सत्यमेव जयते

ENERGY STATISTICS

2019

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

2019

(Twenty Sixth Issue)

CENTRAL STATISTICS OFFICE
MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION
GOVERNMENT OF INDIA
NEW DELHI

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FOREWORD

Energy is one of the most important building blocks in human development, and as such, acts as a key factor in determining the economic development of all the countries. In an effort to meet the demands of a developing nation, the energy sector has witnessed a rapid growth. It is important to note that non-renewable resources are significantly depleted by human use, whereas renewable resources are produced by ongoing processes that can sustain indefinite human exploitation.

The use of renewable resources of energy is rapidly increasing worldwide. Solar power, one of the potential energy sources, is a fast developing industry in India. The country's solar installed capacity has reached 24.31 GW as on 31.10.2018 as compared to 12.29 GW on 31.03.2017. India has expanded its solar generation capacity by 12.02 GW during last one and half year which has led to downward trend in the cost and has increased usage. It clearly signifies that proper integration of policy interventions hold the key to achieve the sustainable development goals.

This publication, 26thin the series is an annual publication of CSO and is a continued effort to provide a comprehensive picture of Energy Sector in India. **Energy Statistics** is an integrated and updated database of reserves, installed capacity, production, consumption, import, export and whole sale prices of different sources viz. coal, crude oil, natural gas and electricity. Energy Balance and Sankey Diagram (Energy flow diagram) adds analytic value and thus increases its utility.

Energy indicators are being brought out by CSO as part of **Energy Statistics** for the use of policy makers as well as for comprehensive reporting. Indicators play a vital role by turning data into information for policy makers and help in decision-making. Keeping in view the importance of Energy Goal no 7 of Sustainable Development Goal, "Double the global rate of improvement in energy efficiency" has been accounted in the form of an indicator i.e. "Energy Intensity measured in terms of primary energy and GDP". Disaggregation of the indicator i.e. Energy Intensity at sectoral level i.e. Industry, agriculture and transport is also available in the publication.

Identification of list of indicators depends on various factors such as transparency, scientific validity, robustness, sensitivity and the extent to which they are linkable to each other. However, no single factor can decide all indicators and in all situations since each indicator needs different data sets. The indicators are selected on the guidelines/approach followed by IAEA in their publication "Energy Indicators for Sustainable Development: Guidelines and Methodologies", which was brought out in collaboration with United Nations Department of Economic and Social Affairs (UNDESA), International Energy Agency (IEA), Eurostat and European Environmental Agency (EEA).

The data in the publication has been sourced from the subject Ministries of the Government of India. The co-operation and support provided by these Ministries/Departments in compiling this publication is appreciated. I also appreciate the efforts of the officers of Economic Statistics Division, Central Statistics Office in bringing out this publication in a time bound manner. I hope the publication will prove to be useful to the policy makers, planners and researchers working in field of Energy. It shall be CSO's endeavour to continuously improve the publication both in content and design with the help of user feedback and data source agencies.

(Jyotirmoy Poddar)

March, 2019
New Delhi

Officers associated with the publication:

Smt. G.S. Lakshmi	Additional Director General
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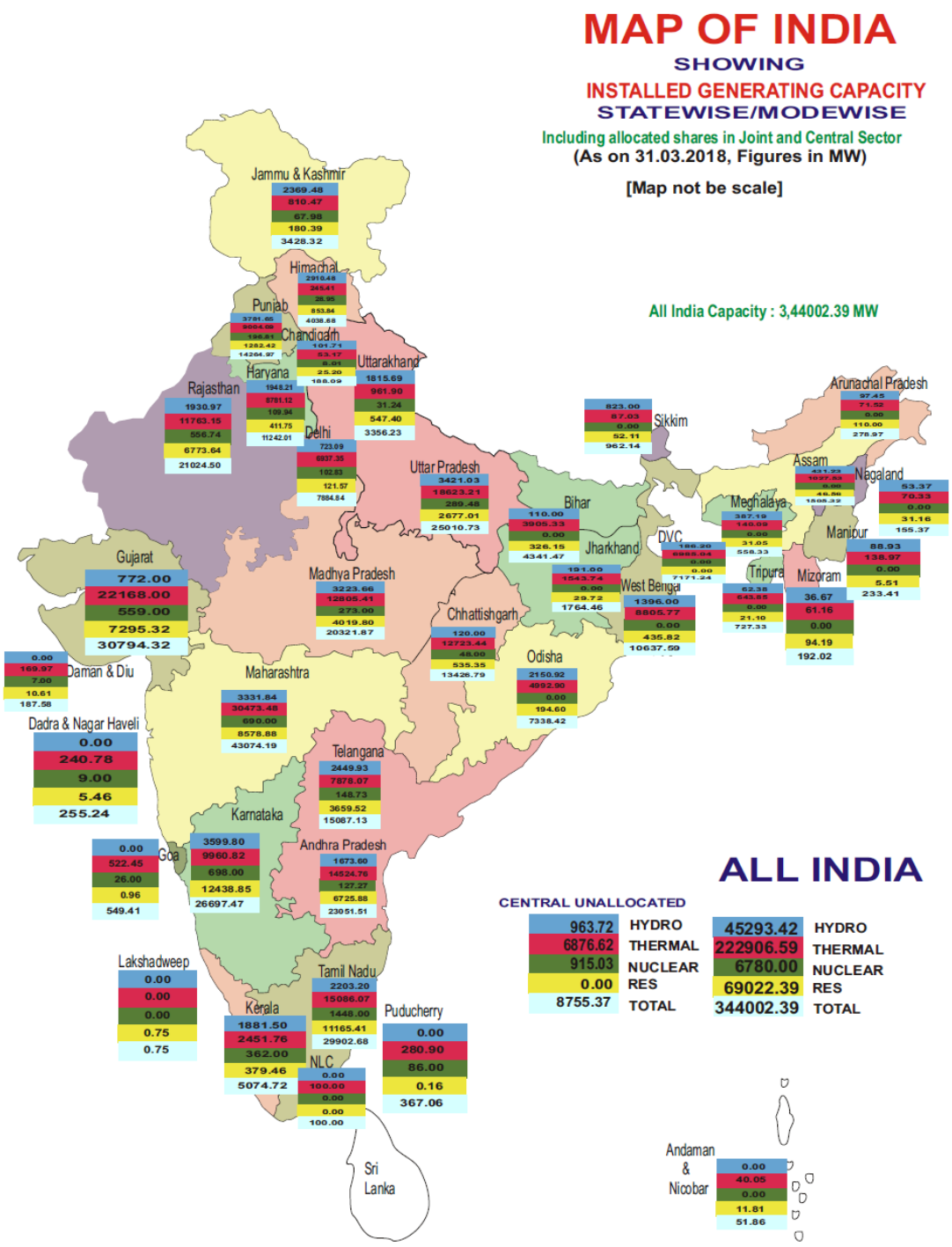
CONTENTS

