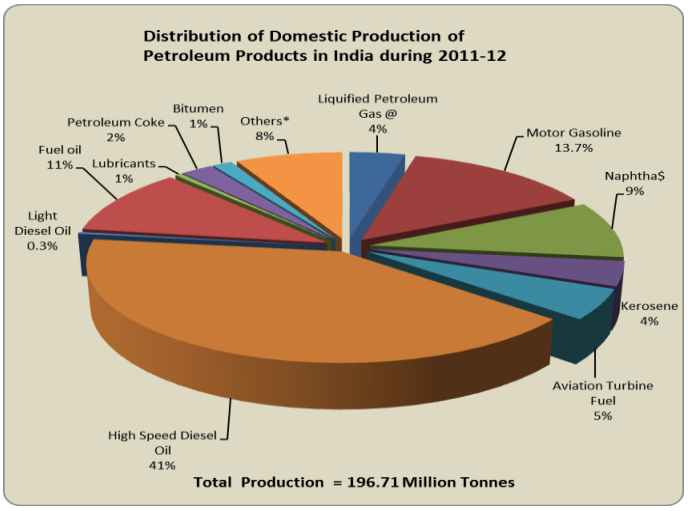
- The production of energy in peta Joules by primary sources (Table 3.2) shows that Coal and Lignite were the major sources of energy, accounting for about 50.23% of the total production during 2011-12. Electricity was second (31.48%), while Natural Gas (9.78%) was third.



3.2 Production of petroleum products

- In the year 2011-12, the production of Petroleum Products in the country was 196.71 MTs as against 190.32 MTs during 2010-11, an increase of 3.36% (Table 3.5).

- Hiigh speed diesel oil accounted for the maximum share (41.63%), followed by Motor Gasoline (13.67%), Fuel Oil (9.89%), Naphtha (8.73%). Kerosene (3.8%) and Aviation Turbine Fuel (5.11%).



- Production of Natural Gas decreased from 51.25 billion cubic meters (BCM) in 2010-11 to 46.48 CM in 2011-12 registering a negative growth of 9.30% and a CAGR of 10.71% from 1970-71 to 2011-12(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 9,23,203 GW during 2011-12.

- The production of electricity from utilities has increased from 8,44,846 GWh during 2010-11 to 9,23,203 GWh during 2011-12, registering an annual growth rate of about 9.27%.

- Total Electricity generation in the country, from utilities and non-utilities taken together, during 2011-12 was 10,51,375 GWh. Out of this 7,59,407 GWh was generated from thermal and 1,30,510 GWh was from hydro and 33,286 GWh was generated from nuclear sources. Total output from non-utilities was 1,28,172 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	99.68	3.03	8.45	2.37	35,928
1980-81	114.01	5.11	10.51	2.36	49,543
1985-86	154.30	8.04	30.17	8.13	56,003
1990-91	213.85	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	407.04	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	532.69	37.73	37.68	52.22	140,524
2011-12(p)	539.94	42.33	38.09	47.56	163,796
Growth rate of 2011-12 over 2010-11(%)	**1.36**	**12.19**	**1.08**	**-8.92**	**16.56**
CAGR 1970-71 to 2011-12(%)	**4.88**	**6.20**	**4.18**	**8.67**	**4.33**

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	9,207	1,579	2,012	5,059	17,857
2011-12(p)	9,410	1,595	1,832	5,897	18,734
Growth rate of 2011-12 over 2010-11(%)	**2.21**	**1.01**	**-8.95**	**16.56**	**4.91**
CAGR 1970-71 to 2011-12(%)	**4.31**	**4.18**	**8.66**	**4.33**	**4.51**

* 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.

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	169.08	213.85	14.07	227.92
1995-96	39.91	233.51	273.42	22.15	295.56
2000-01	30.90	282.80	313.70	24.25	337.94
2005-06	31.51	375.53	407.04	30.23	437.27
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	44.41	487.63	532.04	34.07	566.11
2010-11	49.55	483.15	532.69	37.73	570.43
2011-12(p)	51.65	488.29	539.94	42.33	582.27
Growth rate of 2011-12 over 2009-10(%)	**4.25**	**1.06**	**1.36**	**12.19**	**2.08**
CAGR 1970-71 to 2011-12(%)	**2.57**	**5.33**	**4.88**	**6.20**	**4.96**

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	12.00	13.05	11.17	24.22
1995-96	0.17	0.06	13.08	13.30	11.92	25.22
2000-01	-	-	13.38	13.38	8.64	22.02
2005-06	-	-	13.35	13.35	8.38	21.72
2006-07	-	-	12.57	12.57	7.03	19.59
2007-08	-	-	12.54	12.54	7.17	19.71
2008-09	-	-	12.62	12.62	7.18	19.80
2009-10	-	-	12.66	12.66	6.55	19.21
2010-11	-	-	10.84	10.84	6.96	17.79
2011-12(p)			9.97	9.97	6.50	16.46
Growth rate of 2011-2012 over 2010-11(%)	*	*	**-8.06**	**-8.06**	**-6.61**	**-7.50**
CAGR 1970-71 to 2011-12(%)	*	*	**0.20**	**-0.03**	**-0.39**	**-0.51**

* 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	7.54	26.14	17.54	7.70	9.57	78.04	0.59
2011-12(p)	7.34	26.89	17.18	7.48	10.06	81.90	0.50
Growth rate of 2011-12 over 2010-11(%)	**-2.73**	**2.88**	**-2.05**	**-2.95**	**5.09**	**4.95**	**-14.92**
CAGR 1970-71 to 2011-12(%)	**9.39**	**7.07**	**6.53**	**2.28**	**6.51**	**7.56**	**-1.59**

(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	20.52	0.88	4.48	2.71	14.61	190.32
2011-12(p)	19.46	0.99	4.61	4.48	15.83	196.71
Growth rate of 2011-12 over 2010-11(%)	**-5.18**	**12.44**	**2.95**	**65.25**	**8.37**	**3.36**
CAGR 1970-71 to 2011-12(%)	**3.78**	**3.54**	**8.48**	**4.17**	**8.57**	**5.99**

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

Source : Ministry of Petroleum & Natural Gas.

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	47.50	0.00	0.99	46.51
2010-11	52.22	0.00	0.97	51.25
2011-2012(p)	47.56	0.00	1.08	46.48
Growth rate of 2011-12 over 2010-11(%)	**-8.92**	**-**	**11.03**	**-9.30**
CAGR 1970-71 to 2011-12(%)	**8.67**	**-**	**0.83**	**10.71**

(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) = (10^6 x Kilo Watt hour)

Year	Utilities				Non-utilities			Grand
	Thermal *	Hydro	Nuclear	Total	Railways	Others	Total	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	704,323	114,257	26,266	844,846	-	114,224	114,224	959,070
2011-12(p)	759,407	130,510	33,286	923,203	-	128,172	128,172	1,051,375
Growth rate of 2011-12 over 2010-11(%)	**7.82**	**14.22**	**26.72**	**9.27**	-	**12.21**	**12.21**	**9.62**
CAGR 1970-71 to 2011-12(%)	**8.16**	**3.99**	**6.44**	**6.91**	-	**7.86**	**7.84**	**7.00**

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

Source : Central Electricity Authority.

FOREIGN TRADE IN CONVENTIONAL SOURCES OF ENERGY

4.1 Import and export of coal

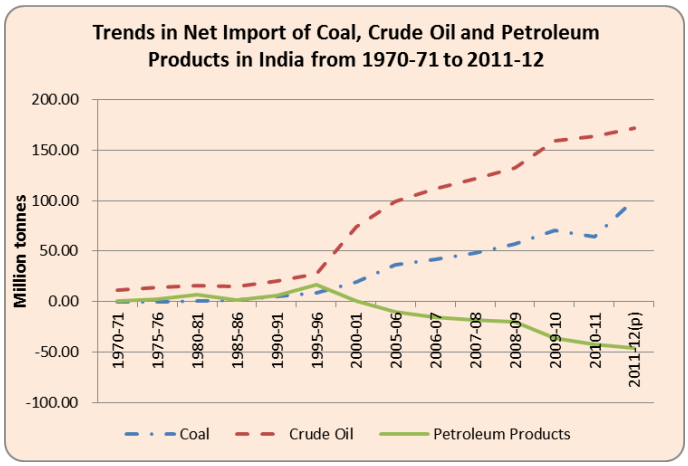
- The average quality of the Indian coal is not very high this necessitates the import of high quality coal to meet the requirements of steel plants. There has been an increasing trend in the import of coal.

- Import of coal has steadily increased from 20.93 MTs during 2000-01 to 102.85 MTs during 2011-12 (Table 4.1).During the said period, the quantum of coal exported increased from 1.29 MTs during 2000-01 to 2.03 MTs during 2011-12.

- There was an increase of 49.24% in gross import and 56.29% in net imports of coal in 2011-12 over the previous year. However there was a decline of 53.91% in export of coal during the same period.

4.2 Crude oil and petroleum products

- India is highly dependent on import of crude oil. Both gross and net imports of crude oil have increased from 11.68 MTs during 1970-71 to 171.73 MTs during 2011-12.



- There has been an annual increase of 4.97% during 2011-12 over 2010-11, as the net import increased from 163.60 MTs to 171.73 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 8.37MTs during 2000-01 and to 40.78 MTs during 2007-08. During 2011-12, exports stood at 60,084 MTs, recording an increase of 2.98% from previous year (Table 4.1).

- The import of petroleum products has increased from only 1.08 MT in 1970-71 to 15.00 MT during 2011-12, although there are some fluctuations in the trend (Table 4.1). However, there was a decline of 10.82% in import of petroleum products over the previous year.

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	1.66	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	68.92	4.41	64.51	163.60	0.00	163.60	16.82	59.08	-42.26
2011-12(p)	102.85	2.03	100.82	171.73		171.73	15.00	60.84	-45.84
Growth rate of 2011-12 over 2010-11(%)	**49.24**	**-53.91**	**56.29**	**4.97**	**-**	**4.97**	**-10.81**	**2.98**	**8.47**

(p): Provisional.

Note: Figures in brackets are in negative.

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

AVAILABILITY

5.1 Availability of coal and lignite

- The total availability of raw coal in India during 2011-12 stood at 638.84 MTs and that of lignite at 41.89 MTs (Table 5.1).

- The availability of coal in the year 2011-12 increased by 8.30% compared to 2010-11, the availability of lignite also increased by 11.15% during the same period.

- The availability of coal has increased at a CAGR of about 5.36% during the period from 1970-71 to 2011-12. This increased availability might be attributed to the secular increase in the coal production (72.95MTs during 1970-71 to 539.94 MTs during 2011-12) supplemented by imports (Table 5.2).

- The availability of lignite during 2011-12 increased by 11.15% compared to 2010-11 (Table 5.3). The availability of lignite has increased at a CAGR of about 1.41% during the period from 1998-99 to 2011-12.

5.2 Availability of Natural Gas

- The availability of natural gas has steadily increased from a mere 17.86 BCMs during 1970-71 to 150.87 BCMs during 2011-12, registering a CAGR of 5.21%. 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 53,031 GWh during 1970-71 to 8,11,506 GWh during 2011-12, registering a CAGR of 6.71% 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 209.82 MTs during 2011-12 (Table 5.4).

- During this period crude oil production increased from 6.82 MTs to 38.09 MTs and the net import increased from 11.68 MTs to 171.73 MTs. There was 4.24% increase in availability of crude oil during 2011-12 over 2010-11.

