

## HIGHLIGHTS

### 3. Production of Primary sources of Conventional Energy.

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

Coal production in the country during the year 2009-10 was 532 million tones(MTs) as compared to 493 MTs during 2008-09, registering a growth of 8%(Table 3.1). The Lignite production during the same period increased by 5%. Considering the trend of production from 1970-71 to 2009-10, it is observed that coal production in India was about 73 MTs during 1970-71, which increased to 532 MTs during 2009-10, with a CAGR of 5%. During the same period the CAGR of Lignite was about 6%, with production increasing from 3.39 MTs in 1970-71 to 34.07 MTs in 2009-10. Production of crude petroleum increased from 6.82 MTs during 1970-71 to 33.69 MTs during 2009-10, a CAGR of about 4%. The CAGRs for natural gas and electricity were 9.12% and 3.85%, respectively. Natural gas has experienced the highest CAGR among all the conventional sources of energy.

For more meaningful comparison in the trends and patterns of growth of different energy resources, it is desirable to convert all the resources to their energy equivalents by applying appropriate conversion factors and express them in energy units (Joules/peta Joules/ Terra joules). The production of energy in peta Joules by primary sources (Table 3.2) shows that Coal and Lignite were the major sources of energy, accounting for about 62% of the total production during 2009-10. Electricity was second (27%), while Natural Gas (11%) was third. The total production of energy from conventional sources increased from 16,046 peta joules during 2008-09 to 16,640 peta joules during 2009-10, showing an increase of 3.7%.

#### 3.2 Production of petroleum products

In the year 2009-10, the production of Petroleum Products in the country was 149.65 MTs as against 150.52 MTs during 2008-09, a decline of about 0.6% (Table 3.5). Out of the total domestic production of 149.65 MTs of all types of petroleum products, high speed diesel oil accounted for the maximum share (41%), followed by Fuel Oil (12%), Motor Gasoline (11%), Naphtha (10%). Kerosene (6%) and Aviation Turbine Fuel (5%).

Production of Natural Gas increased from 31.75 billion cubic meters (BCM) in 2008-09 to 46.49 BCM in 2009-10 registering a growth of 46.4% and a CAGR of 11.3% from 1970-71 to 2009-10 (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 7,96,281 during 2009-10. The CAGR during the period from 1970-71 to 2009-10, has been an impressive 6.9%. The production of electricity from utilities has increased from 7,45,626 MWh during 2008-09 to 7,96,281 MWh during 2009-10, registering an annual growth rate of about 6.8%.

Total Electricity generation in the country, from utilities and non-utilities, during 2009-10 was 9,05,974 GWh. Out of this 6,70,965 GWh was generated from thermal and 1,06,680 GWh was from hydro and 18,636 GWh was generated from nuclear sources. Total output from non-utilities was 1,09,693 GWh.

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

Year	Coal (million tonnes)	Lignite (million tonnes)	Crude Petroleum (million tonnes)	Natural Gas (Billion Cubic Metres)	Electricity* Hydro & Nuclear (GWh)
1	2		3	4	5
1970-71	72.95	3.39	6.82	1.45	27,666
1975-76	99.63	3.03	8.45	2.37	35,928
1980-81	113.91	5.11	10.51	2.36	49,543
1985-86	154.30	8.04	30.17	8.13	56,003
1990-91	214.06	14.07	33.02	18.00	77,782
1995-96	273.42	22.15	35.17	22.64	80,561
2000-01	313.70	24.25	32.43	29.48	91,264
2005-06	407.01	30.23	32.19	32.20	1,18,818
2006-07	430.83	31.29	33.99	31.75	1,32,304
2007-08	457.08	33.98	34.12	32.40	1,37,344
2008-09	492.76	32.42	33.51	32.85	1,42,576
2009-10(p)	532.06	34.07	33.69	47.51	1,25,316
<b>Growth rate of 2009-10 over 2008-09(%)</b>	<b>7.98</b>	<b>5.09</b>	<b>0.55</b>	<b>44.63</b>	<b>-12.11</b>
<b>CAGR 1970-71 to 2009-10(%)</b>	<b>5.09</b>	<b>5.94</b>	<b>4.07</b>	<b>9.12</b>	<b>3.85</b>