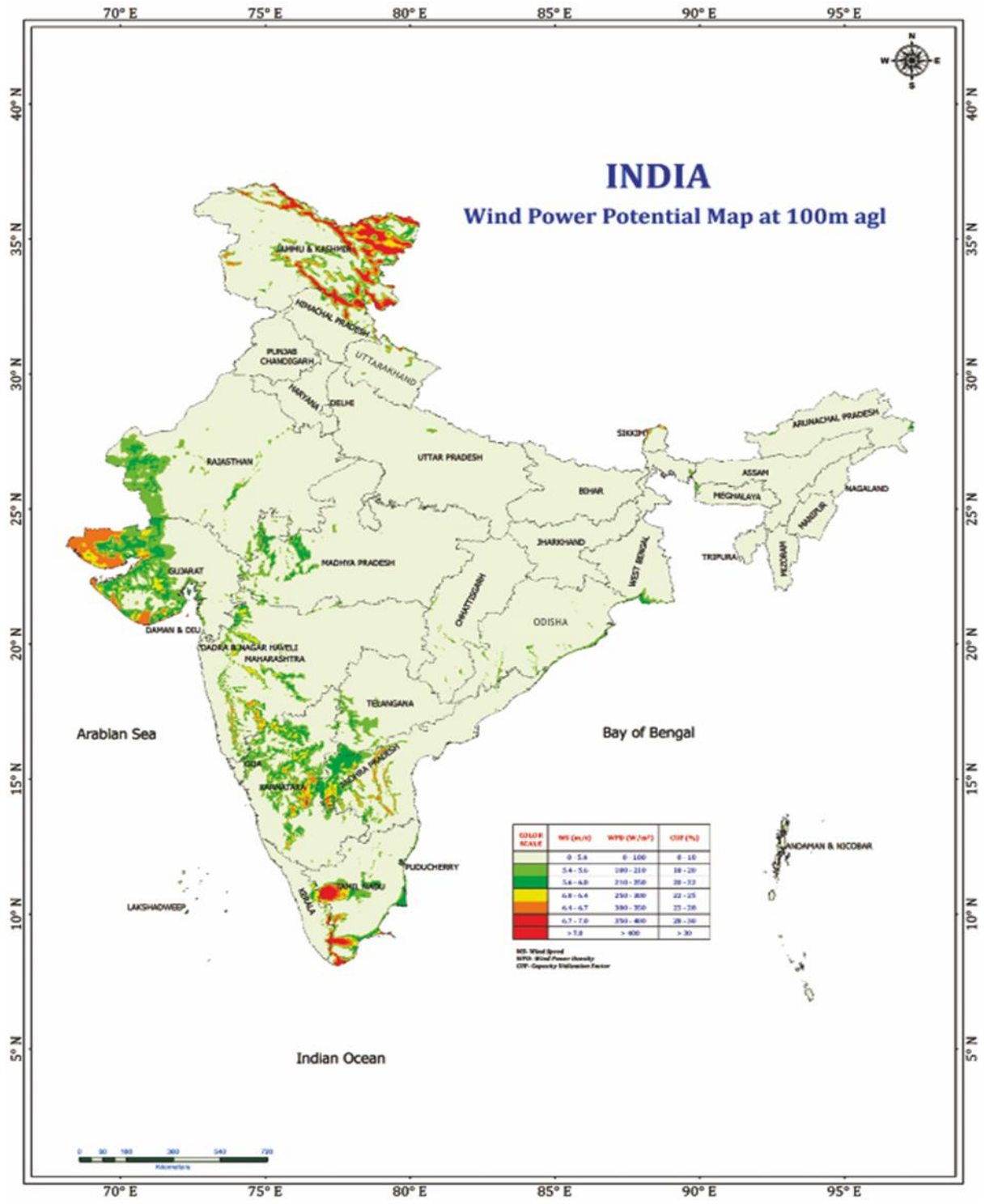
ENERGY MAPS OF INDIA

Map 1: Installed Generating Capacity



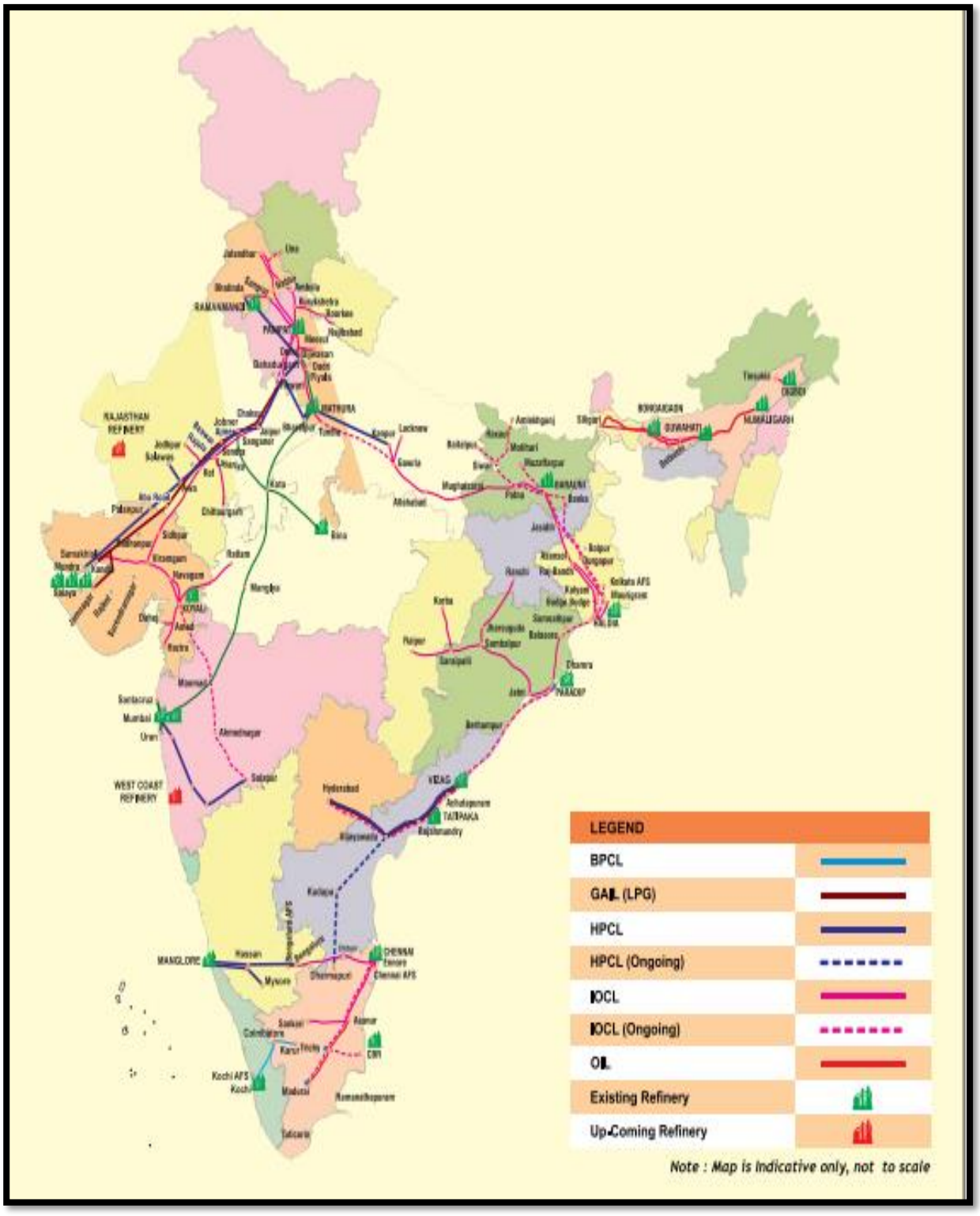
Source: Central Electricity Authority

Map 2: Wind Power Potential at 100m agl (2017-18)



Source: Ministry of New and Renewable Energy

Map 3: Refineries and Petroleum Product Pipelines (as on 31.03.2018)



Source: Ministry of Petroleum and Natural Gas

METADATA-ENERGY STATISTICS

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2. Statistical presentation
2.1 Data sources
The data contained in this publication has been sourced from the Ministry of Petroleum and Natural Gas, Central Electricity Authority, Office of Coal Controller, Ministry of New and Renewable Energy and Office of the Economic Adviser, Ministry of Commerce and Industry and National Accounts Division, Ministry of Statistics and Programme Implementation.
2.2. Data description
The statistics represent information about the reserves, installed capacity, potential for generation, production, consumption, import, export and wholesale price of different energy commodities and Energy Indicators on Economic Dimension.
2.3. Sector coverage
Coal & Lignite, Petroleum & Natural Gas, Renewable Energy Resources and Electricity. (Data Collection Mechanism is given in Annex: V). The indicators are based on the guidelines/approach followed by IAEA in their publication "Energy Indicators for Sustainable Development: Guidelines and Methodologies", which was brought out in collaboration with United Nations Department of Economic and Social Affairs (UNDESA), International Energy Agency (IEA), Eurostat and European Environmental Agency(EEA). Also, the choice of indicators was made as per the availability of data from the subject ministries.
2.4. Data content
The Statistics are given by type of fuel and energy source. The publication includes analytical indicators viz. Growth Rates, Compound Annual Growth Rates (CAGR), Percentage Distributions and Economic Energy Indicators.
2.5. Statistical unit
Data are aggregated appropriately at national and state level.
2.6. Statistical population
Data covers all the energy commodity sources.
2.7. Reference area
The energy industries of the entire country are covered.
2.8. Time coverage
In the current publication the data given is for the period 2008-09 to 2017-18 and is based on statistics compiled by the Ministry of Petroleum and Natural Gas, Central Electricity Authority, Office of Coal Controller, Ministry of New and Renewable Energy. The data for Office of the Economic Advisor, Ministry of Commerce and Industry and National Accounts Division has

been sourced for the year 2011-12 to 2017-18. Energy Indicators on Economic Dimensions have been compiled for the year 2017-18.

2.9. Base period

2001-12 for WPI and GDP data

2.10. Statistical concepts and definitions

The main Concepts and Definitions are given in Annex: I. Annex: II & Annex: III respectively give certain Conversion Factors and Abbreviations used. Annex IV gives categorization of coal in India. Annex V gives details of Energy Data Collection Mechanism.

3. Unit of measure

Energy quantities data are recorded in physical units relevant to the product in question; Giga Watt hour (GWh) for electricity, Thousand Metric Tonne (TMT) for petroleum products etc. Prices are indicated by Wholesale Price Index. The Energy Balance is given in Kilo Tonne of oil equivalent (KToE). Consumption and Production of the Energy resources is also given in Petajoules (PJ).

4. Reference period

Reference period of the Publication of "Energy Statistics -2019" is the financial year 2017-18 and the previous financial years since 2008-09. For Energy Indicators reference period is Financial Year 2017-18.

5. Institutional mandate

5.1. Legal acts and other agreements

No legal acts, however, this statistics is collected in view of the mandate of the Ministry in allocation of Business rules.

5.2. Data sharing

The publication is disseminated on the website of the Ministry(MOSPI) and is available free of cost.

6. Confidentiality

6.1. Confidentiality – policy and data treatment

Confidentiality of the data is maintained by the data source ministries.

7. Release policy

7.1. Release calendar

Publication of Energy Statistics is released on MOSPI's web-site in March every year.

7.2. User access

MOSPI disseminates Energy Statistics on its website in an objective, professional and transparent manner in which all users are treated equitably. The detailed arrangements are governed by the dissemination policy of Government of India.

8. Dissemination format

8.1. News release

Publication on Energy Statistics is released annually.

8.2. Publications

Annual publication in pdf format is available on the website of MOSPI.

9. Accessibility of documentation

9.1. Documentation on methodology

Information on the relevant Energy indicators methodology can be found in the publication in Chapter 10.

10. Accuracy and reliability

10.1. Overall accuracy

Data on energy is published on the basis of information received from the source agencies. CSO compiles and analyses data received from the source agencies and then presents in the form of publication.

11. Timeliness and punctuality

11.1. Timeliness

Preliminary data on energy production and consumption and few energy indicators are available 12 months after the reference year. Final data for the year are published 24 months after the end of the reference year.

11.2. Punctuality

Annual publication on Energy Statistics is released by the end of March every year.

12. Data revision

12.1. Data revision - policy

The annual publication provides data on the last reference year and revisions for the year before. Revisions of entire time series when made by source agencies due to specific survey or data revision are incorporated in due time. The data revision by source Ministries is incorporated in the subsequent edition and hence some of the values may not match with the previous issues of this publication.

12.2. Data revision - practice

Preliminary data on energy production and consumption statistics for the year 2017-18 is published in current publication. Final data will be given in the next publication in March 2020.

13. Statistical processing

13.1. Source data

Energy data are collected from the source agencies at national level and presented in the publication. It is published in the ministry's web-site.

13.2. Frequency of data collection

Annual.

13.3. Data collection
Data is collected through e-mail or by post from the source agencies.
13.4. Data validation
Checks are carried out to the data before publishing it.
13.5. Data compilation
National figures are compiled by aggregating the data received from the source agencies.
13.6. Adjustment
No seasonal adjustment or temperature correction of the energy consumption is applied.

Highlights of Energy Sector 2017-18

- **Production and Consumption.**

  - Compound Annual Growth Rate (CAGR) of Production of Coal & Lignite in 2017-18 over 2008-09 are 3.20% & 3.62% respectively whereas their consumption grew at 5.01% and 3.70% respectively during the same period.
  - In case of Crude Oil and Natural Gas, during the period 2008-09 to 2017-18 the Production increased by 0.63% and (-) 0.06% whereas Consumption increased by 4.59% & 4.82%.
  - During the aforesaid period, Generation of Electricity increased by 5.71 % and Consumption of electricity increased by 7.39%.

- **Imports and Exports.**

  - Imports of the Coal during 2008-09 to 2017-18 increased at a CAGR of 13.44% whereas the Exports during the corresponding period decreased at (-) 0.96%.
  - During the period 2008-09 to 2017-18, the imports of Natural Gas and Crude Oil increased at CAGR of 9.44% and 5.20% respectively.
  - The imports of petroleum products, during the period 2008-09 to 2017-18 increased at CAGR of 6.67%, whereas during the same reference period the exports registered an increase of 5.55%.
  - For electricity, the net imports witnessed significant change in last two years i.e. 2016-17 and 2017-18. The exports have robust increase at CAGR of 61.83% during 2008-09 to 2017-18 whereas the imports registered a decline with CAGR of (-) 0.50%.

- **Usage of Energy.**

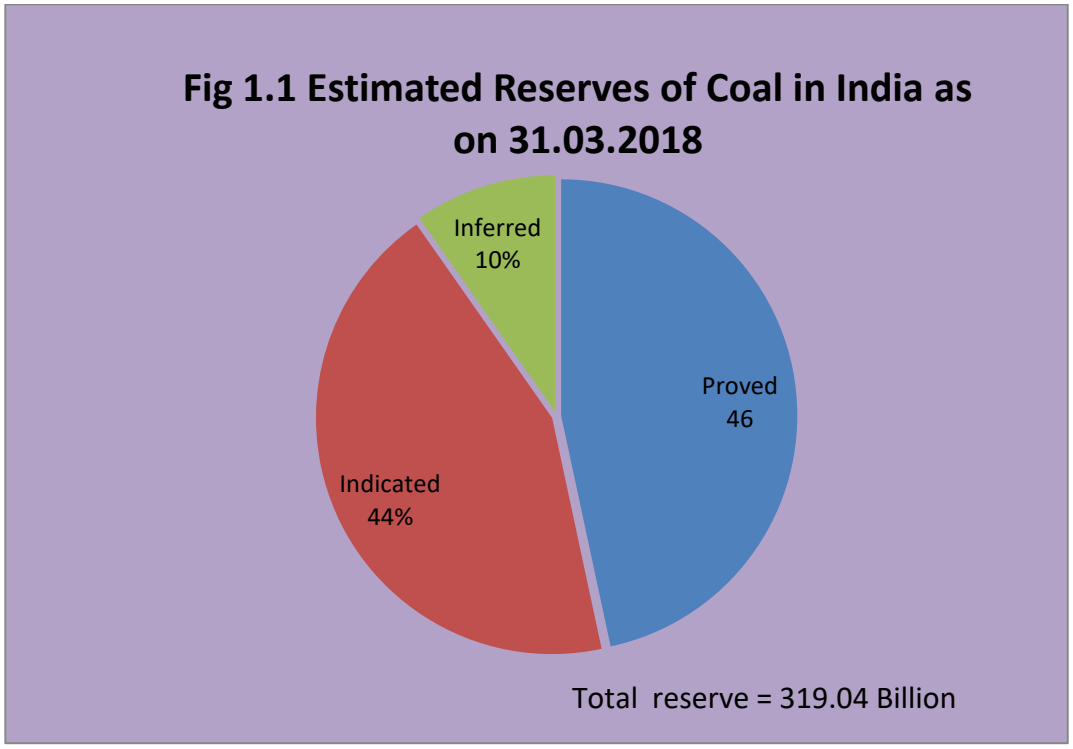
  - The maximum energy intensive sector was industrial sector accounting about 56% of total energy consumption.
  - Per Capita consumption of Energy showed a CAGR of 2.54% for the period 2011-12 to 2017-18.