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

Year	Coal	Lignite	Crude Petroleum	Natural Gas	Electricity
	(Million Tonnes)	(Million Tonnes)	(Million Tonnes)	(Billion Cubic Metres)	(GWh)
1	2		3	4	5
1970-71	71.24	23.28	18.51	17.86	53,031
1975-76	92.17	22.03	22.07	22.88	74,796
1980-81	109.32	24.59	26.76	31.38	103,734
1985-86	155.54	24.81	44.78	41.78	157,300
1990-91	214.99	26.03	53.72	54.57	246,941
1995-96	284.04	28.48	62.51	71.98	356,441
2000-01	325.45	30.09	106.52	96.52	471,868
2005-06	433.27	30.24	131.60	313.25	592,194
2006-07	462.35	30.81	145.49	307.91	639,008
2007-08	502.82	34.65	155.79	314.79	689,780
2008-09	549.57	31.85	166.28	317.46	712,540
2009-10	585.30	34.41	192.95	465.21	761,934
2010-11	589.87	37.69	201.28	512.48	809,455
2011-12(p)	638.84	41.89	209.82	464.82	811,506
Growth rate of 2011-12 over 2010-11(%)	**8.30**	**11.15**	**4.24**	**-9.30**	**0.25**
CAGR 1970-71 to 2011-12(%)	**5.36**	**1.41**	**5.95**	**8.07**	**6.71**

(p) - Provisional

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

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	407.04	10.365	-	38.59	1.99	433.27
2006-07	430.83	10.014	-	43.08	1.55	462.35
2007-08	457.08	2.431	-	49.79	1.63	502.82
2008-09	492.76	0.538	-	59.00	1.66	549.57
2009-10	532.04	17.546	-	73.26	2.45	585.30
2010-11	532.69	7.329	-	68.92	4.41	589.87
2011-12(p)	539.94	1.923	-	102.85	2.03	638.84
Growth rate of 2011-12over 2010-11(%)	**1.36**	**-73.76**	-	**49.24**	**-53.91**	**8.30**

Note: Figures in brackets are in negative.

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	0.58	-	-	-	31.85
2009-10	34.07	-0.34	-	-	-	34.41
2010-11	37.73	0.05		-	-	37.69
2011-12(p)	43.11	0.44		-	-	41.89
Growth rate of 2011-12 over 2010-11(%)	**14.24**	**880.00**	**-**	**-**	**-**	**11.15**
CAGR 1970-71 to 2011-12(%)	**1.46**	**2.70**	**-**	**-**	**-**	**1.41**

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
2010-11	37.68	163.60	201.28	190.36	-42.26	148.10
2011-12(p)	38.09	171.73	209.82	196.71	-45.84	150.87
Growth rate of 2011-12 over 2010-11(%)	**1.08**	**4.97**	**4.24**	**3.33**	**8.47**	**1.87**

.@ Excludes LPG Production from Natural Gas

Source : Ministry of Petroleum & Natural Gas.

CONSUMPTION OF ENERGY RESOURCES

6.1 Consumption of coal and lignite

- The estimated total consumption of raw coal by industry has increased from 72.95 MTs during 1970-71 to 535.88 MTs during 2011-12, with a CAGR of 4.86% (Table 6.1). The annual growth rate from 2010-11 to 2011-12 was 0.60%.

- Consumption of Lignite increased from 3.39 MTs in 1970-71 to 41.88 MTs in 2011-12 registering a compound growth of 6.17%. Consumption of Lignite is highest in Electricity Generation sector, accounting for about 76.55% (Table 6.5) 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.

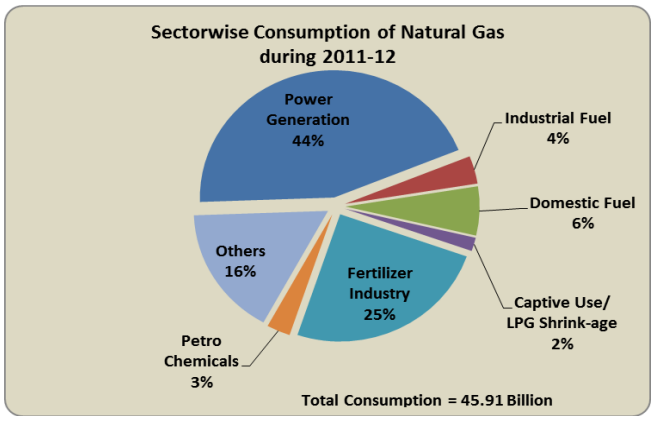
- From the year 1975-76 electricity generation is the biggest consumer of coal, followed by steel industries. Estimated coal consumption for electricity generation increased from 23 MTs during 1975-76 to 403.91 MTs during 2011-12.

- The estimated consumption of coal by steel & washery decreased from 19 MTs to 16.05 MTs, during the same period.

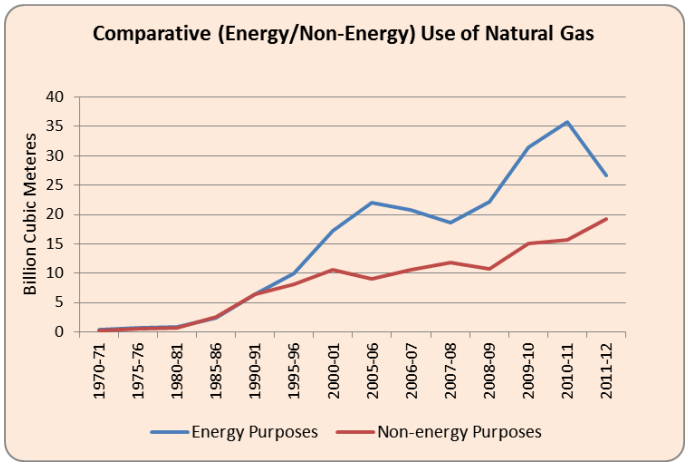
6.2 Consumption of Crude Oil and Natural Gas

- The estimated consumption of crude oil has a steady increase, from 18.38 MTs during 1970-71 to 211.42 MTs during 2011-12 with CAGR of 5.99%. It increased from 206.15 MTs in 2010-11 to 211.42 MTs in 2011-12 (Table 6.1).

- Industry wise off-take of natural gas shows that natural gas has been used both for Energy (58.14 %) and Non-energy (41.86%) purposes (Table 6.8).



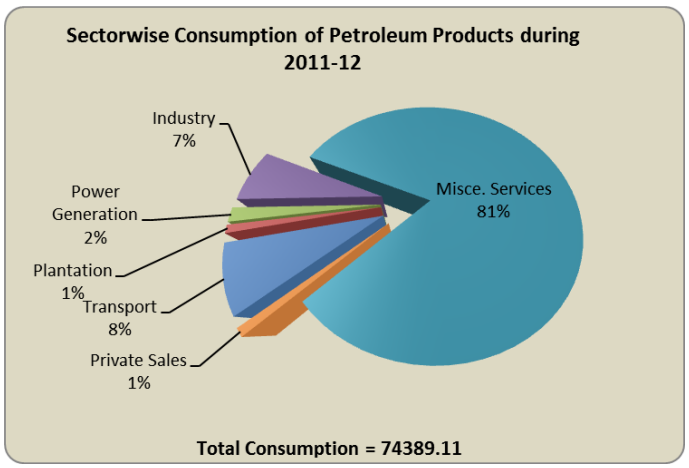
- The maximum use of Natural Gas is in power generation (44.28%) followed by fertilizers industry (24.68%) and 6.20% natural gas was used for domestic fuel.



6.3 Consumption of Petroleum Products

- High speed diesel oil accounted for 39.62% of total consumption of all types of petroleum products in 2011-12. This was followed by Refinery (9.44%), LPG (9.4%), Petrol (9.17%) and Naptha (6.8%). Consumption of Light Diesel oil continuously decreased from 1970-71 (1.1 MTS) to 2011-12 (0.42 MTS) (Tables 6.6 & 6.7).

- Sector-wise consumption of different petroleum products reveals that miscellaneous service sector accounts for the lion's share (81.29%) of the total consumption of petroleum products. (Tables 6.6 & 6.7).

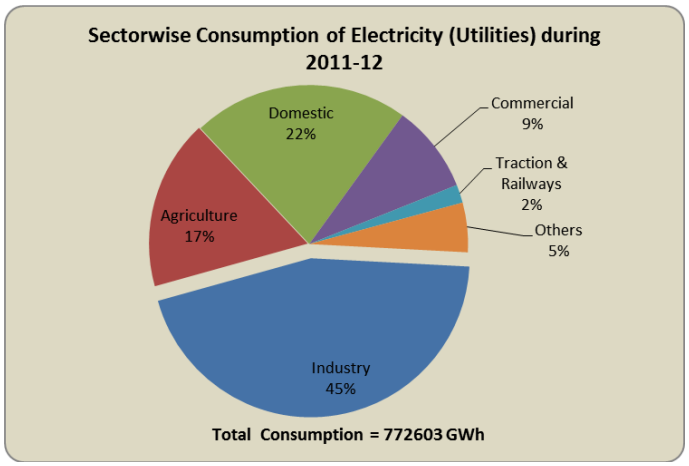


6.4 Consumption of Electricity

- The estimated electricity consumption increased from 43,724 GWh during 1970-71 to 7,72,603 GWh during 2011-12, showing a CAGR of 7.08% (Table 6.9). The increase in electricity consumption is 11.26% from 2010-11 (6,94,392 GWh) to 2011-12 (7,72,603 GWh).

- Of the total electricity sales in 2011-12, industry sector accounted for the largest share (44.84%), followed by domestic (22.01%), agriculture (17.30%) and commercial sector (8.97%).

- The electricity consumption in domestic sector and agriculture sector has increased at a much faster pace compared to other sectors during 1970-71 to 2011-12, with CAGRs of 9.44% and 8.43% respectively.



- Loss of electricity due to transmission has increased from 17.55% during 1970-71 to 32.86% during 2000-01 and it has decreased since then to around 24% during 2011-12 (Table 6.10).

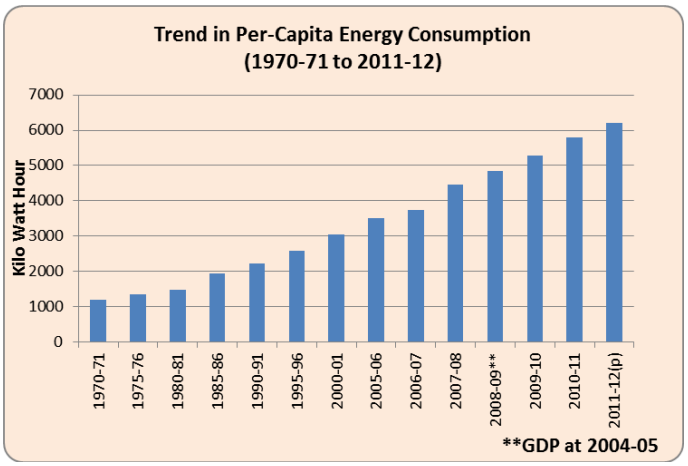
6.5 Per- Capita Energy Consumption & Energy Intensity

- 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 consumption of energy in peta Joules was in the form of Electricity which accounted for about 57.57% of the total consumption during 2011-12. Coal and Lignite were second (19.91%), while Crude Petroleum (18.75%) was third.

- The total consumption of energy from conventional sources increased from 44,448 peta joules during 2010-11 to 47,264 peta joules during 2011-12, showing an increase of 6.33%.

- Per-capita Energy Consumption (PEC) (the ratio of the estimate of total energy consumption during the year to the estimated mid-year population of that year) increased from 1,204.3 KWh in 1970-71 to 6419.53 KWh in 2011-12, a CAGR of 4.06% (Table 6.2). The annual increase in PEC from 2010-11 to 2011-12 was 3.36%.



- The Energy Intensity (amount of energy consumed for generating one unit of Gross Domestic Product) (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 0.148 KWh(at 2004-05 prices) in 2011-12.