GWh = Giga Watt hour =  $10^9$  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	7,813	1,429	1,248	4,944	15,434
2008-09	8,245	1,403	1,265	5,133	16,046
2009-10(p)	8,888	1,411	1,830	4,511	16,640
<b>Growth rate of 2009-10 over 2008-09(%)</b>	<b>7.80</b>	<b>0.55</b>	<b>44.63</b>	<b>-12.11</b>	<b>3.70</b>
<b>CAGR 1970-71 to 2009-10(%)</b>	<b>4.38</b>	<b>4.07</b>	<b>9.11</b>	<b>3.85</b>	<b>4.43</b>

\* Thermal electricity is not a primary source of energy

@ Conversion factors have been applied to convert production of primary

Sources: 1. Office of Coal Controller, Ministry of Coal

2. Ministry of Petroleum & Natural Gas.

3. Central Electricity Authority.

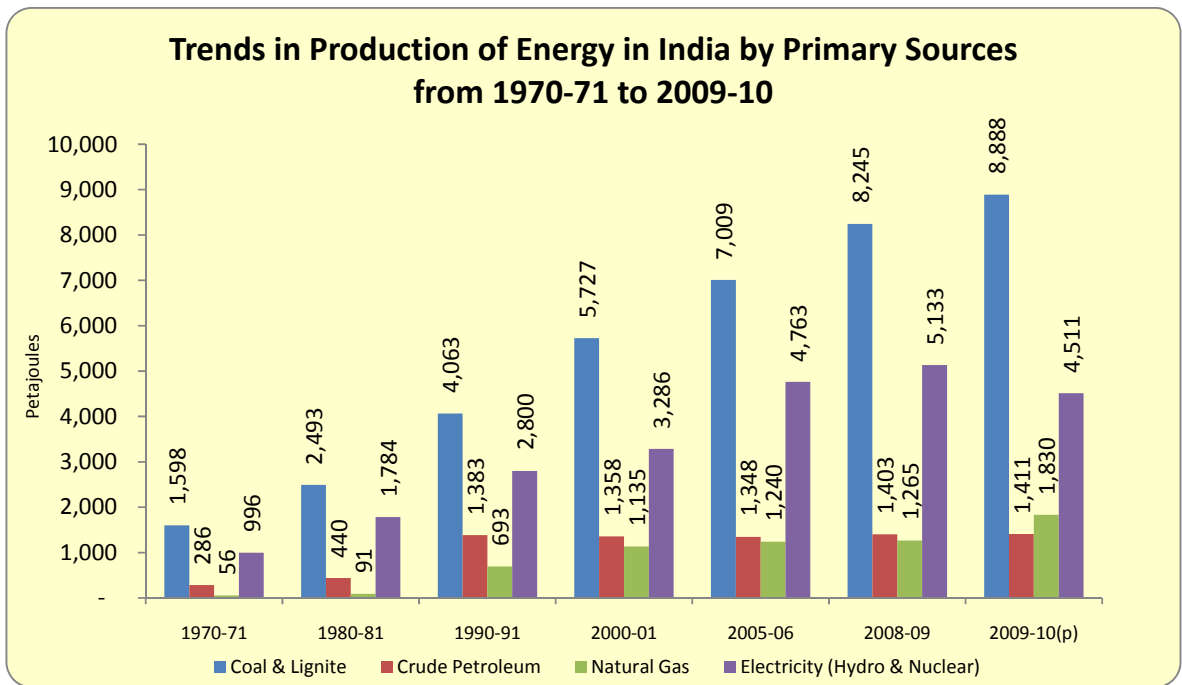


Figure 3.2

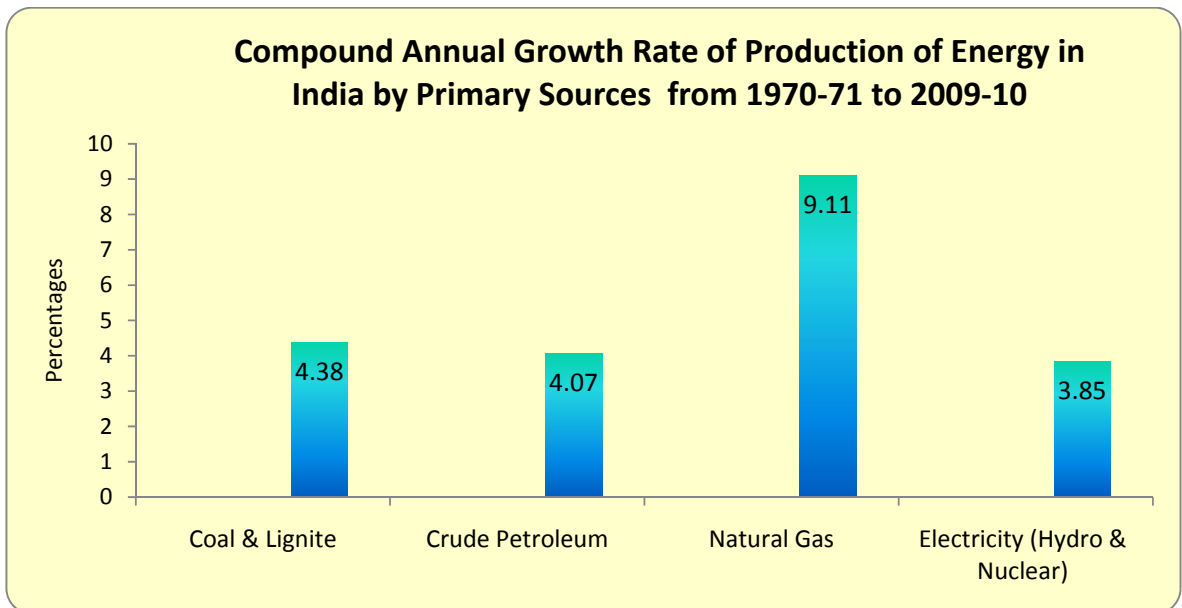


Figure 3.2(A)

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

( million tonnes)

Year	Coal			Lignite	Grand Total
	Coking	Non-coking	Total		
1	2	3	4=(2)+(3)	5	6=(4)+(5)
1970-71	17.82	55.13	72.95	3.39	76.34
1975-76	30.12	69.51	99.63	3.03	102.66
1980-81	32.62	81.29	113.91	5.11	119.02
1985-86	35.16	119.14	154.30	8.04	162.34
1990-91	44.77	169.29	214.06	14.07	228.13
1995-96	39.91	233.50	273.42	22.15	295.56