CHAPTER 1: RESERVES AND POTENTIAL FOR GENERATION

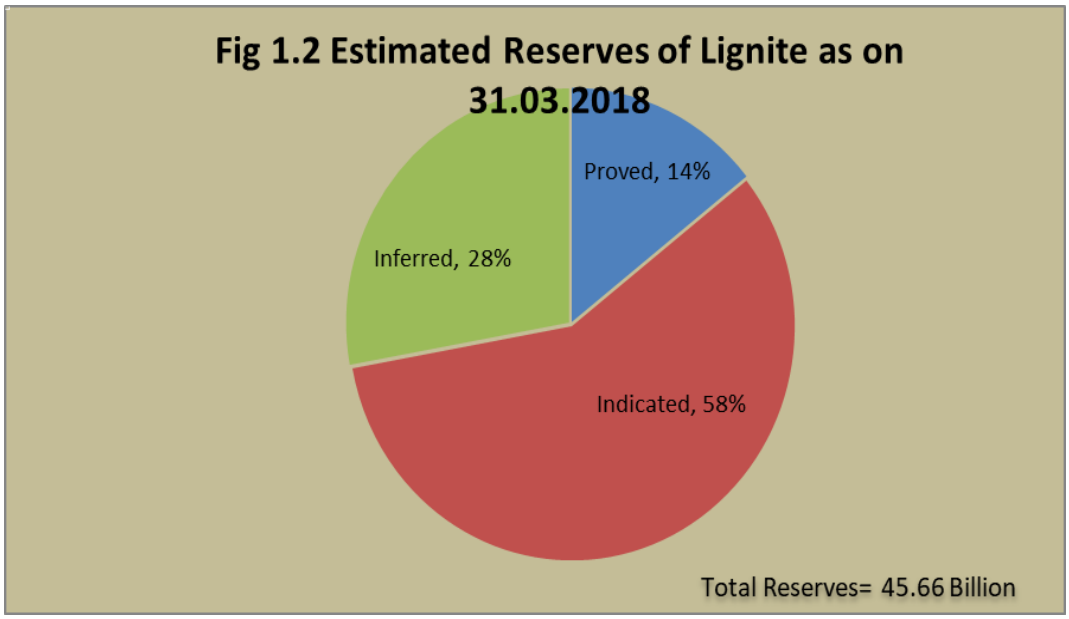
1.1 Coal and Lignite

- Coal deposits are mainly confined to eastern and south central parts of the country. The states of Jharkhand, Odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Telangana and Maharashtra account for 98.26% of the total coal reserves in the country. The State of Jharkhand had the maximum share (26.06%) in the overall reserves of coal in the country as on 31st March 2018 followed by the State of Odisha (24.86%) (Table 1.1).

- As on 31.03.18, the estimated reserves of coal were 319.04 billion tonnes, an addition of 3.88 billion tones over the last year in corresponding period (Table 1.1). There has been an increase of 1.23% in the estimated coal reserves during the year 2017-18 with Odisha accounting for the maximum increase of 2.6%.



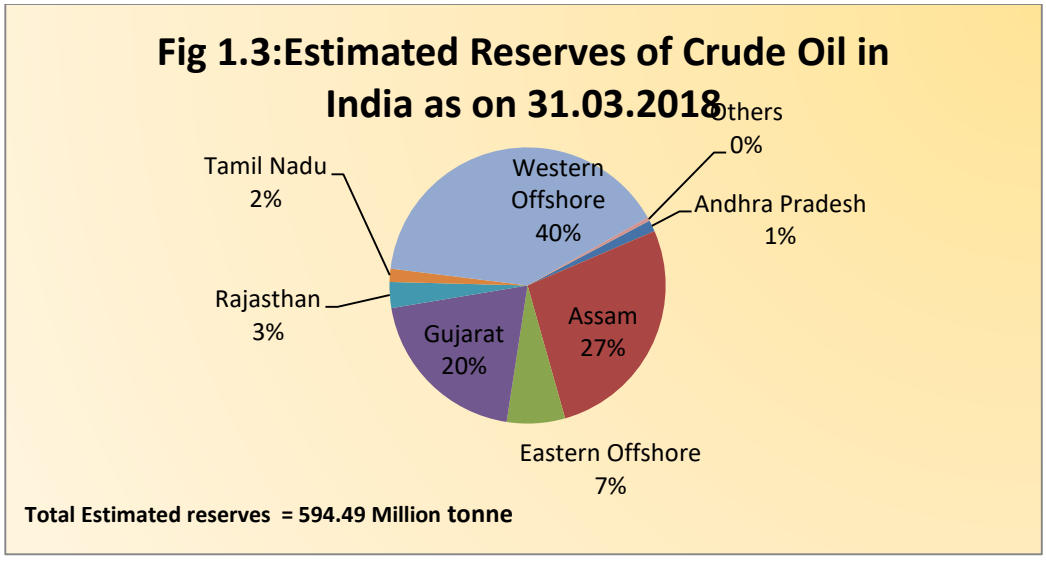
- The estimated total reserves of lignite as on 31.03.18 was 45.66 billion tonnes against 44.70 billion tonnes on 31.03.17. (Table 1.1(A)).



1.2 Petroleum and Natural gas

- The estimated reserves of crude oil in India as on 31.03.2018 stood at 594.49 million tonnes (MT) against 604.10 million tonnes on 31.03.2017 (Table 1.2).

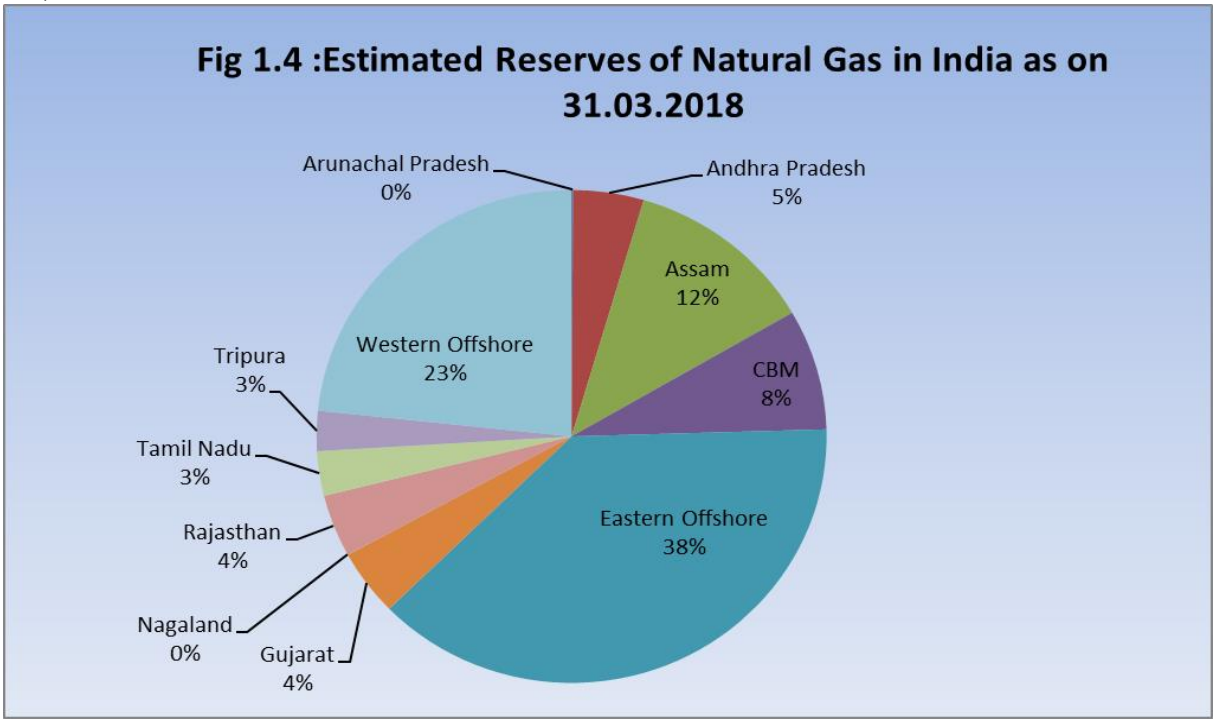
- Geographical distribution of Crude oil indicates that the maximum reserves are in the Western Offshore (40%) followed by Assam (27%), whereas the maximum reserves of Natural Gas are in the Eastern Offshore (38.13%) followed by Western offshore (23.33%). (Table 1.2).



- There was decrease of 1.59% in the estimated reserve of crude oil for the country as a whole during 2017-18 as compared to the position a year ago. During the same

period, estimated reserves of crude oil has decreased in almost all oil producing States except for Arunachal Pradesh which has shown an increase of 14.3%.

- The estimated reserves of Natural Gas in India as on 31.03.2018 stood at 1339.57 Billion Cubic Meters (BCM) as against 1289.70 BCM as on 31.03.2017 (Table 1.2).

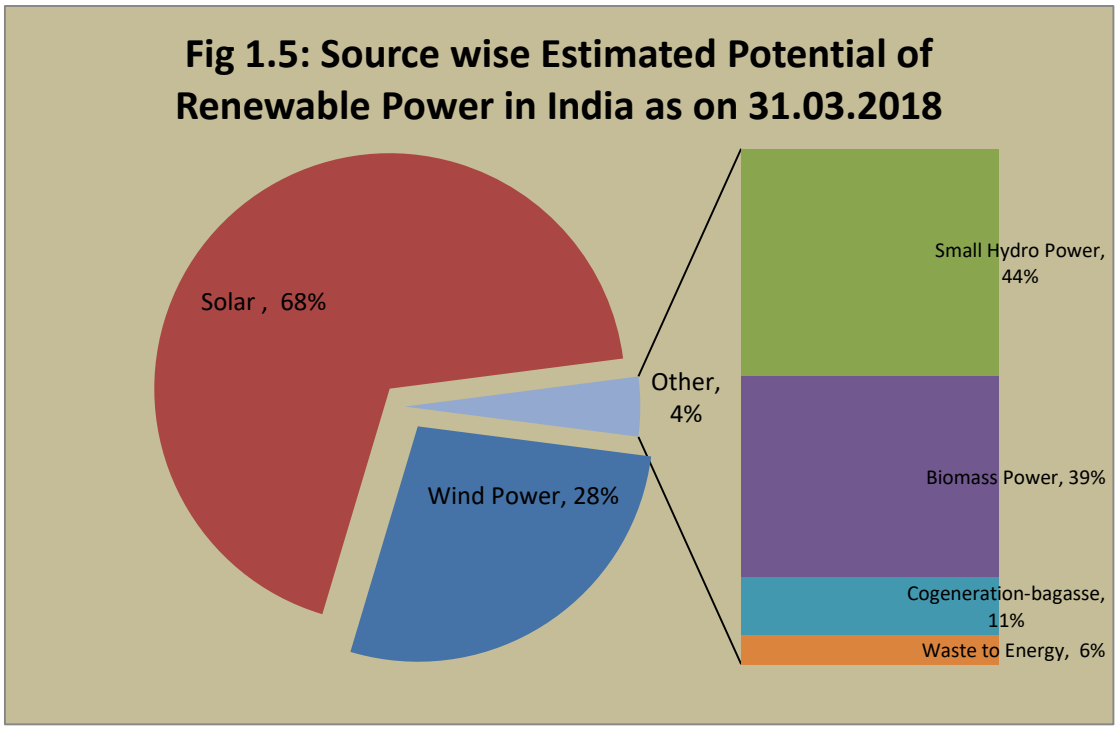


- The estimated reserves of Natural Gas increased by 3.87% over the last year. The maximum contribution to this increase has been from Arunachal Pradesh, and Rajasthan followed by Andhra Pradesh and Tamil Nadu.