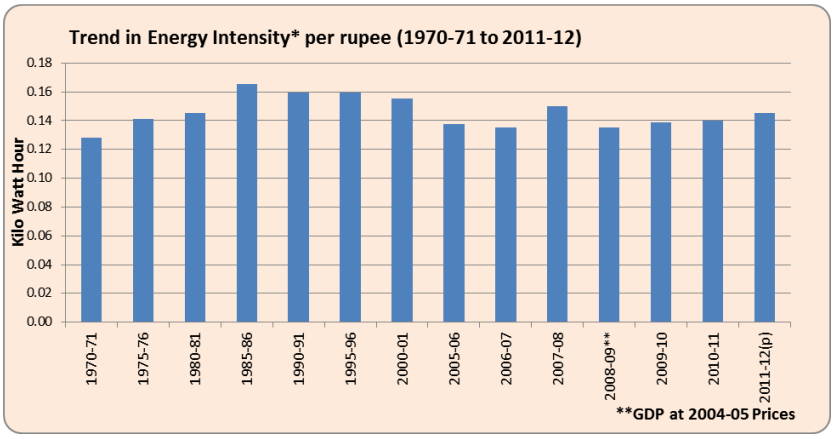


Table 6.1: Trends in Consumption of Conventional Sources of Energy in India

Year	Coal #	Lignite	Crude Oil**	Natural Gas *** (Billion Cubic Metres)	Electricity* (GWh)
	(Million Tonnes)				
1	2	3	4	5	6
1970-71	72.95	3.39	18.38	0.65	43,724
1975-76	99.68	3.03	22.28	1.13	60,246
1980-81	114.01	5.10	25.84	1.52	82,367
1985-86	154.30	7.68	42.91	4.95	123,099
1990-91	213.86	14.07	51.77	12.77	190,357
1995-96	273.42	22.15	58.74	18.09	277,029
2000-01	313.70	24.25	103.44	27.86	316,600
2005-06	407.04	30.34	130.11	31.03	411,887
2006-07	430.83	30.80	146.55	30.79	455,748
2007-08	457.08	34.66	156.10	31.48	510,899
2008-09	492.76	31.79	160.77	31.75	562,888
2009-10	532.04	34.43	192.77	46.51	620,251
2010-11	532.69	37.69	206.15	51.25	684,324
2011-12	535.88	41.88	211.42	46.48	755,847
Growth rate of 2011-12 over 2010-11(%)	**0.60**	**11.14**	**2.56**	**-9.30**	**10.45**
CAGR 1970-71 to 2011-12(%)	**4.86**	**6.17**	**5.99**	**10.71**	**7.02**

(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**	6467.76	1161495	4154973	5568.48	0.1557
2009-10	7127.70	1175480	4464081	6063.65	0.1597
2010-11	7342.05	1182105	4877842	6211.00	0.1505
2011-12(p)	7689.40	1197813	5202514	6419.53	0.1478
Growth rate of 2011-12 over 2010-11(%)	**4.73**	**1.33**	**6.66**	**3.36**	**-1.80**
CAGR 1970-71 to 2011-12(%)	**6.01**	**1.86**	**5.65**	**4.06**	**0.34**

* 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

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	7,009	5,448	1,195	14,828	28,480
2006-07	7,459	6,136	1,208	16,407	31,210
2007-08	7,926	6,536	1,189	18,392	34,043
2008-09	8,476	6,732	1,223	20,264	36,695
2009-10	9,137	8,071	1,791	22,329	41,329
2010-11	9,207	8,632	1,974	24,636	44,448
2011-12(p)	9,410	8,852	1,790	27,210	47,264
Growth rate of 2011-12 over 2010-11(%)	**2.21**	**2.56**	**-9.31**	**10.45**	**6.33**
CAGR 1970-71 to 2011-12(%)	**4.48**	**5.99**	**10.71**	**7.02**	**6.15**

* 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.

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	-	2.71	1.04	36.56	339.31
2005-06	306.04	19.66	14.97	-	2.77	0.29	51.85	395.59
2006-07	321.91	17.30	14.71	-	2.50	0.30	63.08	419.80
2007-08	350.58	16.99	15.27	-	2.64	0.37	67.72	453.57
2008-09	377.27	16.58	13.12	-	2.16	2.53	77.52	489.17
2009-10	390.58	16.45	14.66	-	2.34	0.27	89.50	513.79
2010-11	395.84	17.26	15.08	-	2.43	0.28	92.58	523.47
2011-12(p)	403.91	16.05	13.40	-	2.62	0.31	99.45	535.73
Distribution (%)	**75.39**	**3.00**	**2.50**	**-**	**0.49**	**0.06**	**18.56**	**100.00**
Growth rate of 2011-12over 2010-11(%)	**2.04**	**-7.04**	**-11.15**	**-**	**7.73**	**12.73**	**7.42**	**2.34**
CAGR 1970-71 to 2011-12(%)	**8.48**	**0.41**	**3.23**	**-**	**5.56**	**-3.61**	**3.48**	**4.92**

* 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	-	0.01	-	2.46	-	6.01	31.79
2009-10	28.14	-	0.38	-	1.82	-	4.09	34.43
2010-11	29.90	-	0.36	-	2.56	1.18	6.25	37.69
2011-12(p)	32.06	-	1.01	-	0.06	1.24	8.74	41.88
Distribution (%)	**76.55**	**-**	**2.42**	**-**	**0.15**	**2.96**	**20.87**	**100.00**
Growth rate of 2011-12 over 2010-11(%)	**7.24**	**-**	**180.89**	**-**	**-97.539**	**5.53**	**39.89**	**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	14.33	14.19	10.68	8.93	5.08	60.07	0.46
2011-12(p)	15.36	14.99	11.11	8.23	5.54	64.74	0.42
Growth rate of 2011-12over 2010-11(%)	**7.17**	**5.62**	**4.02**	**-7.83**	**9.02**	**7.78**	**-8.79**
CAGR 1970-71 to 2011-12(%)	**11.23**	**5.71**	**6.15**	**2.21**	**5.09**	**6.96**	**-2.28**

(p) : Provisional

Contd…

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

(Million' Tonnes)

Year	Heavy Ends				Refinery Fuel	Others*	Total
	Fuel Oils	Lubricants	Bitumen	Petroleum Coke			
	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	10.79	2.43	4.54	4.98	15.87	4.57	156.91
2011-12(p)	9.23	2.75	4.63	6.15	15.42	4.69	163.42
Growth rate of 2011-12 over 2010-11(%)	**-14.43**	**13.01**	**2.03**	**23.34**	**-2.84**	**2.52**	**4.15**
CAGR 1970-71 to 2011-12(%)	**1.64**	**3.92**	**4.34**	**10.12**	**6.22**	**6.13**	**5.24**

(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	5,416	616	166	1,440	52,240	193	60,071
	2011-12(p)	5,528	684	168	1,649	56,651	62	64,742
Growth rate of 2011-12 over 2010-11(%)		**2.07**	**11.04**	**1.20**	**14.51**	**8.44**	**-67.88**	**7.78**
CAGR 1970-71 to 2011-12(%)		**2.62**	**1.64**	**-5.13**	**-0.99**	**6.06**	**6.50**	**5.34**

('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	5	2	137	127	184	0	455
	2011-12(p)	3	1	127	102	182	0	415
Growth rate of 2011-12 over 2010-11(%)		**-38.57**	**-44.44**	**-7.23**	**-19.80**	**-1.30**	**-**	**-8.83**
CAGR 1970-71 to 2011-12(%)		**-26.57**	**-30.05**	**-2.35**	**-15.14**	**-4.78**	**-100.00**	**-11.69**

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	780	70	823	2,774	3,986	374	8,807
	2011-12(p)	371	70	647	2,409	3,345	631	7,473
Growth rate of 2011-12over 2010-11(%)		**-52.44**	**0.00**	**-21.39**	**-13.16**	**-16.08**	**68.72**	**-15.15**
CAGR 1970-71 to 2011-12(%)		**1.71**	**-12.95**	**1.47**	**-6.52**	**13.30**	**-6.78**	**-1.11**

('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	0	0	469	1,030	483	0	1,982
	2011-12(p)	0	0	399	1,067	293	0	1,759
Growth rate of 2011-12 over 2010-11(%)		**-**	**-**	**-14.93**	**3.59**	**-39.34**	**-**	**-11.25**
CAGR 1970-71 to 2011-12(%)		**-**	**-**	**-10.80**	**-8.20**	**-2.15**		**-8.24**

(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.

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

(Billion Cubic Metres)

Year	Energy Purposes							Non-energy Purposes				Grand Total
	Power Gener-ation	Indus-trial Fuel	Tea Plant-ation	Dom-estic Fuel	Captive Use/ LPG Shrink-age	Others	Total	Ferti-lizer Indu-stry	Petro Chem-icals	Others @	Total	
1	2	3	4	5	6	7	8=2 to 7	9	10	11	12=9 to11	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	1.80	1.32	18.69	9.82	1.43	0.64	11.89	30.58
2008-09	12.60	5.91	0.15	0.10	1.89	1.54	22.19	9.08	1.11	0.61	10.80	32.99
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	27.42	2.32	0.19	0.03	4.54	1.22	35.72	13.43	1.18	1.10	15.71	51.43
2011-12(p)	20.33	1.62	0.18	2.85	0.78	0.93	26.69	11.33	1.30	6.59	19.22	45.91
Distribution (%)	**44.29**	**3.52**	**0.38**	**6.20**	**1.71**	**2.03**	**58.14**	**24.68**	**2.83**	**14.35**	**41.86**	**100.00**
Growth rate of 2011-12 over 2010-11(%)	**-25.83**	**-30.17**	**-9.33**	**-**	**-82.74**	**-23.57**	**-25.28**	**-15.63**	**9.81**	**499.91**	**22.32**	**-10.74**
CAGR 1970-71 to 2011-12(%)	**10.93**	**6.48**	**6.02**	**-**	**5.99**	**-**	**10.15**	**10.27**	**-**	**-**	**11.66**	**10.68**

@ : 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.

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

(Giga Watt hour) = (10^6 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	236,752	120,209	146,080	60,600	12,408	36,595	612,645
2010-11	272,589	131,967	169,326	67,289	14,003	39,218	694,392
2011-12(p)	346,469	133,660	170,034	69,266	14,327	38,847	772,603
Distribution (%)	**44.84**	**17.30**	**22.01**	**8.97**	**1.85**	**5.03**	**100.00**
Growth rate of 2011-12 over 2010-11(%)	**27.10**	**1.28**	**0.42**	**2.94**	**2.31**	**-0.95**	**11.26**
CAGR 1970-71 to 2011-12(%)	**6.03**	**8.43**	**9.44**	**8.16**	**5.76**	**7.45**	**7.08**

Source : Central Electricity Authority.

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

(Giga Watt hour) = (10^6 x Kilo Watt hour)

Year	Gross Electricity Generated from Utilities	Consum-ption 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 transm-ission	Loss in transm-ission (%)
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	569,723	193,795	25.43
2010-11	844,846	52,380	792,466	16,989	809,455	617,097	194,537	24.03
2011-12(p)	923,203	57,238	865,965	19,839	811,506	663,392	195,562	24.10
Growth rate of 2011-12 over 2010-11(%)	**9.27**	**9.27**	**9.27**	**16.78**	**0.25**	**7.50**	**0.53**	**0.27**
CAGR 1970-71 to 2011-12(%)	**6.91**	**7.39**	**6.88**	**14.55**	**6.71**	**6.69**	**7.52**	**0.76**

Source : Central Electricity Authority.

ENERGY BALANCE

7.1 Definition

- Commodity balance. The purpose of commodity balance is to show the sources of supply and various uses of particular energy product with reference to national territory of the compiling country. The balance is compiled for any energy commodity provided that that commodity remains homogeneous at each point in the balance.

- IRES recommends that the format of energy balance and all applicable concepts are consistently used in the compilation of a commodity balance to ensure data consistency. 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.

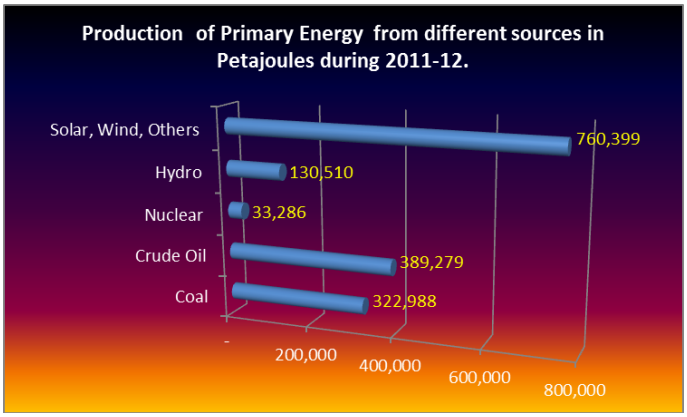
- Coal is also used as a final product or intermediate for power generation. Similarly, natural gas is also used directly or as an intermediate in power generation. Many petroleum products, such as HSDO, Naphtha etc. are used as a final product by the non-energy producing sectors and also used for power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

7.2 Components

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

- In 2011-12, primary energy production added up to 1636539 petajoules (PJ). The share of Crude oil accounted for 23%, renewable energy represented 54.43%, nuclear energy contributed with 2% and coal with 19.7%.