2000-01	30.90	282.80	313.70	22.95	336.64
2005-06	31.51	375.50	407.01	30.07	437.08
2006-07	32.10	398.74	430.83	31.29	462.12
2007-08	34.46	422.63	457.08	33.98	491.06
2008-09	34.81	457.95	492.76	32.42	525.18
2009-10(p)	44.26	487.81	532.06	34.07	566.13
<b>Growth rate of 2009-10 over 2008-09(%)</b>	<b>27.14</b>	<b>6.52</b>	<b>7.98</b>	<b>5.09</b>	<b>7.80</b>
<b>CAGR 1970-71 to 2009-10(%)</b>	<b>2.30</b>	<b>5.60</b>	<b>5.09</b>	<b>5.94</b>	<b>5.14</b>

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)+(3)+(4)+(5)+(6)
1970-71	2.71	0.93	9.15	10.07	7.64	20.43
1975-76	2.74	0.93	10.07	11.00	11.38	25.13
1980-81	2.26	0.60	10.67	11.26	11.57	25.10
1985-86	1.71	0.33	10.53	10.86	11.86	24.43
1990-91	0.91	0.15	11.48	11.63	11.42	23.96
1995-96	0.17	0.06	12.80	12.86	11.92	24.94
2000-01	-	-	11.70	11.70	8.64	20.34
2005-06	-	-	13.38	13.38	8.38	21.75
2006-07	-	-	12.57	12.57	7.03	19.59
2007-08	-	-	12.54	12.54	7.17	19.71
2008-09	-	-	13.68	13.68	7.18	19.15
2009-10(p)	-	-	12.56	12.56	-	12.56
<b>Growth rate of 2009-10 over 2008-09(%)</b>	*	*	<b>-8.17</b>	<b>-8.17</b>	*	<b>-34.42</b>
<b>CAGR 1970-71 to 2009-10(%)</b>	*	*	<b>0.80</b>	<b>0.55</b>	*	<b>-1.21</b>