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 31.03.18 is estimated at 1096081MW (Table 1.3). This includes solar power potential of 748990 MW (68.33%), wind power potential of 302251 MW (27.58%) at 100m hub height, SHP (small-hydro power) potential of 19749 MW (1.80%), Biomass power of 17,536 MW (1.60%), 5000 MW (0.46%) from bagasse-based cogeneration in sugar mills and 2554 MW (0.23%) from waste to energy



- The geographic distribution of the estimated potential of renewable power as on 31.03.2018 reveals that Rajasthan has the highest share of about 15% (162238 MW), followed by Gujarat with 11% share 122086 MW) and Maharashtra with 10% share (113933MW), mainly on account of solar power potential.

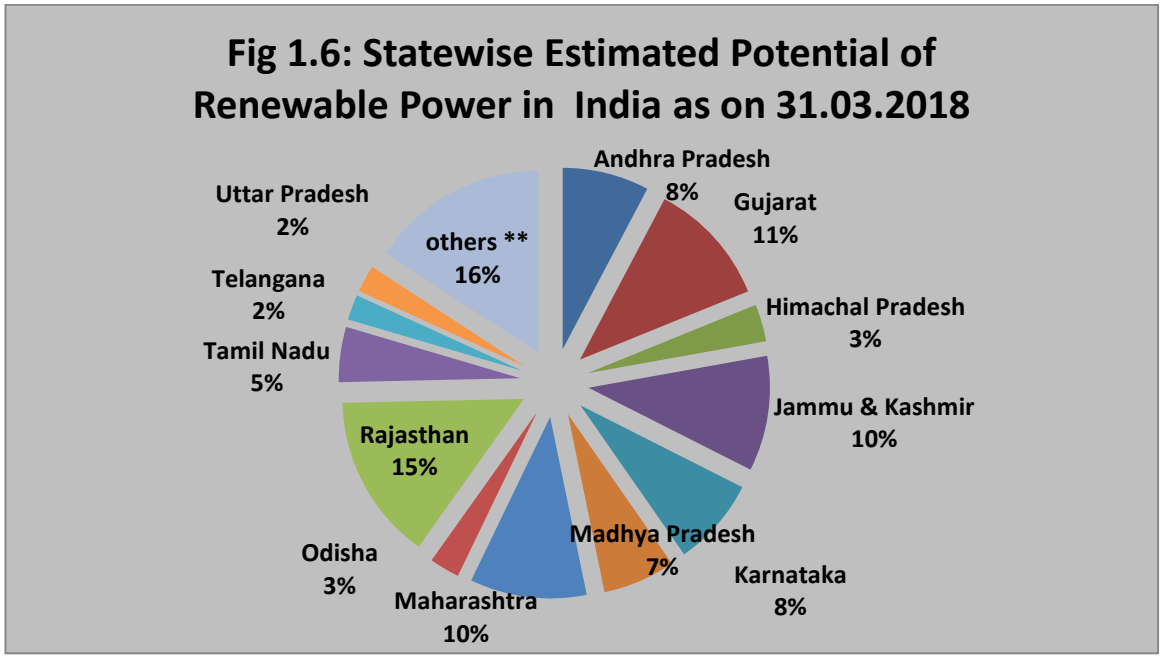


Table 1.1: Statewise Estimated Reserves of Coal in India as on 31.03.2017 and 31.03.2018

(in Billion Tonne)

States/ UTs	Proved		Indicated		Inferred		Total		Distribution (%)	
	31.03.2017	31.03.2018	31.03.2017	31.03.2018	31.03.2017	31.03.2018	31.03.2017	31.03.2018	31.03.2017	31.03.2018
Andhra Pradesh	0	0	1.15	1.15	0.43	0.43	1.58	1.58	0.50	0.50
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	0.06	0.06	0.00	0.00	0.53	0.53	0.16	0.16
Bihar	0.00	0.16	0.00	0.81	1.35	0.39	1.35	1.37	0.43	0.43
Chhattisgarh	20.00	20.43	34.46	34.58	2.20	2.20	56.66	57.21	17.98	17.97
Jharkhand	44.34	45.56	31.88	31.44	6.22	6.15	82.44	83.15	26.16	26.06
Madhya Pradesh	11.27	11.96	12.76	12.15	3.65	3.88	27.67	27.99	8.78	8.77
Maharashtra	7.04	7.18	3.16	3.07	2.06	2.05	12.26	12.30	3.89	3.88
Meghalaya	0.09	0.09	0.02	0.02	0.47	0.47	0.58	0.58	0.18	0.18
Nagaland	0.01	0.01	0.00	0.00	0.40	0.40	0.41	0.41	0.13	0.13
Odisha	34.81	37.39	34.06	34.17	8.42	7.74	77.29	79.30	24.52	24.86
Sikkim	0.00	0.00	0.06	0.06	0.04	0.04	0.10	0.10	0.03	0.03
Uttar Pradesh	0.88	0.88	0.18	0.18	0.00	0.00	1.06	1.06	0.34	0.33
West Bengal	13.72	14.16	12.95	12.87	4.99	4.64	31.67	31.67	10.05	9.92
Telangana	10.40	10.47	8.54	8.58	2.52	2.65	21.46	21.70	6.81	6.80
All India Total	**143.06**	**148.79**	**139.31**	**139.18**	**32.78**	**31.06**	**315.16**	**319.04**	**100.00**	**100.00**
Distribution (%)	**45.39**	**46.64**	**44.20**	**43.62**	**10.40**	**9.74**	**100.00**	**100.00**		

Source: Office of Coal Controller, Ministry of Coal

NOTE: Figure as on 31.03.2017 has been revised.

Download Table 1.1

Table 1.1(A) :Statewise Estimated Reserves of Lignite in India as on 31.03.2017 and 31.03.2018

(in Billion Tonne)

States/ UTs	Proved		Indicated		Inferred		Total		Distribution (%)	
	31.03.2017	31.03.2018	31.03.2017	31.03.2018	31.03.2017	31.03.2018	31.03.2017	31.03.2018	31.03.2017	31.03.2018
Gujarat	1.28	1.28	0.28	0.28	1.16	1.16	2.72	2.72	5.96	6.09
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	0.92	0.93
Rajasthan	1.17	1.17	2.67	3.03	1.90	2.15	5.74	6.35	13.91	12.83
TamilNadu	4.09	4.09	22.63	22.65	9.06	9.39	35.78	36.13	79.12	80.05
West Bengal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
All India	**6.54**	**6.54**	**26.01**	**26.39**	**12.14**	**12.73**	**44.70**	**45.66**	**100.00**	100.00
Distribution (%)	**14.63**	**14.32**	**58.20**	**57.79**	**27.17**	**27.88**	**100.00**	**100.00**		

Source: Office of Coal Controller, Ministry of Coal

Download Table 1.1(A)

Table 1.2 :Statewise Estimated Reserves of Crude Oil and Natural Gas in India as on 31.03.2017 and 31.03.2018

States/ UTs/ Region	Crude Petroleum (million tonnes)				Natural Gas (billion cubic metres)			
	31.03.2017		31.03.2018		31.03.2017		31.03.2018	
	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)	Estimated Reserves	Distribution (%)
Arunachal Pradesh	1.52	0.25	**1.74**	**0.29**	0.72	**0.06**	**1.26**	**0.09**
Andhra Pradesh	8.15	**1.35**	**7.94**	**1.34**	48.31	**3.75**	**59.89**	**4.47**
Assam	159.95	26.48	**160.34**	**26.97**	158.57	12.30	**161.65**	**12.07**
Cold Bed Methane (CBM)	0.00	0.00	**0.00**	**0.00**	106.67	8.27	**105.94**	**7.91**
Eastern Offshore[1]	40.67	6.73	**40.42**	**6.80**	507.76	39.37	**510.83**	**38.13**
Gujarat	118.61	19.63	**118.20**	**19.88**	62.28	4.83	**58.23**	**4.35**
Nagaland	2.38	0.39	**2.38**	**0.40**	0.09	0.01	**0.09**	**0.01**
Rajasthan	24.55	4.06	**17.99**	**3.03**	34.86	2.70	**54.85**	**4.09**
Tamil Nadu	9.00	1.49	**9.16**	**1.54**	31.98	2.48	**39.11**	**2.92**
Tripura	0.07	0.01	**0.07**	**0.01**	36.10	2.80	**35.20**	**2.63**
Western Offshore[2]	239.20	39.60	**236.25**	**39.74**	302.35	23.44	**312.52**	**23.33**
Total	**604.10**	**100.00**	**594.49**	**100.00**	**1289.70**	**100.00**	**1339.57**	**100.00**

* CBM : Cold Bed Methane (Jharkhand, West Bengal and M.P.)

Notes:

1. Proved and indicated Balance Recoverable Reserves as on 1st April.

2. Western offshore includes Gujarat offshore

3. Total may not tally due to rounding off

Source: M/o Petroleum & Natural Gas

Download Table 1.2

Table 1.3 :Sourcewise and Statewise Estimated Potential of Renewable Power in India as on 31.03.2018

(in MW)

Sl. No.	States/ UTs	Wind Power @ 100m	Small Hydro Power	Biomass Power	Cogeneration-bagasse	Waste to Energy	Solar Energy	Total Estimated Reserves	Distribution (%)
1	Andhra Pradesh	44229	978	578	300	123	38440	84648	7.72
2	Arunachal Pradesh		1341	8			8650	10000	0.91
3	Assam		239	212		8	13760	14218	1.30
4	Bihar		223	619	300	73	11200	12415	1.13
5	Chhattisgarh	77	1107	236		24	18270	19714	1.80
6	Goa	1	7	26			880	913	0.08
7	Gujarat	84431	202	1221	350	112	35770	122086	11.14
8	Haryana		110	1333	350	24	4560	6377	0.58
9	Himachal Pradesh		2398	142		2	33840	36382	3.32
10	Jammu & Kashmir		1431	43			111050	112523	10.27
11	Jharkhand		209	90		10	18180	18489	1.69
12	Karnataka	55857	4141	1131	450		24700	86279	7.87
13	Kerala	1700	704	1044		36	6110	9595	0.88
14	Madhya Pradesh	10484	820	1364		78	61660	74406	6.79
15	Maharashtra	45394	794	1887	1250	287	64320	113933	10.39
16	Manipur		109	13		2	10630	10755	0.98
17	Meghalaya		230	11		2	5860	6103	0.56
18	Mizoram		169	1		2	9090	9261	0.84
19	Nagaland		197	10			7290	7497	0.68
20	Odisha	3093	295	246		22	25780	29437	2.69
21	Punjab		441	3172	300	45	2810	6768	0.62
22	Rajasthan	18770	57	1039		62	142310	162238	14.80
23	Sikkim		267	2			4940	5209	0.48
24	Tamil Nadu	33800	660	1070	450	151	17670	53800	4.91
25	Telangana	4244					20410	24654	2.25
26	Tripura		47	3		2	2080	2131	0.19
27	Uttar Pradesh		461	1617	1250	176	22830	26333	2.40
28	Uttarakhand		1708	24		5	16800	18537	1.69
29	West Bengal	2	396	396		148	6260	7202	0.66
30	Andaman & Nicobar	8	8				0	16	0.00
31	Chandigarh					6	0	6	0.00
32	Dadar & Nagar Haveli						0	0	0.00
33	Daman & Diu						0	0	0.00
34	Delhi					131	2050	2181	0.20
35	Lakshadweep	8					0	8	0.00
36	Puducherry	153				3	0	156	0.01
37	Others*					1022	790	1812	0.17
All India Total		**302251**	**19749**	**17536**	**5000**	**2554**	**748990**	**1096081**	**100.00**
Distribution (%)		**27.58**	**1.80**	**1.60**	**0.46**	**0.23**	**68.33**	**100.00**	

* Industrial waste

Source: Ministry of New and Renewable Energy

Download Table 1.3

CHAPTER 2: 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 127.56 million tonne per Year (MTY) as on 31.3.2018. As on 31.03.18, a total of 52 washeries, both PSUs and Private, were operating in the country comprising both Coking (28.78 MTY) and Non-Coking Coal (98.78 MTY) (Table 2.1).