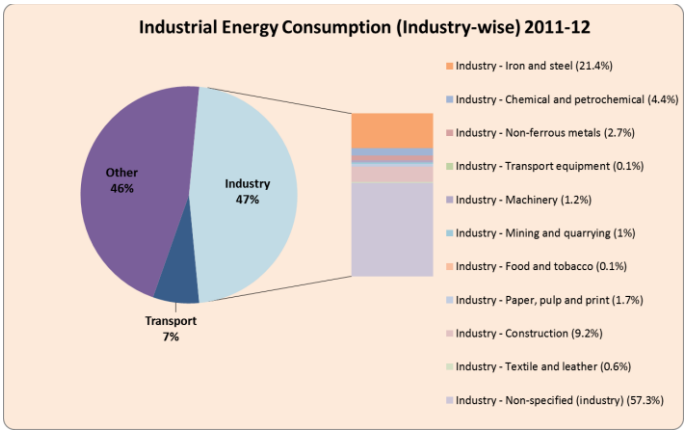


- India continued to be a net importer of primary energy, as it imported 255195 PJ in 2011-12. 68.77 % of such imports corresponded to crude oil.

- Total imports represents 13% of the total primary energy supply and 2.54% of the primary production was exported.

- In 2011-12, national energy consumption was 280934 PJ. The industrial sector used 47% of the total final energy consumption.

- Within the industry sector, the most energy-intensive industries were iron and steel, which accounted for 21.4% of the industrial energy use, construction (9.2%), Chemical and petrochemicals (4.4%),



- The transport sector accounted for 6.9% of total final consumption, The consumption of the residential, commercial and public sectors represented 46.12%

Table 7.1 : Energy Commodity Balance for the years 2010-11 and 2011-12(p)

Supply	Coal (000 tonnes)		Lignite (000 tonnes)		LPG (000 tonnes)		Naphtha (000 tonnes)	
	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12
Production	532694	539940	37733	43105	7541	7335	17535	17176
From Other Sources					2189	2213		
Imports	68918	98929			4502	5084	2074	1974
Exports	4409	1852			154	174	10655	10139
Intl. marine bunkers								
Stock changes	7329	1923	43	2666	2442	3113	1722	2094
Domestic Supply	**589874**	**635094**	**37690**	**40439**	**14331**	**15358**	**10676**	**11105**
Transfer								
Statistical difference	66346	99363		-2061				
Transformation	**395836**	**403905**	**29899**	**33090**				
Electricity plants	395836	403905	29899	33090				
CHP plants								
Heat plants								
Blast furnaces/ gas works								
Coke/pat.fuel/BKB plants								
Petroleum refineries								
Petrochemical industry								
Liquefaction plants								
Other Transform. sector								
Energy Sector							**419**	**187**
Coal mines								
Fuel mining and extraction								
Petroleum refineries								
Elec., CHP and heat plants								
Pumped storage (elec.)								
Other energy sector							419	187
Distribution losses								
Final Consumption	**523528**	**535731**	**37685**	**42500**	**14331**	**15358**	**10676**	**11105**
Industry Sector	**127692**	**131826**	**7786**	**9410**	**985**	**1045**	**3391**	**3754**
Iron and Steel	40055	37327					121	197
Chemical and Petrochemical	509	579	793	850	8	20	1681	1416
Non-Ferrous Metals	1166	2145						
Non-Metallic Minerals								
Transport Equipment								
Machinery					31	32		
Mining and Quarrying								
Food and Tobacco								
Paper, Pulp and Print	2432	2779	1766	1789				
Wood and Wood Products								
Cement	15079	13398	361	971				
Textile and Leather	275	280	1175	1123	3	2		
Brick	273	356	545	500				
Non-specified (Industry)	67840	74962	3146	4177	343	991	1589	2141
Transport Sector					**224**	**224**		
International aviation								
Domestic aviation								
Road								
Rail								
Pipeline transport								
Domestic navigation					68	74		
Non-specified					156	150		
Other Sectors					12369	**13319**	**6866**	**7164**
Residential					11682	12365		
Comm. And public services								
Agriculture/forestry					2	2		
Fishing								
Non-specified					685	952	6866	7164
Non-Energy Use								
in industry/transf./energy								
of which : feedstock								
in transport								
in other sectors								

Contd...

Table 7.1(contd) : Energy Commodity Balance for the years 2010-11 and 2011-12

Supply	Kerosene (000 tonnes)		Diesel (000 tonnes)		Heavy fuel oil (000 tonnes)		Electricity (GWH)	
	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12
Production	7702	**7475**	78840	81901	20519	**19456**	845435	923203
From Other Sources							114224	128172
Imports	1381	544	2073	1051	925	1128	5610	5610
Exports	33	34	20433	20491	6734	7895	62	128
Intl. marine bunkers								
Stock changes	261	-244	409	-2281	5903	5216		
Domestic Supply	**8789**	**8229**	**60071**	**64742**	**8807**	**7473**	**965207**	**1056857**
Transfer								
Statistical difference							301539	284254
Transformation			**166**	**168**	**823**	**647**	**52380**	**57238**
Electricity plants			166	168	823	647	52380	57238
CHP plants								
Heat plants								
Blast furnaces/ gas works								
Coke/pat.fuel/BKB plants								
Petroleum refineries								
Petrochemical industry								
Liquefaction plants								
Other Transform. sector								
Energy Sector			**303**	**303**			**3427**	**5069**
Fuel mining and extraction			303	303			437	3598
Petroleum refineries								
Elec., CHP and heat plants							2990	1471
Pumped storage (elec.)								
Other energy sector								
Distribution losses							146063	195562
Final Consumption	**8789**	**8229**	**60071**	**64742**	**8807**	**7473**	**663667**	**772603**
Industry Sector	**67**	**61**	**2801**	**2830**	**3225**	**3043**	**225019**	**346469**
Iron and steel			255	311			15579	29947
Chemical and petroleum			143	163	790	746	22990	33465
Non-ferrous metals							23739	25875
Non-metallic minerals								
Transport equipment							1458	1993
Machinery			106	200	1237	1049	3568	3728
Mining & Quarrying			1366	1181	7	45		
Food and tobacco							1326	1592
Paper, pulp and print								
Wood and wood products								
Construction			568	645	440	589	11485	15311
Textile and leather			183	156	85	52	2845	2371
Non-specified	67	61	180	174	666	562	142029	232187
Transport Sector			**5416**	**5528**	**780**	**371**	**179571**	**149582**
International aviation			1	1				
Domestic aviation								
Road			2483	2558				
Rail			2371	2429			17217	14327
Pipeline transport								
Domestic navigation			561	540				
Non-specified					780	371	162354	135255
Other Sectors	**8722**	**8045**	**51385**	**55913**	**3979**	**3412**	**349334**	**409807**
Residential	8583	7922					156894	170034
Comm. And public services							65168	67266
Agriculture/forestry			616	684			107536	133660
Fishing								
Non-specified	139	123	50769	55229	3979	3412	19736	38847
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 2011-12(p)*

in Kilotonne of Oil Equivalent (ktoe)

	Coal	Crude Oil	Oil Products	Nuclear
Production	322,988	389,279		33,286
Imports	64,008	175,507	15,198	
Exports	1,247		48,351	
Stock changes	1,723		8,080	
Total primary energy supply	**389,966**	**564,786**	**71,629**	**33,286**
Transfers				
Statistical differences	-19,437		-136,169	
Main activity producer electricity plants	-279,593		-801	-33,286
Oil refineries			177,960	
Non-specified (transformation)		-564,786		
Energy industry own use			-525	
Losses				
Final consumption	**90,936**		**112,094**	
Industry	**90,936**		**11,229**	
Iron and steel	25,141		545	
Chemical and petrochemical	584		2,435	
Non-ferrous metals	1,445			
Transport equipment				
Machinery			1,257	
Mining and quarrying			1,307	
Food and tobacco				
Paper, pulp and print	2,280			
Construction	9,599		1,256	
Textile and leather	445		219	
Non-specified (industry)	51,443		4,210	
Transport			**6,523**	
Road			2,737	
Rail			2,599	
Domestic navigation			661	
Non-specified (transport)			526	
Other			**94,341**	
Residential			22,330	
Commercial and public services				
Agriculture/forestry			734	
Non-specified (other)			71,277	

Table 7.2(contd) : Energy Balance of India for 2011-12(p)*

in Kilotonne of Oil Equivalent (ktoe)

	Hydro	Solar, Wind, Others	Electricity	Total
Production	130,510	760,399		1,636,539
Imports			482	255,195
Exports			11	49,609
Stock changes				9,803
Total primary energy supply	**130,510**	**760,399**	**493**	**1,951,146**
Transfers				
Statistical differences				-43,512
Main activity producer electricity plants	-130,510	-760,399	94,665	-280,394
Oil refineries				177,960
Non-specified (transformation)				-564,786
Energy industry own use			-436	-961
Losses			-16,818	-16,818
Final consumption			**77,904**	**280,934**
Industry			**29,796**	**131,962**
Iron and steel			2,575	28,261
Chemical and petrochemical			2,878	5,897
Non-ferrous metals			2,225	3,670
Transport equipment			171	171
Machinery			321	1,578
Mining and quarrying				1,307
Food and tobacco			137	137
Paper, pulp and print				2,280
Construction			1,317	12,172
Textile and leather			204	868
Non-specified (industry)			19,968	75,621
Transport			**12,864**	**19,387**
Road				2,737
Rail			1,232	3,831
Domestic navigation				661
Non-specified (transport)			11,632	12,158
Other			**35,243**	**129,584**
Residential			14,623	36,953
Commercial and public services			5,785	5,785
Agriculture/forestry			11,495	12,229
Non-specified (other)			3,341	74,618

* Provisional

tonne of oil equivalent (**toe**) is a unit of energy: the amount of energy released by burning one tonne of crude oil, **ktoe=11630000 kWh(appox)**

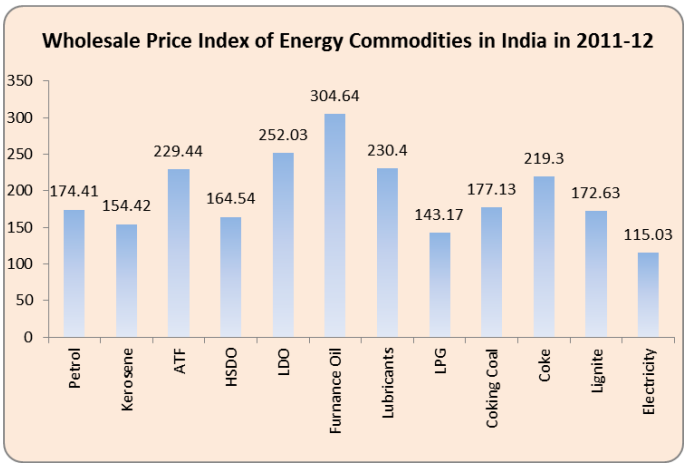
SOURCE PROGRAM: International Energy Agency, Paris.

WHOLE SALE PRICE INDEX OF ENERGY COMMODITIES

8.1 *The Wholesale Price Index of Petroleum Products*

- Wholesale Price Index of Petroleum Products except High Speed Diesel Oil recorded a increase ranging from 19.65% to 39.12% from 2010-11 to 2011-12.

- The maximum increase was observed in Aviation Turbine Fuel(39.12%) followed by Furnace oil(36.19%). The wholesale price index decreased for Coke by 5.94% and Electricity only recorded a modest increase of 1.64% 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
2011-12	174.4	154.4	229.4	164.5	252.0	304.6	230.4	143.2	177.1	219.3	172.6	115.0
Increase in 2011-12 over 2010-11(%)	**21.95**	**21.41**	**39.12**	**8.45**	**30.93**	**36.19**	**19.65**	**13.72**	**27.26**	**-5.94**	**19.82**	**1.64**

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

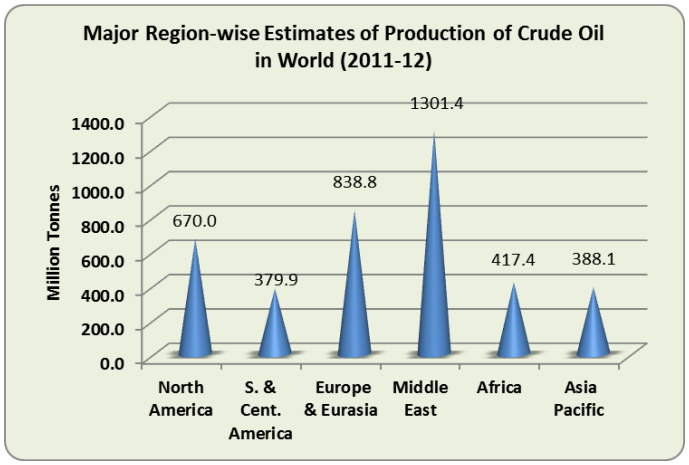
Source :Office of the Economic Advisor, Ministry of Commerce & Industry.