\* No Production after 1999-2000

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(p)	6.52	15.97	14.81	8.55	8.08	61.17	0.47
<b>Growth rate of 2009-10 over 2008-09(%)</b>	<b>-6.88</b>	<b>-0.32</b>	<b>-0.09</b>	<b>3.92</b>	<b>0.05</b>	<b>-2.73</b>	<b>-23.10</b>
<b>CAGR 1970-71 to 2009-10(%)</b>	<b>9.56</b>	<b>6.05</b>	<b>6.47</b>	<b>2.74</b>	<b>6.27</b>	<b>7.17</b>	<b>-1.86</b>

(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**

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	4.24	4.71	5.37	150.52
2009-10(p)	17.54	0.95	3.71	4.89	7.02	149.65
<b>Growth rate of 2009-10 over 2008-09(%)</b>	<b>-0.84</b>	<b>8.70</b>	<b>-12.54</b>	<b>3.73</b>	<b>30.63</b>	<b>-0.57</b>
<b>CAGR 1970-71 to 2009-10(%)</b>	<b>3.71</b>	<b>3.60</b>	<b>8.33</b>	<b>4.61</b>	<b>6.82</b>	<b>5.57</b>

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

Source : Ministry of Petroleum & Natural Gas.

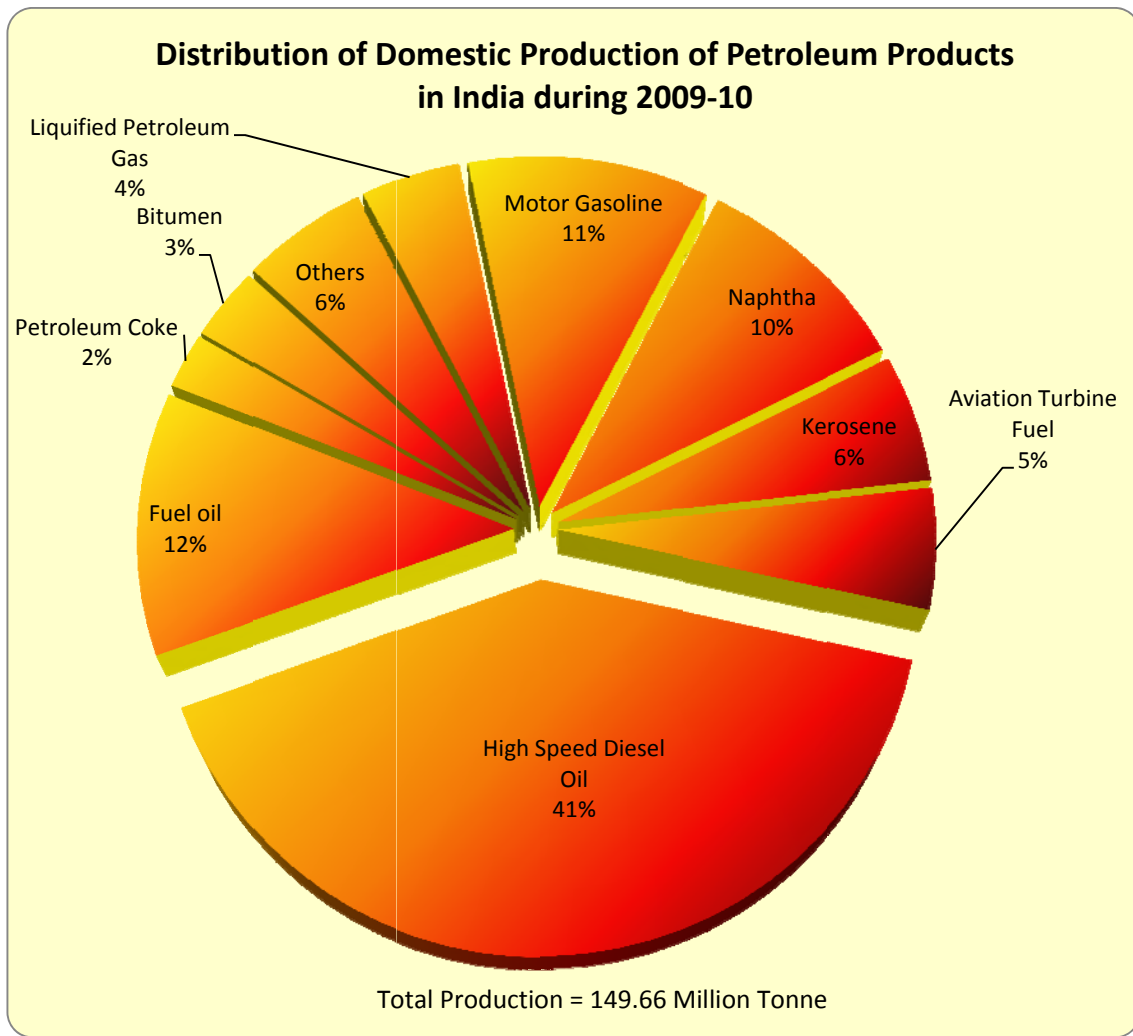


Figure 3.5

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

(Billion Cubic Metres)

<b>Year</b>	<b>Gross Production</b>	<b>Reinjected</b>	<b>Flared</b>	<b>Net Production</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5=2-3-4</b>
1970-71	1.45	0.04	0.76	0.65
1975-76	2.37	0.16	1.08	1.12
1980-81	2.36	0.07	0.77	1.52
1985-86	8.13	0.07	3.12	4.95
1990-91	18.00	0.10	5.13	12.77
1995-96	22.64	0.00	1.71	20.93
2000-01	29.48	0.00	1.62	27.86
2005-06	32.20	0.00	0.88	31.33