2.2 Refineries of crude oil

- As on 31.03.18, there were a total of 23 refineries in the country), 18 in the Public Sector, 3 in the Private sector and 2 in Joint Venture (Table 2.2).

- The refining capacity of the country was 248 MMTPA on 31.03.2018 which is 14 MMTPA higher than the country's refining capacity (234 MMTPA) on 31.03.2017.

- The Refinery production (crude throughput) achievement was 251.935 MMT during 2017-18 which marks net increase of 2.67% over 2016-17 (245.362 MMT).

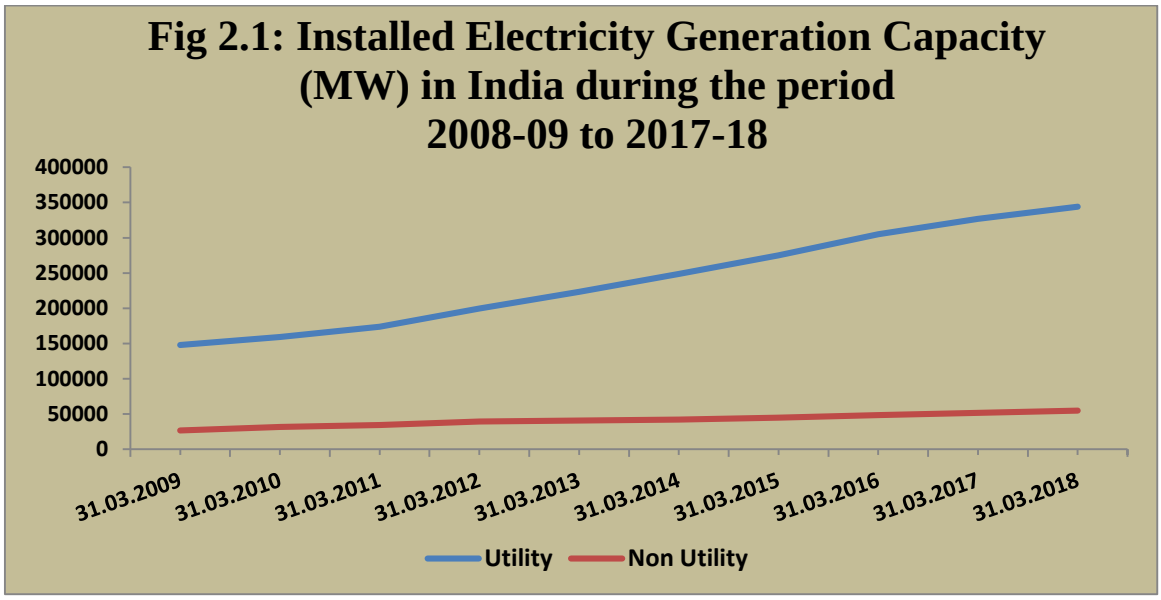
- Capacity utilization of the refineries was 106.6% during 2016-17 which increased to 107.7% during 2017-18. In the Public Sector, the maximum increase in capacity utilization (30%) was at IOC, Paradip, Odisha. In the Private Sector the highest increase (1%) in capacity utilization was at RIL(DTA), Jamnagar, Gujarat.

- Indian Oil Corporation(IOC), the state owned corporation had highest refining capacity of 69.2 MMTPA. All units of IOC together processed 69.001 MMT during 2017-18 as compared to 65.191 MMT during 2016-17. The capacity utilization of these refineries has increased to 99.7% in 2017-18 as against 94.2% in the year 2016-17.

- All the private refineries taken together processed 91.163 MMT during 2017-18 which is higher than 91.093 MMT processed in 2016-17. The capacity utilization of these refineries during 2017-18 was 114.0% which is 0.1% higher than its capacity utilization (113.9%) in 2016-17.

2.3 Installed generating capacity of electricity

- The total installed capacity for electricity generation in the country has increased from 174639 MW as on 31.03.2009 to 399000 MW as on 31.03.2018, registering a compound annual growth rate (CAGR) of 8.61% (Table 2.3).



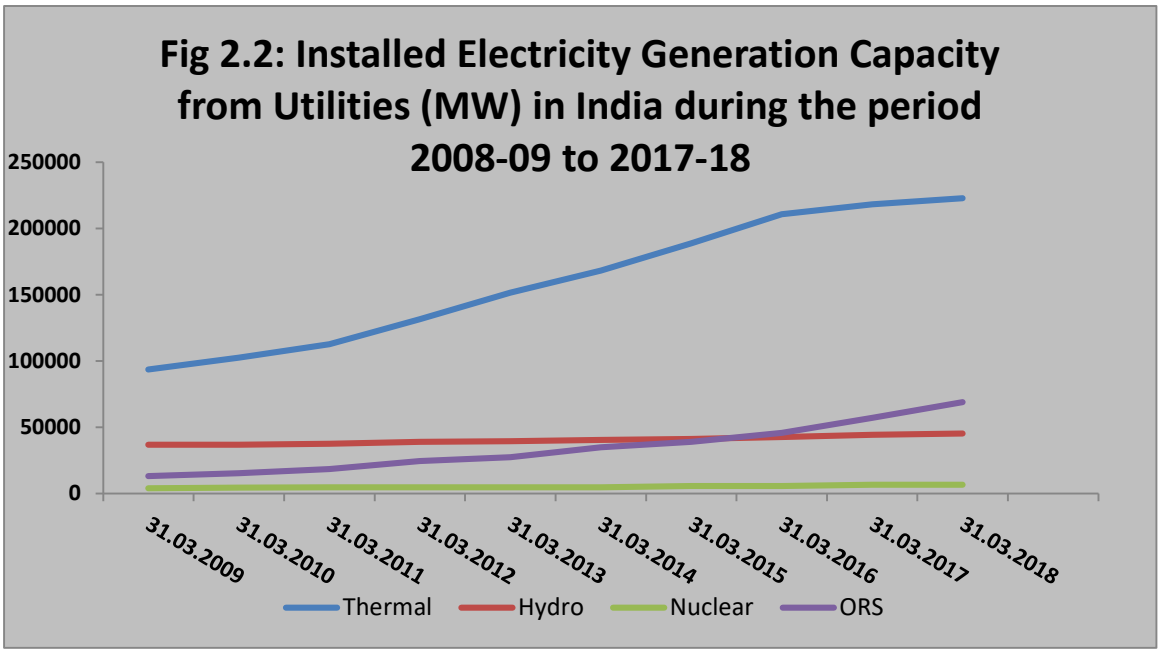
- Electricity generation capacity increased by 5.45% to 399000 MW in 2017-18 over 2016-17.

- The highest rate of annual growth from 2016-17 to 2017-18 in installed capacity in utilities is from Other Renewable Sources (ORS- 20.58%) followed by Thermal Power (2.10%).

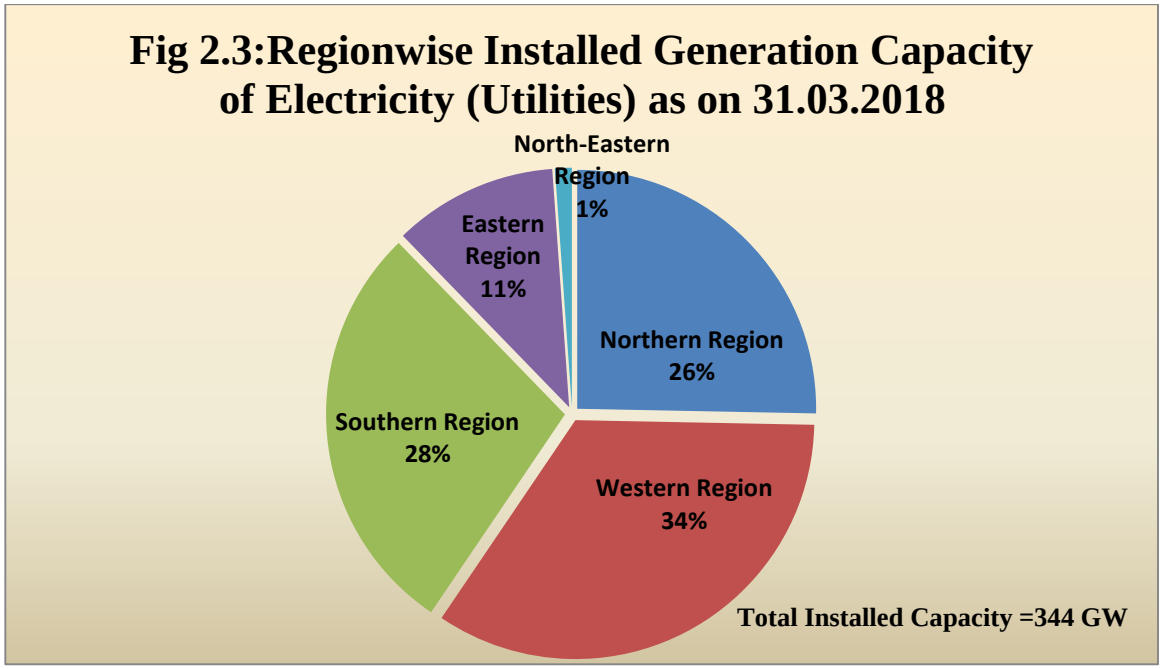
- The total installed capacity of power utilities in the country increased from 147966 MW in 31.3.2009 to 344002 MW as on 31.3.2018, with a CAGR of 8.80% over the period.

- At the end of March 2018, thermal power plants accounted for an overwhelming 69.25% of the total installed capacity in the country, with an installed capacity of 276293 MW. Other renewable Sources (excluding hydro) come next with an installed capacity of 70563 MW, accounting for 17.68% of the total installed Capacity. The share of Hydro and Nuclear energy was only 11.37% and 1.70% of total installed capacity.

- Non-utilities accounted for 13.78% (54997MW) of the total installed electricity generation capacity.



❖ The geographical distribution of installed generating capacity of electricity as on 31.03.18 indicates that Western Region (both central and state sector) accounted for the highest share (34%) followed by Southern Region (28%), Northern Region (26%), Eastern Region (11%) and North Eastern Region (1%) (Table 2.4).



❖ Region wise growth in the installed capacity during 2017-18 reveals that Southern region registered the highest annual growth of about 11.09%, followed by Western

Region (4.57%), Northern Region (4.07%), North Eastern Region (0.17%), whereas Eastern Region with negative growth (-2.74%).

- Among all the states Bihar registered highest annual growth (106.31%)in the installed capacity followed by Sikkim (33.60%) and Telangana (28.40%).

2.4 Grid Interactive Renewable Power

- The total installed capacity of grid interactive renewable power, which was 57244.23 MW as on 31.03.2017, had gone up to 73351.81 MW as on 31.10.2018 indicating growth of 28% during the period (Table 2.5).

- Out of the total installed generation capacity of renewable power as on 31.10.2018, Wind power accounted for about 47.7%, followed by Solar power including roof tops (33.1%) and Biomass power (13.0%).

- Karnataka had the highest installed capacity of grid connected renewable power (12933.23 MW) followed by Tamil Nadu (11899.34 MW) and Maharashtra (8779.87 MW), mainly on account of wind and solar power.

- As on 31.10.2018, out of total number of Biogas plants installed (49.57 lakh), maximum number of plants installed were in Maharashtra (8.99lakh) followed by Andhra Pradesh (5.49 lakh), Karnataka (4.90 lakh), Uttar Pradesh (4.41 lakh) and Gujarat (4.33 lakh) (Table 2.6)

- As on 31.3.2018, a total of 5,97,121 villages were electrified (Table 2.7) accounting to 99.9% of the total villages in the country.