WORLD PRODUCTION AND CONSUMPTION OF CRUDE OIL & NATURAL GAS

9.1 Production and consumption of crude oil

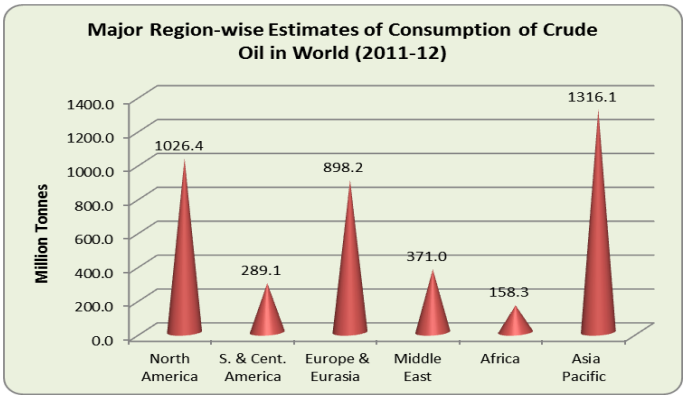
- The total estimated production of crude oil in the world has increased from about 3,929.2 MT in 2006-07 to about 3,945.4 MT during 2010-11, and increased to 39,956 MT during 2011-12(Table 9.1). The production increased by 1.3% from 2010-11 to 2011-12.

- Geographical distribution of total world production during 2011-12 across major regions reveals that Middle East accounted for the highest share (32.6%), followed by Europe & Eurasia (21%), North America (16.8%), Africa (10.4%), Asia Pacific (9.7%) and South & Central America (9.5%).



- Distribution of total world production according to countries shows that Saudi Arabia and Russian Federation were the first and second highest producers with 13.2% and 12.8% respectively. They were followed by USA (8.8%), Iran (5.2%), China (5.1%), Canada (4.3%), Mexico (3.6%), United Arab Emirates(3.8%), Venezuela (3.5%), Kuwait(3.5%) and Iraq (3.4%). India accounted for only 1% of the world production.

- Major region-wise consumption shows that Asia Pacific accounted for the highest share (32.4%) of total world consumption, followed by North America (25.3%), and Europe & Eurasia (22.1%).African countries accounted for the lowest share in the world consumption (3.9%).



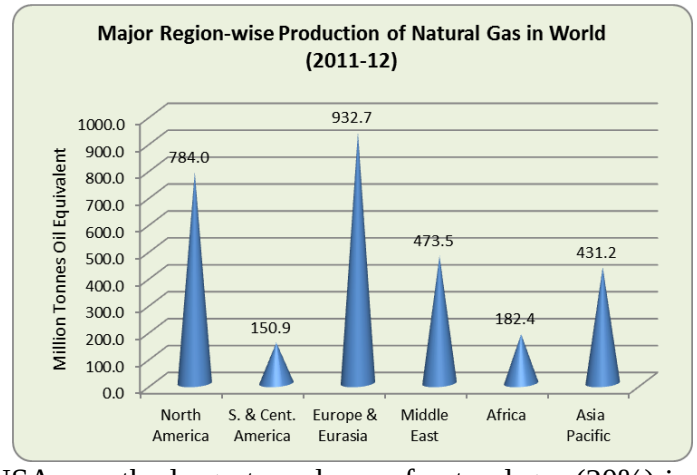
- Country-wise distribution of consumption reveals that the United States was the largest consumer of crude oil, consuming 20.5% of the world consumption during 2011-12. China was the second largest consumer (11.4%), followed by Japan (5%), India (4%) and Russian federation (3.4%).

- 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 2,590.2 million tonnes oil equivalent (Mtoe) in 2006-07 to 2954.8 Mtoe in 2010-11. The production has increased by 3.1% from 2010-11 to 2011-12(Table 9.3).

- Distribution of production of natural gas over major regions shows that Europe & Eurasia (31.66%) and North America (26.5%) are the highest and the second highest producers, together accounting for 58.1% of the total world production.



- Country-wise, USA was the largest producer of natural gas (20%) in the world during 2011-12, followed by the Russian Federation (18.5%) and Canada (4.9%). India's share in the total world production of natural gas during 2011-12 was only 1.4% (41.5 Mtoe).

- The growth in production of natural gas from 2010-11 to 2011-12 was highest in Middle East (11.4%), followed by North America (5.5%), South & Central America (3%).

- The total world consumption of natural gas has increased from 2,548.9 Mtoe in 2006-07 to 2,905.6 Mtoe (2.2%) in 2011-12(Table 9.4).

- United States of America was the largest consumer of natural gas, consuming 21.5% of the world consumption during 2011-12, Europe & Eurasia accounted for 34.1% of the total world consumption.

- Country-wise distribution of consumption of natural gas indicates that USA was the largest consumer (21.5%), followed by Russian federation (13.2%). India with a consumption of 55.0 Mtoe accounted for only 1.9% of total world consumption.

- Consumption of natural gas over major regions shows that Europe & Eurasia (34.1%) and North America (26.92%) are the highest and the second highest consumers, together accounting for 61.03% of the total world consumption.

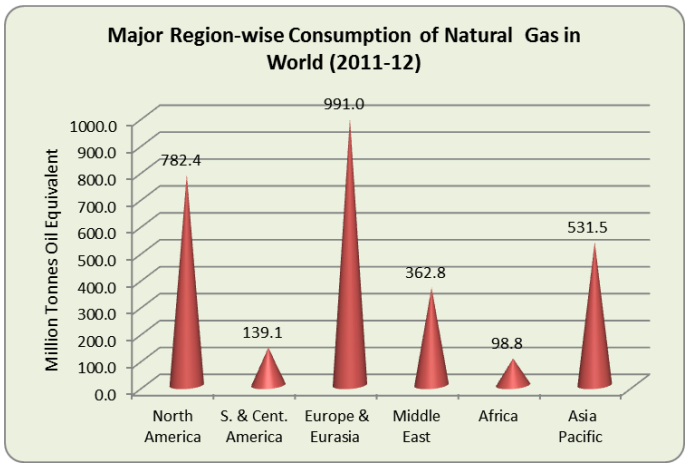


Table 9.1:Country-wise Estimates of Production of Crude Oil*

(Million tonnes)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total Production
North America								
USA	310.2	309.8	304.9	328.6	**339.9**	**352.3**	3.6	8.8
Canada	153.4	158.6	155.9	156.1	**164.4**	**172.6**	5.0	4.3
Mexico	183.3	172.9	157.6	147.4	**146.3**	**145.1**	-0.8	3.6
Total North America	**646.9**	**641.3**	**618.5**	**632.1**	**650.6**	**670.0**	**3.0**	**16.8**
South and Central America								
Argentina	35.8	34.9	34.1	33.8	**32.5**	**30.3**	-7.0	0.8
Brazil	94.2	95.5	99.2	106.0	**111.7**	**114.6**	2.5	2.9
Colombia	28.8	29.0	32.0	35.8	**41.9**	**48.7**	16.3	1.2
Ecuador	29.0	27.7	27.4	26.3	**26.3**	**27.1**	2.8	0.7
Peru	5.4	5.3	5.5	6.6	**7.2**	**7.0**	-2.8	0.2
Trinidad & Tobago	8.0	6.9	6.6	6.6	**6.3**	**5.9**	-6.5	0.1
Venezuela	151.2	152.1	154.1	149.9	**142.5**	**139.6**	-2.0	3.5
Other S. & Cent. America	7.0	7.1	7.0	6.7	**6.6**	**6.7**	1.4	0.2
Total S. & Cent. America	**359.3**	**358.6**	**366.0**	**371.9**	**375.2**	**379.9**	**1.3**	**9.5**
Europe and Eurasia								
Azerbaijan	32.5	42.8	44.7	50.6	**50.8**	**45.6**	-10.3	1.1
Denmark	16.7	15.2	14.0	12.9	**12.2**	**10.9**	-10.1	0.3
Italy	5.8	5.9	5.2	4.6	**5.1**	**5.3**	3.9	0.1
Kazakhstan	66.1	68.4	72.0	78.2	**81.6**	**82.4**	0.9	2.1
Norway	128.7	118.6	114.2	108.8	**98.6**	**93.4**	-5.2	2.3
Romania	5.0	4.7	4.7	4.5	**4.3**	**4.2**	-1.5	0.1
Russian Federation	480.5	491.3	488.5	494.2	**505.1**	**511.4**	1.2	12.8
Turkmenistan	9.2	9.8	10.3	10.4	**10.7**	**10.7**	0.0	0.3
United Kingdom	76.6	76.8	71.7	68.2	**63.0**	**52.0**	-17.4	1.3
Uzbekistan	5.4	4.9	4.8	4.5	**3.6**	**3.6**	-1.8	0.1
Other Europe & Eurasia	21.7	21.6	20.6	19.9	**19.2**	**19.2**	0.3	0.5
Total Europe & Eurasia	**848.1**	**860.0**	**850.8**	**856.8**	**854.2**	**838.8**	**-1.8**	**21.0**
Middle East								
Iran	207.9	209.6	213.0	204.0	**207.1**	**205.8**	-0.6	5.2
Iraq	98.1	105.2	119.5	120.0	**121.4**	**136.9**	12.8	3.4
Kuwait	133.8	129.9	135.8	121.0	**122.7**	**140.0**	14.1	3.5
Oman	35.7	34.5	35.9	38.7	**41.0**	**42.1**	2.8	1.1
Qatar	50.9	53.6	60.8	57.9	**65.7**	**71.1**	8.2	1.8
Saudi Arabia	512.4	492.4	513.5	462.7	**466.6**	**525.8**	12.7	13.2
Syria	21.6	20.6	19.8	19.9	**19.1**	**16.5**	-13.7	0.4
United Arab Emirates	145.5	140.7	142.9	126.3	**131.4**	**150.1**	14.2	3.8
Yemen	17.9	16.1	14.9	14.4	**14.2**	**10.8**	-24.0	0.3
Other Middle East	1.4	1.6	1.5	1.7	**1.7**	**2.2**	32.0	0.1
Total Middle East	**1225.4**	**1204.2**	**1257.6**	**1166.6**	**1190.9**	**1301.4**	**9.3**	**32.6**

Contd….

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

(Million tonnes)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total
Africa								
Algeria	86.2	86.5	85.6	77.8	**75.5**	**74.3**	-1.6	1.9
Angola	69.6	82.5	93.5	89.1	**92.0**	**85.2**	-7.3	2.1
Cameroon	8.0	7.5	6.7	6.2	**6.4**	**6.0**	-6.7	0.1
Chad	14.3	11.5	12.2	14.2	**15.1**	**15.2**	1.0	0.4
Rep. of Congo (Brazzaville)	33.7	34.1	34.6	35.3	**35.0**	**35.2**	0.3	0.9
Egypt	16.9	17.3	17.2	15.2	**13.6**	**12.5**	-8.1	0.3
Equatorial Guinea	11.7	11.5	11.8	11.5	**12.5**	**12.2**	-2.0	0.3
Gabon	84.9	85.0	85.3	77.1	**77.4**	**22.4**	-71.0	0.6
Libya	119.7	114.1	105.3	101.5	**117.2**	**117.4**	0.2	2.9
Nigeria	16.3	23.1	23.7	23.4	**22.9**	**22.3**	-2.6	0.6
Sudan	3.3	4.6	4.2	4.0	**3.8**	**3.7**	-2.5	0.1
Tunisia	7.6	8.3	8.1	7.7	**7.1**	**10.9**	52.7	0.3
Other Africa	472.4	486.1	488.3	463.0	**478.5**	**417.4**	-12.8	10.4
Total Africa	**472.4**	**486.1**	**488.3**	**463.0**	**478.5**	**417.4**	**-12.8**	**10.4**
Asia Pacific								
Australia	23.8	24.7	24.4	22.6	**24.6**	**21.0**	-14.5	0.5
Brunei	10.8	9.5	8.5	8.2	**8.4**	**8.1**	-3.8	0.2
China	184.8	186.3	190.4	189.5	**203.0**	**203.6**	0.3	5.1
India	35.8	36.1	36.1	35.4	**38.9**	**40.4**	3.9	1.0
Indonesia	48.9	47.5	49.0	47.9	**48.3**	**45.6**	-5.6	1.1
Malaysia	30.9	31.7	32.1	30.6	**29.8**	**26.6**	-10.9	0.7
Thailand	11.8	12.5	13.3	13.7	**13.8**	**13.9**	0.8	0.3
Vietnam	17.4	16.4	15.4	16.9	**15.5**	**15.9**	2.1	0.4
Other Asia Pacific	13.0	13.9	14.7	14.2	**13.6**	**13.0**	-5.1	0.3
Total Asia Pacific	**377.1**	**378.6**	**383.8**	**379.0**	**396.1**	**388.1**	**-2.0**	**9.7**
TOTAL WORLD	**3929.2**	**3928.8**	**3965.0**	**3869.3**	**3945.4**	**3995.6**	**1.3**	**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.