2006-07	31.75	0.00	0.96	30.79
2007-08	32.42	0.00	0.94	31.48
2008-09	32.85	0.00	1.10	31.75
2009-10(p)	47.51	0.00	0.99	46.49
<b>Growth rate of 2009-10 over 2008-09(%)</b>	<b>44.65</b>	<b>-</b>	<b>-9.65</b>	<b>46.43</b>
<b>CAGR 1970-71 to 2009-10(%)</b>	<b>9.12</b>	<b>-</b>	<b>0.66</b>	<b>11.28</b>

(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<sup>6</sup> 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	1,10,844	42	8,374	8,416	1,19,260
1985-86	1,14,347	51,021	4,982	1,70,350	43	12,997	13,040	1,83,390
1990-91	1,86,547	71,641	6,141	2,64,329	29	25,082	25,111	2,89,440
1995-96	2,99,316	72,579	7,982	3,79,877	24	38,142	38,166	4,18,043
2000-01	4,09,940	74,362	16,902	5,01,204	-	59,638	59,638	5,60,842
2005-06	5,05,001	1,01,494	17,324	6,23,819	-	73,640	73,640	6,97,459
2006-07	5,38,350	1,13,502	18,802	6,70,654	-	81,800	81,800	7,52,454
2007-08	5,85,282	1,20,387	16,957	7,22,626	-	90,477	90,477	8,13,102
2008-09	6,17,832	1,13,081	14,713	7,45,626	-	95,905	95,905	8,42,531
2009-10(p)	6,70,965	1,06,680	18,636	7,96,281	-	1,09,693	1,09,693	9,05,974
<b>Growth rate of 2009-10 over 2008-09(%)</b>	<b>8.60</b>	<b>-5.66</b>	<b>26.67</b>	<b>6.79</b>	<b>-</b>	<b>14.38</b>	<b>14.38</b>	<b>7.53</b>
<b>CAGR 1970-71 to 2008-09(%)</b>	<b>8.24</b>	<b>3.92</b>	<b>4.74</b>	<b>6.87</b>	<b>-</b>	<b>7.68</b>	<b>7.66</b>	<b>6.95</b>

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

Source : Central Electricity Authority.