Table 2.1: Installed Capacity of Coal Washeries in India as on 31.03.2018

Sl. No.	Washery & Operator	State of Location	Capacity (MTY) 31.03.2018*
	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	NA
13	DCOP, DPL	West Bengal	NA
14	Chasnala, IISCO	Jharkhand	1.40
15	Jamadoba, TISCO	Jharkhand	1.30
16	West Bokaro-II, TISCO	Jharkhand	2.40
17	West Boakaro-III,TISCO	Jharkhand	3.00
18	Bhelatand	Jharkhand	1.00
	(B) PSU & Private		**9.10**
	TOTAL COKING (A + B)		**28.78**
	NON-COKING COAL		
1	Dugda-I,CIL	Jharkhand	1.00
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		**19.72**
7	Dipka, Aryan coal beneficiation pvt. Ltd.	Chattisgarh	14.00
8	Gevra, Aryan coal beneficiation pvt. Ltd.	Chattisgarh	6.25
9	Panderpauni, Aryan coal beneficiation pvt. Ltd.	Maharashtra	2.62
10	Chakabuwa, Aryan Energy private ltd.	Chattisgarh	7.50
11	Indaram, Aryan Coal Benefication Pvt.Ltd.	Andhra Pradesh	0.60
12	Talcher, Aryan Energy Pvt. Ltd.	Odisha	2.34

* Provisional

NA: Not Available.

Source: Office of Coal Controller, Ministry of Coal

Table 2.1(Contd.): Installed Capacity of Coal Washeries in India as on 31.03.2018

Sl. No.	Washery & Operator	State of Location	Capacity (MTY) 31.03.2018*
13	Wani, Kartikay Coal washeries pvt. ltd.(Aryan)	Maharashtra	2.50
14	Korba, ST-CLI Coal washeries ltd.	Chattisgarh	NA
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	NA
19	Bhandara, Gupta coalfield & washeries ltd.	Maharashtra	NA
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	NA
23	Ghugus, Gupta coalfield & washeries ltd.	Maharashtra	2.40
24	Talcher, Global coal Mining (P) Ltd.	Odisha	4.00
25	Ib Valley, Global coal Mining (P) Ltd.	Odisha	4.00
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	NA
33	Punwat, Indo Unique Flame Ltd.	Maharashtra	2.40
34	Dharamsthal, BLA Industries	Madhya Pradesh	0.30
	(B) Private		**79.06**
	TOTAL NON-COKING (A+B)		**98.78**
	Gross Total (Coking + Non-Coking)		**127.56**

* Provisional

Source: Office of Coal Controller, Ministry of Coal

Download Table 2.1

Table 2.2: Installed Capacity and Capacity Utilization of Refineries of Crude Oil during 2016-17 and 2017-18

Sl. No.	Refinery	Refinery Capacity (TMTPA)		Crude Oil Processed (TMT)		Capacity Utilisation (%)		
		31.03.2017	31.03.2018	2016-17	2017-18(P)	2016-17	2017-18	Change in Utilisation
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
(a)	**PUBLIC SECTOR**	**138966**	**142066**	**137388**	**145234**	**101.72**	**104.51**	**2.79**
	IOCL, Guwahati, Assam	1000	1000	864	1024	86.36	102.37	16.01
	IOCL, Barauni, Bihar	6000	6000	6526	5819	108.77	96.98	-11.79
	IOCL, Koyali, Gujarat	13700	13700	13994	13811	102.15	100.81	-1.34
	IOCL, Haldia, West Bengal	7500	7500	7689	7655	102.52	102.07	-0.45
	IOCL, Mathura, Uttar Pradesh	8000	8000	9230	9240	115.37	115.50	0.13
	IOCL, Digboi, Assam	650	650	533	666	82.07	102.40	20.33
	IOCL, Panipat, Haryana	15000	15000	15638	15654	104.25	104.36	0.11
	IOCL, Bongaigaon, Assam	2350	2350	2486	2402	105.78	102.20	-3.58
	IOCL, Paradip, Odisha	15000	15000	8230	12730	54.87	84.87	30.00
	Total IOC	**69200**	**69200**	**65191**	**69001**	**94.21**	**99.71**	**5.51**
	BPCL, Mumbai, Maharashtra	12000	12000	13541	14054	112.84	117.12	4.27
	BPCL, Kochi, Kerala	12400	15500	11820	14095	124.43	113.67	-10.76
	Total BPCL	**24400**	**27500**	**25362**	**28149**	**117.96**	**115.36**	**-2.60**
	HPCL, Mumbai, Maharashtra	7500	7500	8510	8641	130.93	115.22	-15.71
	HPCL, Visakh, Andhra Pradesh	8300	8300	9335	9635	112.47	116.08	3.61
	Total HPCL	**15800**	**15800**	**17846**	**18276**	**120.58**	**115.67**	**-4.91**
	CPCL, Manali, Tamil Nadu	10500	10500	9725	10289	92.62	97.99	5.37
	CPCL, Narimanam, Tamil Nadu	1000	1000	531	500	53.08	50.02	-3.06
	Total CPCL	**11500**	**11500**	**10256**	**10789**	**89.18**	**93.82**	**4.63**
	NRL, Numaligarh, Assam	3000	3000	2683	2809	89.44	93.65	4.21
	ONGC, Tatipaka, Andhra Pradesh	66	66	86	80	129.76	120.58	-9.19
	MRPL, Mangalore, Karnataka	15000	15000	15965	16130	106.44	107.53	1.10
(b)	**PRIVATE SECTOR**	**80000**	**88200**	**91093**	**91163**	**113.87**	**113.95**	**0.09**
	RIL, Jamnagar, Gujarat	33000	33000	32823	33153	99.46	100.46	1.00
	RIL, SEZ-Jamnagar, Gujarat	27000	35200	37351	37317	138.34	138.21	-0.12
	ESSAR Oil Ltd. Vadinar	20000	20000	20919	20693	104.59	103.46	-1.13
(c)	**JOINT VENTURE**	**15000**	**17300**	**16882**	**15538**	**112.54**	**103.59**	**-8.96**
	BORL, Bina, M.P.	6000	6000	6360	6708	106.00	111.80	5.80
	HMEL, GGS, Bathinda, Punjab	9000	11300	10521	8830	116.91	98.11	-18.79
	Total (a+b+c)	**233966**	**247566**	**245362**	**251935**	**106.65**	**107.68**	**1.03**

Note: 1.Total may not tally due to rounding off P:Provisional

2. Crude throughput in terms of crude oil processed.

3. Capacity utilisation is equal to crude oil processsed in current year divided by refineing capacity at the end of previous year*100

Source: M/o Petroleum & Natural Gas

Download Table 2.2

Table 2.3 : Trends in Installed Generating Capacity of Electricity in Utilities and Non-utilities in India from 2008-09 to 2017-18

(in Mega Watt = 10^3 Kilo Watt)

As on	Utilities							
	Thermal				Hydro	Nuclear	ORS*	Total
	Steam	Diesel	Gas	Total				
1	2	3	4	5	6	7	8	9
31.03.2009	77,649	1,200	14,877	93,725	36,878	4,120	13,242	1,47,966
31.03.2010	84,198	1,200	17,056	1,02,454	36,863	4,560	15,521	1,59,398
31.03.2011	93,918	1,200	17,706	1,12,824	37,567	4,780	18,455	1,73,626
31.03.2012	1,12,022	1,200	18,381	1,31,603	38,990	4,780	24,503	1,99,877
31.03.2013	1,30,221	1,200	20,110	1,51,530	39,491	4,780	27,542	2,23,344
31.03.2014	1,45,273	1,200	21,782	1,68,255	40,531	4,780	34,988	2,48,554
31.03.2015	1,64,636	1,200	23,062	1,88,898	41,267	5,780	38,959	2,74,904
31.03.2016	1,85,173	994	24,509	2,10,675	42,783	5,780	45,924	3,05,162
31.03.2017	1,92,163	838	25,329	2,18,330	44,478	6,780	57,244	3,26,833
31.03.2018	1,97,172	838	24,897	2,22,907	45,293	6,780	69,022	3,44,002
Growth rate of 2017-18 over 2016-17(%)	**2.61**	**0.00**	**-1.71**	**2.10**	**1.83**	**0.00**	**20.58**	**5.25**
CAGR 2008-09 to 2017-18(%)**	**9.77**	**-3.53**	**5.28**	**9.05**	**2.08**	**5.11**	**17.95**	**8.80**

Note: Data for ORS has been revised with respect to year 2014, 2015 along with 2016 as per the data supplied by CEA

* ORS means Other Renewable Sources

** 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 2.3 (contd.) : Installed Electricity Generation Capacity in Utilities and Non-utilities in India from 2008-09 to 2017-18

(in Mega Watt = 10^3 x Kilo Watt)

As on	Non-Utilities							Grand Total
	Thermal				Hydro	ORS*	Total	
	Steam	Diesel	Gas	Total				
	10	11	12	13	14	15	16	17= 9+16
31.03.2009	13,818	8,750	3,621	26,188	111	375	26,674	1,74,639
31.03.2010	17,183	9,457	4,368	31,008	55	454	31,517	1,90,915
31.03.2011	19,112	9,655	5,054	33,821	57	567	34,444	2,08,071
31.03.2012	22,615	9,955	5,885	38,456	48	872	39,375	2,39,252
31.03.2013	23,890	11,148	4,498	39,535	67	1,124	40,726	2,64,070
31.03.2014	24,752	11,432	4,751	40,935	64	1,259	42,258	2,90,812
31.03.2015	26,089	12,009	5,193	43,291	65	1,301	44,657	3,19,561
31.03.2016	28,688	12,347	5,819	46,853	59	1,368	48,279	3,53,442
31.03.2017	30,572	13,350	6,109	50,031	65	1,433	51,529	3,78,362
31.03.2018	32,843	14,318	6,225	53,387	70	1,540	54,997	3,99,000
Growth rate of 2017-18 over 2016-17(%)	**7.43**	**7.26**	**1.90**	**6.71**	**7.74**	**7.47**	**6.73**	**5.45**
CAGR 2008-09 to 2017-18(%)**	**9.04**	**5.05**	**5.57**	**7.38**	**-4.44**	**15.19**	**7.50**	**8.61**

* ORS means Other Renewable Sources

** 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.

Download Table 2.3

Table 2.4 : Regionwise and Statewise Installed Generating Capacity of Electricity (Utilities) in India as on 31.03.2017 and 31.03.2018

(in Gw)