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

(Million tonnes)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total Consumption
North America								
US	930.7	928.8	875.8	833.2	**849.9**	**833.6**	-1.9	20.5
Canada	100.5	103.8	102.5	97.1	**102.7**	**103.1**	0.4	2.5
Mexico	89.7	92.0	91.6	88.5	**88.5**	**89.7**	1.3	2.2
Total North America	**1120.8**	**1124.6**	**1069.9**	**1018.7**	**1041.1**	**1026.4**	**-1.4**	**25.3**
South and Central America								
Argentina	21.7	24.0	24.7	23.7	**25.9**	**28.1**	8.2	0.7
Brazil	95.0	100.7	107.9	108.0	**118.0**	**120.7**	2.3	3.0
Chile	12.5	16.2	16.8	15.6	**14.8**	**15.2**	2.8	0.4
Colombia	10.7	10.7	10.7	10.6	**11.4**	**11.7**	2.4	0.3
Ecuador	8.3	8.5	8.7	8.9	**10.3**	**10.5**	2.6	0.3
Trinidad & Tobago	6.9	7.1	8.0	8.1	**8.5**	**9.2**	9.0	0.2
Peru	1.4	1.7	1.8	1.7	**1.7**	**1.7**	-3.5	0.0
Venezuela	30.3	31.9	33.3	34.8	**36.9**	**38.3**	3.8	0.9
Other S. & Cent. America	57.1	58.4	56.7	54.5	**53.5**	**53.7**	0.4	1.3
Total S. & Cent. America	**244.0**	**259.3**	**268.5**	**266.0**	**281.0**	**289.1**	**2.9**	**7.1**
Europe and Eurasia								
Austria	14.1	13.4	13.3	12.8	**12.9**	**12.5**	-3.6	0.3
Azerbaijan	4.8	4.5	3.6	3.3	**3.2**	**3.6**	11.9	0.1
Belarus	8.1	7.3	8.3	9.4	**7.3**	**9.0**	22.8	0.2
Belgium & Luxembourg	33.4	33.7	36.8	32.2	**33.5**	**33.7**	0.7	0.8
Bulgaria	4.7	4.6	4.6	4.2	**3.8**	**3.5**	-6.4	0.1
Czech Republic	9.8	9.7	9.9	9.7	**9.1**	**9.1**	-0.5	0.2
Denmark	9.6	9.7	9.5	8.5	**8.4**	**8.3**	-1.7	0.2
Finland	10.6	10.6	10.5	9.9	**10.4**	**10.5**	0.9	0.3
France	93.0	91.4	90.8	87.5	**84.4**	**82.9**	-1.7	2.0
Germany	123.6	112.5	118.9	113.9	**115.4**	**111.5**	-3.3	2.7
Greece	22.1	21.7	21.3	20.1	**18.7**	**17.2**	-7.9	0.4
Hungary	7.8	7.7	7.5	7.1	**6.7**	**6.5**	-3.1	0.2
Republic of Ireland	9.3	9.4	9.0	8.0	**7.6**	**6.8**	-10.4	0.2
Italy	86.7	84.0	80.4	75.1	**73.1**	**71.1**	-2.7	1.8
Kazakhstan	10.3	11.3	11.1	9.0	**9.5**	**10.2**	7.6	0.3
Lithuania	2.8	2.8	3.1	2.6	**2.7**	**2.7**	0.8	0.1
Netherlands	52.0	53.5	51.1	49.4	**49.9**	**50.1**	0.3	1.2
Norway	10.5	10.7	10.4	10.6	**10.8**	**11.1**	3.5	0.3
Poland	23.3	24.2	25.3	25.3	**26.7**	**26.3**	-1.5	0.6
Portugal	14.4	14.4	13.6	12.8	**12.5**	**11.6**	-7.3	0.3
Romania	10.3	10.3	10.4	9.2	**8.7**	**9.0**	4.4	0.2
Russian Federation	130.8	123.6	129.8	124.8	**128.9**	**136.0**	5.5	3.4
Slovakia	3.4	3.6	3.9	3.7	**3.9**	**3.7**	-5.3	0.1
Spain	79.4	80.4	78.0	73.6	**72.1**	**69.5**	-3.7	1.7
Sweden	16.5	16.0	15.7	14.6	**15.3**	**14.5**	-5.3	0.4
Switzerland	12.6	11.3	12.1	12.3	**11.4**	**11.0**	-3.0	0.3
Turkey	32.7	33.5	31.9	31.6	**30.2**	**32.0**	5.8	0.8
Turkmenistan	4.1	4.6	5.1	4.6	**4.8**	**4.9**	3.9	0.1
Ukraine	14.2	15.6	14.9	13.4	**13.0**	**12.9**	-0.8	0.3
United Kingdom	82.3	79.2	77.9	74.4	**73.5**	**71.6**	-2.6	1.8
Uzbekistan	5.0	4.6	4.5	4.2	**4.3**	**4.4**	0.7	0.1
Other Europe & Eurasia	31.2	32.1	32.3	30.5	**30.4**	**30.3**	-0.4	0.7
Total Europe & Eurasia	**973.3**	**952.2**	**955.5**	**908.5**	**903.1**	**898.2**	**-0.6**	**22.1**

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

(Million tonnes)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total Consumption
Middle East								
Iran	86.1	88.0	91.0	91.9	**89.8**	**87.0**	-3.1	2.1
Israel	11.9	12.4	12.2	11.5	**11.2**	**11.1**	-0.8	0.3
Kuwait	17.7	17.9	17.8	17.5	**19.0**	**19.0**	0.2	0.5
Qatar	4.6	5.4	6.2	6.2	**7.4**	**8.0**	8.3	0.2
Saudi Arabia	91.7	97.4	106.1	115.4	**123.2**	**127.8**	3.7	3.1
United Arab Emirates	26.6	28.5	29.6	27.5	**28.9**	**30.5**	5.6	0.8
Other Middle East	70.8	73.5	78.7	80.2	**84.7**	**87.5**	3.2	2.2
Total Middle East	**309.4**	**323.1**	**341.6**	**350.3**	**364.3**	**371.0**	**1.8**	**9.1**
Africa								
Algeria	11.5	12.9	14.0	14.9	**14.8**	**15.6**	5.3	0.4
Egypt	28.7	30.6	32.6	34.4	**36.3**	**33.7**	-7.2	0.8
South Africa	25.3	26.2	25.3	24.7	**26.1**	**26.2**	0.0	0.6
Other Africa	70.4	73.4	78.1	80.3	**83.4**	**82.9**	-0.6	2.0
Total Africa	**135.9**	**143.1**	**150.1**	**154.2**	**160.6**	**158.3**	**-1.4**	**3.9**
Asia Pacific								
Australia	41.5	41.8	42.5	42.2	**43.4**	**45.9**	5.7	1.1
Bangladesh	4.2	4.5	4.6	4.8	**4.9**	**5.0**	2.2	0.1
China	351.2	369.3	376.0	388.2	**437.7**	**461.8**	5.5	11.4
China Hong Kong SAR	15.0	16.1	14.6	16.6	**17.9**	**18.1**	1.0	0.4
India	**120.4**	**133.4**	**144.1**	**153.7**	**156.2**	**162.3**	**3.9**	**4.0**
Indonesia	57.8	59.3	58.7	60.6	**65.2**	**64.4**	-1.1	1.6
Japan	237.1	228.7	220.9	198.3	**200.3**	**201.4**	0.5	5.0
Malaysia	24.5	27.3	27.1	26.5	**26.7**	**26.9**	0.7	0.7
New Zealand	7.1	7.2	7.2	6.9	**7.0**	**6.9**	-1.5	0.2
Pakistan	17.6	19.2	19.3	20.6	**20.5**	**20.4**	-0.2	0.5
Philippines	13.3	14.1	12.3	13.1	**12.2**	**11.8**	-3.6	0.3
Singapore	45.1	49.0	52.0	56.1	**60.5**	**62.5**	3.3	1.5
South Korea	104.7	107.6	103.1	103.7	**106.0**	**106.0**	-0.1	2.6
Taiwan	48.6	50.4	45.1	44.3	**46.3**	**42.8**	-7.5	1.1
Thailand	45.5	45.6	44.2	45.6	**45.8**	**46.8**	2.2	1.2
Vietnam	12.0	13.3	14.1	14.1	**15.1**	**16.5**	8.9	0.4
Other Asia Pacific	15.3	16.0	15.7	15.9	**16.0**	**16.7**	4.5	0.4
Total Asia Pacific	**1160.9**	**1202.8**	**1201.6**	**1211.2**	**1281.7**	**1316.1**	**2.7**	**32.4**
TOTAL WORLD	**3944.2**	**4005.0**	**3987.3**	**3908.9**	**4031.9**	**4059.1**	**0.7**	**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.

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	2011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total Production
North America								
USA	479.3	499.6	521.7	532.7	**549.9**	**592.3**	7.7	20.0
Canada	169.6	164.4	158.9	147.6	**143.9**	**144.4**	0.3	4.9
Mexico	46.3	48.6	48.5	49.1	**49.6**	**47.2**	-4.7	1.6
Total North America	**695.3**	**712.6**	**729.2**	**729.4**	**743.4**	**784.0**	**5.5**	**26.5**
South and Central America								
Argentina	41.5	40.3	39.7	37.2	**36.1**	**34.9**	-3.3	1.2
Bolivia	11.6	12.4	12.9	11.1	**12.8**	**13.8**	8.1	0.5
Brazil	10.2	10.1	12.4	10.5	**12.9**	**15.0**	16.2	0.5
Colombia	6.3	6.8	8.2	9.5	**10.1**	**9.9**	-2.7	0.3
Peru	1.6	2.4	3.1	3.1	**6.5**	**10.2**	56.9	0.3
Trinidad & Tobago	32.8	35.1	35.4	36.5	**38.2**	**36.6**	-4.2	1.2
Venezuela	28.3	26.6	27.0	25.8	**27.2**	**28.1**	3.2	0.9
Other S. & Cent. America	3.7	3.5	3.4	2.9	**2.6**	**2.4**	-8.3	0.1
Total S. & Cent. America	**136.0**	**137.2**	**141.8**	**136.7**	**146.5**	**150.9**	**3.0**	**5.1**
Europe and Euroasia								
Azerbaijan	5.5	8.8	13.3	13.3	**13.6**	**13.3**	-1.8	0.5
Denmark	9.4	8.3	9.1	7.6	**7.4**	**6.4**	-14.0	0.2
Germany	14.1	12.9	11.7	11.0	**9.6**	**9.0**	-5.9	0.3
Italy	9.1	8.0	7.6	6.6	**6.8**	**6.9**	0.7	0.2
Kazakhstan	12.5	15.0	16.8	16.0	**15.8**	**17.3**	9.6	0.6
Netherlands	55.4	54.5	60.0	56.4	**63.5**	**57.8**	-9.0	2.0
Norway	78.9	80.7	89.4	93.4	**95.7**	**91.3**	-4.6	3.1
Poland	3.9	3.9	3.7	3.7	**3.7**	**3.9**	4.3	0.1
Romania	10.7	10.4	10.3	10.1	**9.8**	**9.9**	1.4	0.3
Russian Federation	535.6	532.8	541.5	474.9	**530.0**	**546.3**	3.1	18.5
Turkmenistan	54.3	58.9	59.5	32.7	**38.1**	**53.6**	40.6	1.8
Ukraine	16.9	16.9	17.1	17.3	**16.3**	**16.4**	0.4	0.6
United Kingdom	72.0	64.9	62.7	53.7	**51.4**	**40.7**	-20.8	1.4
Uzbekistan	49.0	53.2	56.0	54.0	**53.7**	**51.3**	-4.4	1.7
Other Europe & Eurasia	10.3	9.7	9.2	8.8	**8.9**	**8.7**	-2.0	0.3
Total Europe & Eurasia	**937.6**	**938.8**	**967.9**	**859.4**	**924.2**	**932.7**	**0.9**	**31.6**
Middle East								
Bahrain	10.2	10.6	11.4	11.5	**11.8**	**11.7**	-0.8	0.4
Iran	97.7	100.7	104.7	118.0	**131.5**	**136.6**	3.9	4.6
Iraq	1.3	1.3	1.7	1.0	**1.2**	**1.7**	42.0	0.1
Kuwait	11.3	10.9	11.5	10.1	**10.6**	**11.7**	10.4	0.4
Oman	21.3	21.6	21.7	22.3	**24.4**	**23.9**	-2.2	0.8
Qatar	45.6	56.9	69.3	80.4	**105.0**	**132.2**	25.8	4.5
Saudi Arabia	66.2	67.0	72.4	70.6	**78.9**	**89.3**	13.2	3.0
Syria	5.1	5.0	4.8	5.0	**6.9**	**7.5**	8.7	0.3
United Arab Emirates	44.1	45.3	45.2	43.9	**46.2**	**46.6**	0.9	1.6
Yemen	-	-	-	0.7	**5.6**	**8.5**	51.3	0.3
Other Middle East	2.4	2.7	3.3	2.8	**3.1**	**4.0**	31.0	0.1
Total Middle East	**305.2**	**322.1**	**345.9**	**366.3**	**425.1**	**473.5**	**11.4**	**16.0**