States/UTs	Hydro		Thermal		Nuclear		RES*		Total		Growth Rate(2017-18 to 2016-17)
	31.03.17	31.03.18	31.03.17	31.03.18	31.03.17	31.03.18	31.03.17	31.03.18	31.03.17	31.03.18	
Chandigarh	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.02	0.03	**45.50**
Delhi	0.00	0.00	2.49	2.49	0.00	0.00	0.06	0.12	2.55	2.61	**2.56**
Haryana	1.08	1.08	5.03	5.03	0.00	0.00	0.25	0.41	6.37	6.53	**2.44**
Himachal Pradesh	2.37	2.48	0.00	0.00	0.00	0.00	0.83	0.85	3.20	3.33	**4.17**
Jammu & Kashmir	1.23	1.23	0.18	0.18	0.00	0.00	0.16	0.18	1.56	1.59	**1.34**
Punjab	2.57	2.57	7.79	7.78	0.00	0.00	1.15	1.28	11.52	11.64	**1.04**
Rajasthan	1.09	1.09	8.99	9.65	0.00	0.00	6.24	6.48	16.32	17.22	**5.53**
Uttar Pradesh	0.72	0.72	12.57	12.87	0.00	0.00	2.30	2.65	15.59	16.24	**4.15**
Uttarakhand	1.98	1.98	0.55	0.55	0.00	0.00	0.52	0.55	3.05	3.08	**1.04**
Central Sector NR	8.27	8.60	13.61	14.27	1.62	1.62	0.00	0.33	23.50	24.81	**5.61**
Sub-Total (NR)	19.31	19.75	51.21	52.82	1.62	1.62	11.52	12.87	83.66	87.07	**4.07**
Chhattisgarh	0.12	0.12	14.23	16.09	0.00	0.00	0.43	0.54	14.78	16.74	**13.28**
Gujarat	0.77	0.77	20.25	19.63	0.00	0.00	6.67	7.06	27.70	27.46	**-0.86**
Madhya Pradesh	1.70	1.70	9.83	9.83	0.00	0.00	3.54	3.72	15.07	15.25	**1.21**
Maharashtra	3.33	3.33	23.74	24.29	0.00	0.00	7.65	8.46	34.72	36.07	**3.91**
Daman & Diu	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	**1.43**
D. & N. Haveli	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	-
Goa	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.05	0.05	**0.41**
Central Sector WR	1.52	1.52	16.69	17.90	1.84	1.84	0.00	0.66	20.05	21.92	**9.32**
Sub-Total (WR)	7.45	7.45	84.79	87.78	1.84	1.84	18.30	20.45	112.38	117.52	**4.57**
Andhra Pradesh	1.75	1.67	12.52	12.72	0.00	0.00	6.16	6.48	20.43	20.87	**2.14**
Telangana	2.31	2.45	5.47	5.87	0.00	0.00	1.55	3.65	9.32	11.97	**28.40**
Karnataka	3.60	3.60	7.23	7.23	0.00	0.00	7.46	12.44	18.29	23.27	**27.23**
Kerala	1.88	1.88	0.33	0.33	0.00	0.00	0.34	0.33	2.55	2.54	**-0.36**
Tamil Nadu	2.20	2.20	8.71	8.71	0.00	0.00	10.63	10.98	21.54	21.90	**1.66**
Puducherry	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03	**0.25**
Lakshadweep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**5.63**
Central Sector SR #	0.00	0.00	12.05	12.85	3.32	3.32	0.00	0.49	15.37	16.66	**8.41**
Sub-Total (SR)	11.74	11.81	46.35	47.75	3.32	3.32	26.13	34.37	87.54	97.25	**11.09**
Bihar	0.00	0.00	0.21	0.71	0.00	0.00	0.29	0.33	0.50	1.04	**106.31**
DVC	0.14	0.14	8.69	8.14	0.00	0.00	0.00	0.00	8.83	8.28	**-6.23**
Jharkhand	0.13	0.13	1.78	1.20	0.00	0.00	0.03	0.03	1.93	1.36	**-29.63**
Odisha	2.06	2.06	5.42	4.22	0.00	0.00	0.19	0.18	7.68	6.47	**-15.76**
West Bengal	0.99	0.99	7.40	7.65	0.00	0.00	0.42	0.44	8.81	9.07	**2.89**
Sikkim	0.56	0.76	0.00	0.00	0.00	0.00	0.05	0.05	0.61	0.81	**33.60**
A. & N. Islands	0.00	0.00	0.04	0.04	0.00	0.00	0.01	0.01	0.05	0.05	**-9.83**
Central Sector ER	0.86	0.86	10.08	10.33	0.00	0.00	0.00	0.02	10.94	11.21	**2.42**
Sub-Total (ER)	4.74	4.94	33.62	32.29	0.00	0.00	1.00	1.05	39.36	38.28	**-2.74**
Arunachal Pradesh	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.11	0.10	0.11	**4.89**
Assam	0.10	0.10	0.41	0.31	0.00	0.00	0.05	0.05	0.55	0.46	**-17.03**
Manipur	0.00	0.00	0.04	0.04	0.00	0.00	0.01	0.01	0.04	0.04	**0.07**
Meghalaya	0.28	0.32	0.00	0.00	0.00	0.00	0.03	0.03	0.31	0.35	**12.78**
Mizoram	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	**-11.79**
Nagaland	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	**1.60**
Tripura	0.00	0.00	0.17	0.17	0.00	0.00	0.02	0.02	0.19	0.19	**-2.62**
Central Sector NER	0.86	0.92	1.75	1.75	0.00	0.00	0.00	0.01	2.61	2.68	**2.49**
Sub-Total (NER)	1.24	1.34	2.37	2.27	0.00	0.00	0.28	0.28	3.89	3.90	**0.17**
Total States	**32.97**	**33.40**	**164.14**	**165.80**	**0.00**	**0.00**	**57.24**	**67.52**	**254.36**	**266.72**	**4.86**
Total Central	**11.51**	**11.90**	**54.19**	**57.10**	**6.78**	**6.78**	**0.00**	**1.50**	**72.47**	**77.28**	**6.64**
Total All India	**44.48**	**45.29**	**218.33**	**222.91**	**6.78**	**6.78**	**57.24**	**69.02**	**326.83**	**344.00**	**5.25**

* RES: Other Renewable sources excluding hydro

Includes NLC-Central capacity also

Sub-totals/Totals may not tally due to conversion to GW and rounding off.

Source : Central Electricity Authority.

Download Table 2.4

Table 2.5:Statewise and Sourcewise Installed Capacity of Grid Interactive Renewable Power as on 31.03.2017 and 31.10.2018

(In MW)

States/ UTs	Bio-Power					
	Biomass Power & Bagase Cogeneration*		Waste to Energy		Wind Power	
	31.03.17	31.10.18	31.03.17	31.10.18	31.03.17	31.10.18
Andhra Pradesh	378.20	477.18	58.16	23.16	3618.85	4074.35
Arunachal Pradesh	-	-	-		-	
Bihar	113.00	121.20	-		-	
Chhattisgarh	228.00	230.50	-		-	
Goa	-	-	-		-	
Gujarat	65.30	77.30	-		5340.62	5852.67
Haryana	96.40	205.66	-		-	
Himachal Pradesh	-	7.20	-		-	
Jammu & Kashmir	-	-	-		-	
Jharkhand	-	4.30	-		-	
Karnataka	1452.00	1798.80	1.00	1.00	3751.40	4672.30
Kerala	-	0.72	-		51.50	52.50
Madhya Pradesh	93.00	105.35	3.90	15.40	2497.79	2519.89
Maharashtra	2065.00	2186.40	12.72	12.59	4771.33	4788.13
Manipur	-	-	-		-	
Meghalaya	-	13.80	-		-	
Mizoram	-	-	-		-	
Nagaland	-	-	-		-	
Odisha	50.40	59.22				
Punjab	179.00	317.10	9.25	9.25		
Rajasthan	119.30	121.30			4281.72	4299.72
Sikkim	-	-	-		-	
Tamil Nadu	878.00	954.55	8.05	6.40	7861.46	8594.39
Telangana	158.10	159.10		18.50	100.80	128.10
Tripura	-	-	-		-	
Uttar Pradesh	1933.00	2117.51	5.00			
Uttarakhand	73.00	130.50	-		-	
West Bengal	300.00	319.92	-		-	
Andaman & Nicobar	-	-	-		-	
Chandigarh	-	-	-		-	
Dadar & Nagar Haveli	-	-	-		-	
Daman & Diu	-	-	-		-	
Delhi	-	-	16.00	52.00		
Lakshadweep	-	-	-		-	
Puducherry	-	-	-		-	
Others	-	-	-		4.30	4.30
All India Total	**8181.70**	**9407.61**	**114.08**	**138.30**	**32279.77**	**34986.35**
Distribution (%)	**14.29**	**12.83**	**0.20**	**0.19**	**56.39**	**47.70**

* Bagase Cogeneration available for 2018-19

...Contd

- Denotes non availability or indeterminant value

The potential of Solar Power (100 GW) is estimated at 30-50 MW/Sq.Cm. of open, shadow free area.

Solar potential As per NISE

Source: Ministry of New and Renewable Energy

Table 2.5Contd..:Statewise and Sourcewise Installed Capacity of Grid Interactive Renewable Power as on 31.03.2017 and 31.10.2018

(In MW)

States/ UTs	Small Hydro Power		Solar Power		Total	
	31.03.17	31.10.18	31.03.17	31.10.18	31.03.17	31.10.18
Andhra Pradesh	241.98	162.11	1867.23	2641.76	**6164.42**	**7378.56**
Arunachal Pradesh	104.61	107.10	0.27	5.39	**104.87**	**112.49**
Assam	34.11	34.11	11.78	12.70	**45.89**	**46.81**
Bihar	70.70	70.70	108.52	142.45	**292.22**	**334.35**
Chhattisgarh	76.00	76.00	128.86	231.35	**432.86**	**537.85**
Goa	0.05	0.05	0.71	0.91	**0.76**	**0.96**
Gujarat	16.60	28.60	1249.37	1647.55	**6671.89**	**7606.12**
Haryana	73.50	73.50	81.40	216.85	**251.30**	**496.01**
Himachal Pradesh	831.81	858.61	0.73	3.36	**832.54**	**869.17**
Jammu & Kashmir	158.03	179.03	1.36	9.85	**159.39**	**188.88**
Jharkhand	4.05	4.05	23.27	32.07	**27.32**	**40.42**
Karnataka	1225.73	1230.73	1027.84	5230.40	**7457.97**	**12933.23**
Kerala	213.02	222.02	74.20	138.49	**338.72**	**413.73**
Madhya Pradesh	86.16	95.91	857.04	1531.81	**3537.89**	**4268.36**
Maharashtra	346.18	373.57	452.37	1419.18	**7647.60**	**8779.87**
Manipur	5.45	5.45	0.03	2.17	**5.48**	**7.62**
Meghalaya	31.03	31.03	0.01	0.06	**31.04**	**44.89**
Mizoram	41.47	36.47	0.10	0.20	**41.57**	**36.67**
Nagaland	30.67	30.67	0.50	1.00	**31.17**	**31.67**
Odisha	64.63	64.63	79.42	117.75	**194.45**	**241.60**
Punjab	170.90	173.55	793.95	905.62	**1153.10**	**1405.52**
Rajasthan	23.85	23.85	1812.93	3079.99	**6237.80**	**7524.86**
Sikkim	52.11	52.11	0.00	0.01	**52.11**	**52.12**
Tamil Nadu	123.05	123.05	1691.83	2220.95	**10562.39**	**11899.34**
Telangana		90.87	1286.98	3405.13	**1545.88**	**3801.70**
Tripura	16.01	16.01	5.09	5.09	**21.10**	**21.10**
Uttar Pradesh	25.10	25.10	336.73	805.15	**2299.83**	**2947.76**
Uttarakhand	209.32	214.32	233.49	302.99	**515.81**	**647.81**
West Bengal	98.50	98.50	26.14	37.97	**424.64**	**456.39**
Andaman & Nicobar	5.25	5.25	6.56	6.56	**11.81**	**11.81**
Chandigarh			17.32	30.35	**17.32**	**30.35**
Dadar & Nagar Haveli			2.97	5.46	**2.97**	**5.46**
Daman & Diu			10.46	13.01	**10.46**	**13.01**
Delhi			40.27	106.56	**56.27**	**158.56**
Lakshadweep			0.71	0.75	**0.71**	**0.75**
Puducherry			0.08	1.71	**0.08**	**1.71**
Others			58.31	0.00	**62.61**	**4.30**
All India Total	**4379.86**	**4506.95**	**12288.83**	**24312.60**	**57244.23**	**73351.81**
Distribution (%)	**7.65**	**6.14**	**21.47**	**33.15**	100.00	100.00

- Denotes non availability or indeterminant value

Source: Ministry of New and Renewable Energy

Download Table 2.5

Table 2.6 : Installation of Off-grid / Decentralised Renewable Energy Systems/ Devices as on 31.10.2018