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	2011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total Production
Africa								
Algeria	76.0	76.3	77.2	71.6	**72.4**	**70.2**	-3.0	2.4
Egypt	49.2	50.1	53.1	56.4	**55.2**	**55.1**	-0.1	1.9
Libya	11.9	13.8	14.3	14.3	**15.1**	**3.7**	-75.6	0.1
Nigeria	25.6	31.5	31.5	22.3	**32.9**	**35.9**	9.0	1.2
Other Africa	9.4	11.1	14.2	14.7	**16.6**	**17.5**	5.4	0.6
Total Africa	**172.1**	**182.8**	**190.4**	**179.3**	**192.2**	**182.4**	**-5.1**	**6.2**
Asia Pacific								
Australia	35.0	36.0	34.4	38.1	**41.0**	**40.5**	-1.3	1.4
Bangladesh	13.4	14.3	15.3	16.6	**17.9**	**17.9**	-0.1	0.6
Brunei	11.3	11.0	10.9	10.3	**11.1**	**11.5**	4.2	0.4
China	52.7	62.3	72.3	76.7	**85.4**	**92.3**	8.1	3.1
India	26.4	27.1	27.5	35.3	**45.8**	**41.5**	-9.3	1.4
Indonesia	63.2	60.9	62.7	64.7	**73.8**	**68.0**	-7.8	2.3
Malaysia	57.0	58.1	58.2	57.7	**56.3**	**55.6**	-1.3	1.9
Myanmar	11.3	12.2	11.2	10.4	**10.9**	**11.2**	2.6	0.4
Pakistan	32.5	33.1	33.8	34.6	**35.7**	**35.2**	-1.2	1.2
Thailand	21.9	23.4	25.9	27.8	**32.7**	**33.3**	2.0	1.1
Vietnam	6.3	6.4	6.7	7.2	**8.5**	**7.7**	-9.2	0.3
Other Asia Pacific	13.2	15.7	16.5	16.7	**16.3**	**16.4**	1.0	0.6
Total Asia Pacific	**344.2**	**360.4**	**375.4**	**396.2**	**435.2**	**431.2**	**-0.9**	**14.6**
TOTAL WORLD	**2590.2**	**2654.0**	**2750.5**	**2667.4**	**2866.7**	**2954.8**	**3.1**	**100.0**

* Excluding gas flared or recyled.

Source : Ministry of Petroleum & Natural Gas.

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

(Million tonnes oil equivalent)

Country/ Region	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total Consumption
North America								
USA	560.0	597.3	600.6	590.1	**611.2**	**626.0**	2.4	21.5
Canada	87.3	86.6	86.5	85.4	**85.5**	**94.3**	10.3	3.2
Mexico	54.8	56.9	59.5	59.6	**61.1**	**62.0**	1.5	2.1
Total North America	**702.1**	**740.8**	**746.6**	**735.1**	**757.9**	**782.4**	3.2	26.9
South and Central America								
Argentina	37.6	39.5	40.0	38.8	**39.0**	**41.9**	7.5	1.4
Brazil	18.7	19.0	22.2	17.8	**24.1**	**24.0**	-0.3	0.8
Chile	7.0	4.1	2.4	2.8	**4.2**	**4.7**	11.7	0.2
Colombia	6.3	6.7	6.8	7.8	**8.2**	**8.1**	-0.8	0.3
Ecuador	0.7	0.5	0.4	0.4	**0.4**	**0.4**	0.0	0.0
Peru	1.6	2.4	3.1	3.1	**4.9**	**5.6**	15.2	0.2
Trinidad & Tobago	18.2	18.2	19.7	18.8	**20.3**	**19.8**	-2.7	0.7
Venezuela	28.3	26.6	28.3	27.5	**29.2**	**29.8**	2.3	1.0
Other S. & Cent. America	3.5	4.0	4.3	4.5	**4.9**	**4.7**	-4.6	0.2
Total S. & Cent. America	**121.9**	**121.2**	**127.2**	**121.6**	**135.2**	**139.1**	**2.9**	**4.8**
Europe and Eurasia								
Austria	8.5	8.0	8.6	8.4	**9.1**	**8.5**	-6.0	0.3
Azerbaijan	8.2	7.2	8.2	7.0	**6.7**	**7.3**	9.6	0.3
Belarus	17.1	17.0	17.3	14.5	**17.7**	**16.5**	-7.2	0.6
Belgium & Luxembourg	15.0	14.9	14.8	15.1	**17.0**	**14.4**	-14.8	0.5
Bulgaria	2.9	2.9	2.9	2.1	**2.3**	**2.6**	14.5	0.1
Czech Republic	8.4	7.8	7.8	7.4	**8.4**	**7.6**	-9.3	0.3
Denmark	4.6	4.1	4.1	4.0	**4.5**	**3.8**	-16.2	0.1
Finland	3.8	3.5	3.6	3.2	**3.6**	**3.2**	-10.0	0.1
France	37.9	38.2	39.4	38.0	**42.2**	**36.3**	-13.9	1.2
Germany	78.5	74.6	73.1	70.2	**75.0**	**65.3**	-12.9	2.2
Greece	2.8	3.4	3.6	3.0	**3.3**	**4.1**	24.3	0.1
Hungary	11.5	10.7	10.6	9.1	**9.8**	**9.1**	-6.8	0.3
Republic of Ireland	4.0	4.3	4.5	4.3	**4.7**	**4.2**	-10.5	0.1
Italy	69.7	70.0	70.0	64.4	**68.5**	**64.2**	-6.2	2.2
Kazakhstan	8.9	7.5	7.3	7.0	**7.4**	**8.3**	13.0	0.3
Lithuania	2.9	3.3	2.9	2.5	**2.8**	**3.1**	9.0	0.1
Netherlands	34.3	33.3	34.7	35.0	**39.2**	**34.3**	-12.7	1.2
Norway	4.0	3.8	3.9	3.7	**3.7**	**3.6**	-2.1	0.1
Poland	12.4	12.4	13.5	13.0	**14.0**	**13.8**	-1.0	0.5
Portugal	3.7	3.9	4.2	4.2	**4.5**	**4.6**	1.8	0.2
Romania	16.3	14.5	14.3	11.9	**12.2**	**12.5**	2.0	0.4
Russian Federation	367.7	379.9	374.4	350.7	**372.7**	**382.1**	2.5	13.2
Slovakia	5.4	5.1	5.2	4.4	**5.0**	**5.6**	12.3	0.2
Spain	30.3	31.6	34.8	31.1	**31.2**	**28.9**	-7.2	1.0
Sweden	0.8	0.9	0.8	1.0	**1.4**	**1.1**	-19.1	0.0
Switzerland	2.7	2.6	2.8	2.7	**3.0**	**2.6**	-12.8	0.1
Turkey	27.4	32.5	33.8	32.1	**35.1**	**41.2**	17.3	1.4
Turkmenistan	16.5	19.1	18.5	17.9	**20.4**	**22.5**	10.4	0.8
Ukraine	60.3	56.9	54.0	42.3	**46.9**	**48.3**	3.0	1.7
United Kingdom	81.1	81.9	84.5	78.0	**84.6**	**72.2**	-14.6	2.5
Uzbekistan	37.7	41.3	43.8	39.2	**41.0**	**44.2**	7.9	1.5
Other Europe & Eurasia	16.0	16.4	15.6	13.4	**14.5**	**14.9**	2.7	0.5
Total Europe & Eurasia	**1001.0**	**1013.6**	**1017.6**	**940.9**	**1012.2**	**991.0**	**-2.1**	**34.1**

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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	22011-12	% Change 2011-12 over 2010-11	2011-12 % Share of World's Total Consumption
Middle East								
Iran	97.8	101.7	107.4	118.2	**130.1**	**138.0**	6.1	4.7
Israel	2.1	2.5	3.7	4.1	**4.8**	**4.5**	-6.0	0.2
Kuwait	11.3	10.9	11.5	10.9	**13.1**	**14.6**	11.5	0.5
Qatar	17.6	17.4	17.4	18.0	**18.4**	**21.4**	16.4	0.7
Saudi Arabia	66.2	67.0	72.4	70.6	**78.9**	**89.3**	13.2	3.1
United Arab Emirates	39.0	44.3	53.5	53.2	**54.7**	**56.6**	3.5	1.9
Other Middle East	28.3	29.1	32.8	34.7	**39.6**	**38.4**	-3.0	1.3
Total Middle East	**262.3**	**272.8**	**298.7**	**309.7**	**339.5**	**362.8**	**6.9**	**12.5**
Africa								
Algeria	21.4	21.9	22.8	24.5	**23.7**	**25.2**	6.5	0.9
Egypt	32.9	34.5	36.8	38.3	**40.6**	**44.7**	10.0	1.5
South Africa	3.1	3.1	3.4	3.0	**3.5**	**3.8**	8.9	**0.1**
Other Africa	22.0	25.4	27.2	23.2	**28.4**	**25.1**	-11.6	0.9
Total Africa	**79.3**	**85.0**	**90.1**	**89.0**	**96.2**	**98.8**	**2.7**	**3.4**
Asia Pacific								
Australia	22.0	23.9	23.0	22.7	**23.1**	**23.0**	-0.4	0.8
Bangladesh	13.4	14.3	15.3	16.6	**17.9**	**17.9**	-0.1	0.6
China	50.5	63.5	73.2	80.6	**96.8**	**117.6**	21.5	4.0
China Hong Kong SAR	2.6	2.5	2.9	2.8	**3.4**	**2.7**	-20.4	0.1
India	33.5	36.1	37.2	45.9	**55.7**	**55.0**	-1.2	1.9
Indonesia	29.9	28.2	30.0	33.6	**36.3**	**34.1**	-5.9	1.2
Japan	75.4	81.2	84.4	78.7	**85.1**	**95.0**	11.6	3.3
Malaysia	30.4	30.1	30.4	30.3	**28.7**	**25.7**	-10.5	0.9
New Zealand	3.3	3.6	3.4	3.6	**3.9**	**3.5**	-10.0	0.1
Pakistan	32.5	33.1	33.8	34.6	**35.7**	**35.2**	-1.2	1.2
Philippines	2.4	2.8	3.0	3.0	**2.8**	**3.2**	16.0	0.1
Singapore	6.3	7.8	7.4	7.3	**7.6**	**7.9**	4.4	0.3
South Korea	28.8	31.2	32.1	30.5	**38.7**	**41.9**	8.3	1.4
Taiwan	10.0	10.6	10.5	10.2	**12.7**	**14.0**	10.1	0.5
Thailand	30.0	31.8	33.6	35.3	**40.6**	**41.9**	3.3	1.4
Vietnam	6.3	6.4	6.7	7.2	**8.5**	**7.7**	-9.2	0.3
Other Asia Pacific	4.9	5.4	5.1	4.6	**4.8**	**5.2**	7.3	0.2
Total Asia Pacific	**382.3**	**412.4**	**431.8**	**447.4**	**502.1**	**531.5**	**5.9**	**18.3**
TOTAL WORLD	**2548.9**	**2645.8**	**2712.0**	**2643.7**	**2843.1**	**2905.6**	**2.2**	**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.

ANNEX- I

DEFINITIONS OF ENERGY PRODUCTS.

1. Solid fuels

i. **Hard Coal**: Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous coals.

ii. **Lignite**: Brown coal with a gross calorific value (moist, ash-free basis) less than 20 MJ/kg.

iii. **Coke**: Products derived directly or indirectly from the various classes of coal by carbonisation or pyrolysis processes, or by the aggregation of finely divided coal or by chemical reactions with oxidising agents, including water.

2. Liquid fuels

i. **Crude petroleum** A mineral oil of fossil origin extracted by conventional means from underground reservoirs, and comprises liquid or near-liquid hydrocarbons and associated impurities such as sulphur and metals.
Remark: Conventional crude oil exists in the liquid phase under normal surface temperature and pressure, and usually flows to the surface under the pressure of the reservoir. This is termed "conventional" extraction. Crude oil includes condensate from condensate fields, and "field" or "lease" condensate extracted with the crude oil.

The various crude oils may be classified according to their sulphur content ("sweet" or "sour") and API gravity ("heavy" or "light"). There are no rigorous specifications for the classifications but a heavy crude oil may be assumed to have an API gravity of less than 20º and a sweet crude oil may be assumed to have less than 0.5% sulphur content.

ii. **Liquefied petroleum** LPG refers to liquefied propane (C3H8) and butane (C4H10) or mixtures of both. Commercial grades are usually mixtures of the gases with small amounts of propylene, butylene, isobutene and isobutylene stored under pressure in containers.
Remark: The mixture of propane and butane used varies according to purpose and season of the year. The gases may be extracted from natural gas at gas separation plants or at plants re-gasifying imported liquefied natural gas. They are also obtained during the refining of crude oil.
LPG may be used for heating and as a vehicle fuel. Certain oil field practices also use the term LPG to describe the high vapour pressure components of natural gas liquids.

iii. **Motor gasoline** A mixture of some aromatics (e.g., benzene and toluene) and aliphatic hydrocarbons in the C5 to C12 range. The distillation range is 25ºC to 220ºC.
Remark: Additives are blended to improve octane rating, improve combustion performance, reduce oxidation during storage, maintain cleanliness of the engine and

improve capture of pollutants by catalytic converters in the exhaust system. Motor gasoline may also contain bio-gasoline products.

iv. **Naphtha's** Light or medium oils distilling between 30ºC and 210ºC which do not meet the
specification for motor gasoline.

Remark: Different naphthas are distinguished by their density and the content of paraffins, isoparaffins, olefins, naphthenes and aromatics. The main uses for naphthas are as feedstock for high octane gasolines and the manufacture of olefins in the petrochemical industry

v. **Kerosene** Mixtures of hydrocarbons in the range C9 to C16 and distilling over the temperature interval 145ºC to 300°C, but not usually above 250ºC and with a flash point above 38ºC.

Remark: The chemical compositions of kerosenes depend on the nature of the crude oils from which they are derived and the refinery processes that they have undergone. Kerosenes obtained from crude oil by atmospheric distillation are known as straight-run kerosenes. Such streams may be treated by a variety of processes to produce kerosenes that are acceptable for blending as jet fuels. Kerosenes are primarily used as jet fuels. They are also used as domestic heating and cooking fuels, and as solvents. Kerosenes may include components or additives derived from biomass.

vi. **Gasoline-type Jet fuels** Light hydrocarbons for use in aviation turbine power units, distilling between 100ºC and 250ºC. They are obtained by blending kerosene and gasoline or naphtha in such a way that the aromatic content does not exceed 25 per cent in volume, and the vapour pressure is between 13.7 kPa and 20.6 kPa.

Remark: Gasoline-type jet fuel is also known as “aviation turbine fuel”.

vii. **Gas oil / Diesel oil** Gas oils are middle distillates, predominantly of carbon number range C11 to C25 and with a distillation range of 160ºC to 420°C.

Remark: The principal marketed products are fuels for diesel engines (diesel oil), heating oils and marine fuel. Gas oils are also used as middle distillate feedstock for the petrochemical industry and as solvents.

viii. **Fuel oil** Comprises residual fuel oil and heavy fuel oil. Residual fuel oils have a distillation range of 350ºC to 650ºC and a kinematic viscosity in the range 6 to 55 cSt at 100ºC. Their flash point is always above 60ºC and their specific gravity is above 0.95. Heavy fuel oil is a general term describing a blended product based on the residues from various refinery processes.

Remark: Other names commonly used to describe fuel oil include: bunker fuel, bunker C, fuel oil No. 6, industrial fuel oil, marine fuel oil and black oil. Residual and heavy fuel oil are used in medium to large industrial plants, marine applications and power stations in combustion equipment such as boilers, furnaces and diesel engines. Residual fuel oil is also used as fuel within the refinery.

ix. **Lubricants** Oils, produced from crude oil, for which the principal use is to reduce friction between sliding surfaces and during metal cutting operations.

Remark: Lubricant base stocks are obtained from vacuum distillates which result from further distillation of the residue from atmospheric distillation of crude oil. The lubricant base stocks are then further processed to produce lubricants with the desired properties.

x. **Petroleum coke** Petroleum coke is a black solid obtained mainly by cracking and carbonizing heavy hydrocarbon oils, tars and pitches. It consists mainly of carbon (90 to 95 per cent) and has a low ash content.
The two most important categories are "green coke" and "calcined coke".

xi. Green coke (raw coke) is the primary solid carbonization product from high boiling hydrocarbon fractions obtained at temperatures below 630ºC. It contains 4-15 per cent by weight of matter that can be released as volatiles during subsequent heat treatment at temperatures up to approximately 1330ºC.
Calcined coke is a petroleum coke or coal-derived pitch coke obtained by heat treatment of green coke to about 1330ºC. It will normally have a hydrogen content of less than 0.1 per cent by weight.

Remark: In many catalytic operations (e.g., catalytic cracking) carbon or catalytic coke is deposited on the catalyst, thus deactivating it. The catalyst is reactivated by burning off the coke which is used as a fuel in the refining process. The coke is not recoverable in a concentrated form

xii. **Bitumen (Asphalt)** A solid, semi-solid or viscous hydrocarbon with a colloidal structure, being brown to black in color.

Remark: It is obtained as a residue in the distillation of crude oil and by vacuum distillation of oil residues from atmospheric distillation. It should not be confused with the nonconventional primary extra heavy oils which may also be referred to as bitumen. In addition to its major use for road pavements, bitumen is also used as an adhesive, a waterproofing agent for roof coverings and as a binder in the manufacture of patent fuel. It may also be used for electricity generation in specially designed power plants. Bitumen is also known in some countries as asphalt but in others asphalt describes the mixture of bitumen and stone aggregate used for road pavements.

xiii. **Refinery gas** is a non-condensable gas collected in petroleum refineries (it is also known as still gas).

3. Gaseous fuels

i. **Natural Gas:** A mixture of gaseous hydrocarbons, primarily methane, but generally also including ethane, propane and higher hydrocarbons in much smaller amounts and some noncombustible gases such as nitrogen and carbon dioxide.

Remark: The majority of natural gas is separated from both "non-associated" gas originating from fields producing hydrocarbons only in gaseous form, and "associated"

gas produced in association with crude oil. The separation process produces natural gas by removing or reducing the hydrocarbons other than methane to levels which are acceptable in the marketable gas. The natural gas The natural gasliquids (NGL) removed in the process are distributed separately.

ii. **Coke-oven gas** : A gas produced from coke ovens during the manufacture of coke oven coke.

iii. **Biogases:** Gases arising from the anaerobic fermentation of biomass and the gasification of solid biomass (including biomass in wastes).

Remark: The biogases from anaerobic fermentation are composed principally of methane and carbon dioxide and comprise landfill gas, sewage sludge gas and other biogases from anaerobic fermentation.
Biogases can also be produced from thermal processes (by gasification or pyrolysis) of biomass and are mixtures containing hydrogen and carbon monoxide (usually known as syngas) along with other components. These gases may be further processed to modify their composition and can be further processed to produce substitute natural gas.
The gases are divided into two groups according to their production: biogases from anaerobic fermentation and biogases from thermal processes. They are used mainly as a fuel but can be used as a chemical feedstock.

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**: refers to electricity produced from devices driven by fresh, flowing or falling water.

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** is defined as the capture, extraction or manufacture of fuels or energy in forms which are ready for general use. In energy statistics, two types of production are distinguished, primary and secondary. Primary production is the capture or extraction

of fuels or energy from natural energy flows, the biosphere and natural reserves of fossil fuels within the national territory in a form suitable for use. Inert matter removed from the extracted fuels and quantities reinjected flared or vented are not included. The resulting products are referred to as "primary" products.
Secondary production is the manufacture of energy products through the process of transformation of primary fuels or energy. The quantities of secondary fuels reported as production include quantities lost through venting and flaring during and after production. In this manner, the mass, energy and carbon within the primary source(s) from which the fuels are manufactured may be balanced against the secondary fuels produced. Fuels, electricity and heat produced are usually sold but may be partly or entirely consumed by the producer. 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 of energy products** comprise all fuel and other energy products entering the national territory. Goods simply being transported through a country (goods in transit) and goods temporarily admitted are excluded but re-imports, which are domestic goods exported but subsequently readmitted, are included. The bunkering of fuel outside the reference territory by national merchant ships and civil aircraft engaged in international travel is excluded from imports. Fuels delivered to national merchant ships and civil aircraft which are outside of the national territory and are engaged in international travel should be classified as "International Marine" or "Aviation Bunkers", respectively, in the country where such bunkering is carried out (see paragraph 5.12). Note that the "country of origin" of energy products should be recorded as a country from which goods were imported**.**

viii. **Exports of energy products** comprise all fuel and other energy products leaving the national territory with the exception that exports exclude quantities of fuels delivered for use by merchant (including passenger) ships and civil aircraft, of all nationalities, during international transport of goods and passengers. Goods simply being transported through a country (goods in transit) and goods temporarily withdrawn are excluded but re-exports, foreign goods exported in the same state as previously imported, are included. Fuels delivered to foreign merchant ships and civil aircraft engaged in international travel are classified as "International Marine" or "Aviation Bunkers", respectively. Note that "country of destination" of energy products (that is country of the last known destination as it is known at the time of exportation) should be recorded as a country to which these products are exported to**.**

ix. **Losses** refer to losses during the transmission, distribution and transport of fuels, heat and electricity. Losses also include venting and flaring of manufactured gases, losses of geothermal heat after production and pilferage of fuels or electricity. Production of secondary gases includes quantities subsequently vented or flared. This ensures that a balance can be constructed between the use of the primary fuels from which the gases are derived and the production of the gases.

x. **Energy Industries Own Use** refers to consumption of fuels and energy for the direct support of the production, and preparation for use of fuels and energy. Quantities of fuels which are transformed into other fuels or energy are not included here but within the transformation use. Neither are quantities which are used within parts of the energy

industry not directly involved in the activities listed in the definition. These quantities are reported within final consumption.

5. Non-commercial Energy Sources

i. **Fuelwood, wood residues and by-products:** Fuelwood or firewood (in log, brushwood, pellet or chip form) obtained from natural or managed forests or isolated trees. Also included are wood residues used as fuel and in which the original composition of wood is retained.
Remark: Charcoal and black liquor are excluded.

ii. **Charcoal** The solid residue from the carbonisation of wood or other vegetal matter through slow pyrolysis.

iii. **Bagasse** The fuel obtained from the fibre which remains after juice extraction in sugar cane processing.

Source: International Recommendations for Energy Statistics (IRES), UNITED NATIONS STATISTICS DIVISION, NEW YORK

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 x 10^3 calories
1 giga joule		=	10^9 joules = 238.84 x 10^6 calories
1 tera joule		=	10^{12} joules = 238.84 x 10^9 calories
1 peta joule		=	10^{15} joules = 238.84 x 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.
	2006-12	=	16.14 peta joules of energy
One million tonnes of oil equivalent (MTOE)		=	41.87 peta joules of energy.
		=	4.1868 x 10^4 terajoule (TJ)
One billion cubic metre of natural gas		=	38.52 peta joules of energy.
One million cubic metre of natural gas		=	38.52 tera joules of energy.
		=	.03852 peta joules of energy.
One billion kilowatt hour of electricity		=	3.60 peta joules of energy.

ANNEX-III

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

ANNEX- IV

Energy Data Collection Mechanisms-Country Practice

I. Coal and Coal Derivatives

I.1 Organsiational 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

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.