Sl. No.	State/UT	Biogas Plants	SPV Pumps	Solar Photovoltaic (SPV) Systems				Aerogen/Aerogen/systems (KW.)	Biomass Gasifier (MW.)	Waste to Energy (MW)
				SLS	HLS	SL	PP			
		Nos in Lakh.	(Nos.)	(Nos.)	(Nos.)	(Nos.)	(KWP)			
1	2	3	4	5	6	7	8	9	10	11
1	Andhra Pradesh	5.49	33,226	8,992	22,972	51,360	3815.6	272.5	22.9	23.88
2	Arunachal Pradesh	0.03	22	5,008	35,065	18,551	963.2	6.8	0.0	
3	Assam	1.28	45	9,441	46,879	2,13,364	1605.0	6.0	2.9	
4	Bihar	1.30	2,107	27,270	12,303	7,97,775	4361.6	-	5.9	1
5	Chhattisgarh	0.54	41,964	2,042	7,754	3,311	30230.9	-	1.2	0.33
6	Goa	0.04	15	707	393	1,093	32.7	193.8	0.0	
7	Gujarat	4.33	11,522	2,004	9,253	31,603	13576.6	20.0	20.1	15.66
8	Haryana	0.62	1,293	22,018	56,727	93,853	2321.3	10.0	4.5	4.46
9	Himachal Pradesh	0.48	6	78,000	22,592	33,909	1905.5	-	0.0	1
10	Jammu & Kashmir	0.03	39	14,156	1,44,316	51,224	8129.9	95.6	0.2	
11	Jharkhand	0.07	3,857	9,856	9,450	5,97,184	3769.9	-	0.5	
12	Karnataka	4.90	5,695	2,694	52,638	7,781	7754.0	39.2	6.3	10.05
13	Kerala	1.49	818	1,735	41,912	54,367	15825.4	8.0	0.0	0.23
14	Madhya Pradesh	3.64	12,903	10,833	7,920	5,29,101	3654.0	24.0	9.9	0.72
15	Maharashtra	8.99	3,315	10,420	3,497	2,39,297	3857.7	1,779.5	7.2	27.71
16	Manipur	0.02	40	11,205	24,583	9,058	1580.5	140.0	0.0	
17	Meghalaya	0.10	19	4,900	7,844	24,875	1084.5	201.5	0.3	
18	Mizoram	0.05	37	5,325	12,060	10,512	2955.6	21.2	0.0	
19	Nagaland	0.08	3	6,235	1,045	6,766	1506.0	20.0	0.0	
20	Odisha	2.70	8,937	14,181	5,274	99,843	567.5	13.1	0.3	
21	Punjab	1.77	1,857	42,758	8,626	17,495	2066.0	50.0	0.0	7.4
22	Rajasthan	0.71	42,581	6,852	1,87,968	2,25,851	10850.0	14.0	2.6	3.91
23	Sikkim	0.09	-	504	15,059	23,300	850.0	15.5	0.0	
24	Tamil Nadu	2.23	4,459	39,413	2,89,333	16,818	12752.6	256.7	14.9	15.96
25	Telangana	0.24	424	1,029	-	-	7450.0	-	0.0	3.5
26	Tripura	0.04	151	1,199	32,723	64,282	867.0	2.0	0.0	
27	Uttar Pradesh	4.41	14,696	2,55,783	2,35,909	5,23,306	10638.3	-	31.9	49.81
28	Uttarakhand	0.21	26	22,119	91,595	93,927	2935.5	24.0	2.2	8.49
29	West Bengal	3.67	653	8,726	1,45,332	17,662	1730.0	74.0	29.8	1.17
30	Andaman & Nicobar	0.00	5	390	468	6,296	167.0	-	0.0	
31	Chandigarh	0.00	12	898	275	1,675	730.0	-	0.0	
32	Dadar & Nagar Haveli	0.00	-	-	-	-	0.0	-	0.0	
33	Daman & Diu	-	-	-	-	-	0.0	-	0.0	
34	Delhi	0.01	90	301	-	4,807	1269.0	-	0.0	
35	Lakshadweep	-	-	2,465	600	5,289	2190.0	-	0.0	
36	Puducherry	0.01	21	417	25	1,637	121.0	5.0	0.0	
37	Others*	0.02	4,621	9,150	1,40,273	1,25,797	23885.0	-	0.0	
	Total	49.57	1,95,459	6,39,026	16,72,663	40,02,969	187998.8	3,292.4	163.4	175.28

* Others includes installations through NGOs/IREDA in different states

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

Source : Ministry of New and Renewable Energy

Download Table 2.6

Table: 2.7: State-wise Number of Villages Electrified

S. No.	States/ UTs	No. of villages as per 2011 Census	No. of villages Electrified as on 31.3.2018	Percentage
1	Andhra Pradesh	16158	16158	100.0
2	Arunachal Pradesh	5258	5035	95.8
3	Assam	25372	25372	100.0
4	Bihar	39073	39073	100.0
5	Chhatisgarh	19567	19534	99.8
6	Goa	320	320	100.0
7	Gujarat	17843	17843	100.0
8	Haryana	6642	6642	100.0
9	Himachal Pradesh	17882	17882	100.0
10	Jammu & Kashmir	6337	6271	99.0
11	Jharkhand	29492	29492	100.0
12	Karnataka	27397	27397	100.0
13	Kerala	1017	1017	100.0
14	Madhya Pradesh	51929	51924	100.0
15	Maharashtra	40956	40956	100.0
16	Manipur	2379	2379	100.0
17	Meghalaya	6459	6459	100.0
18	Mizoram	704	704	100.0
19	Nagaland	1400	1400	100.0
20	Odisha	47677	47674	100.0
21	Punjab	12168	12168	100.0
22	Rajasthan	43264	43264	100.0
23	Sikkim	425	425	100.0
24	Tamil Nadu	15049	15049	100.0
25	Telangana	10128	10128	100.0
26	Tripura	863	863	100.0
27	Uttar Pradesh	97813	97813	100.0
28	Uttarakhand	15745	15732	99.9
29	West Bengal	37463	37463	100.0
30	Andaman & Nicobar	396	396	100.0
31	Chandigarh	5	5	100.0
32	Dadar & Nagar Haveli	65	65	100.0
33	Daman & Diu	19	19	100.0
34	Delhi	103.00	103	100.0
35	Lakshwadeep	6	6	100.0
36	Pondicherry	90	90	100.0
Total		**597464**	**597121**	99.9

Source: Central Electricity Authority

Download Table 2.7

CHAPTER 3: PRODUCTION OF COMMERCIAL SOURCES OF ENERGY

3.1 Production of Coal, Lignite, Crude Oil, Natural Gas& Electricity

- Coal production in the country during the year 2017-18 was 675.40 million tonne (MTs) as compared to 657.87 MTs during 2016-17, registering a growth of 2.66%(Table 3.1).

- The Lignite production during 2017-18 was 46.26 million tonnes which is 2.27% higher than the production during 2016-17 (45.23 million tonnes).

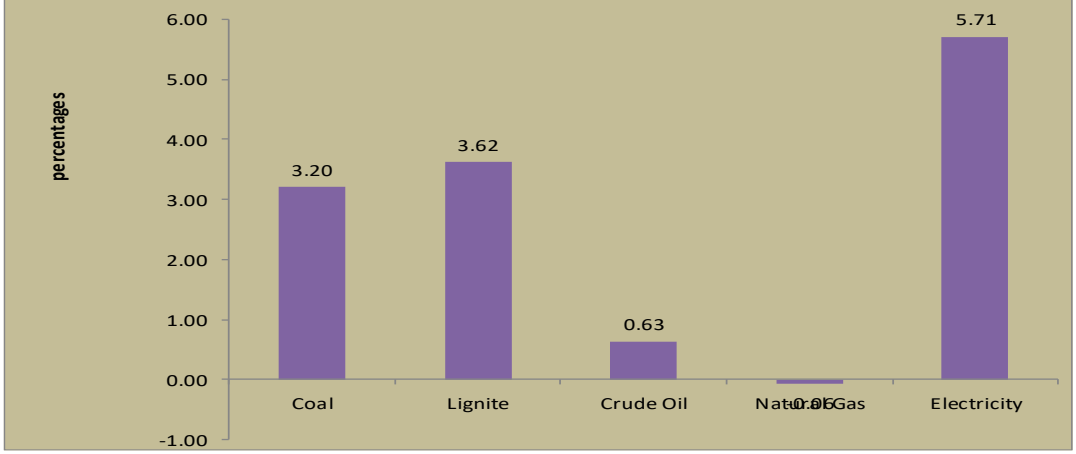
- Considering the trend of production from 2008-09 to 2017-18, it is observed that coal production in India was about 492.76 MTs during 2008-09, which increased to 675.40 MTs during 2017-18 with a CAGR of 3.2%.

- During the same period, the CAGR of Lignite was about 3.62% with production increasing from 32.42 MTs in 2008-09 to 46.26 MTs in 2017-18.

- Production of crude oil increased from 33.51 MTs during 2008-09 to 35.68 MTs during 2017-18, a CAGR of about 0.63%.

- The CAGRs for natural gas and electricity were (-) 0.06% and 5.71% respectively for the period 2008-09 to 2017-18. Electricity has experienced the highest CAGR i.e. 5.71% among all the commercial sources of energy since 2008-09 to 2017-18.

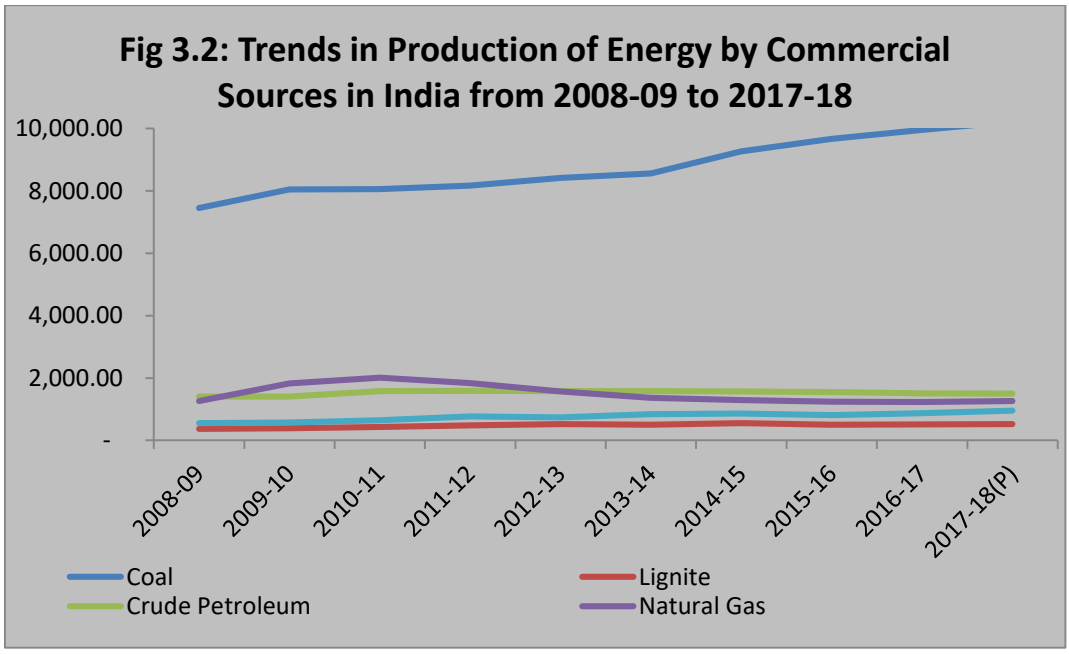
Fig 3.1: Compound Annual Growth Rate of Production of Energy in India by Primary Sources from 2008-09 to 2017-18



- 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/Petajoules/Terrajoules).

- The total production of energy from commercial sources increased from 14074.82 petajoules during 2016-17 to 14455.19 petajoules during 2017-18, showing an increase of 2.7%(Table 3.2).

- The production of energy in petajoules by commercial sources shows that Coal was the major source of energy, accounting for about 70.69% of the total production during 2017-18. Crude Oil was the second (10.34%), while Natural Gas (8.7%) was the third major source. Electricity and lignite contributed 6.63% and 3.64% respectively.



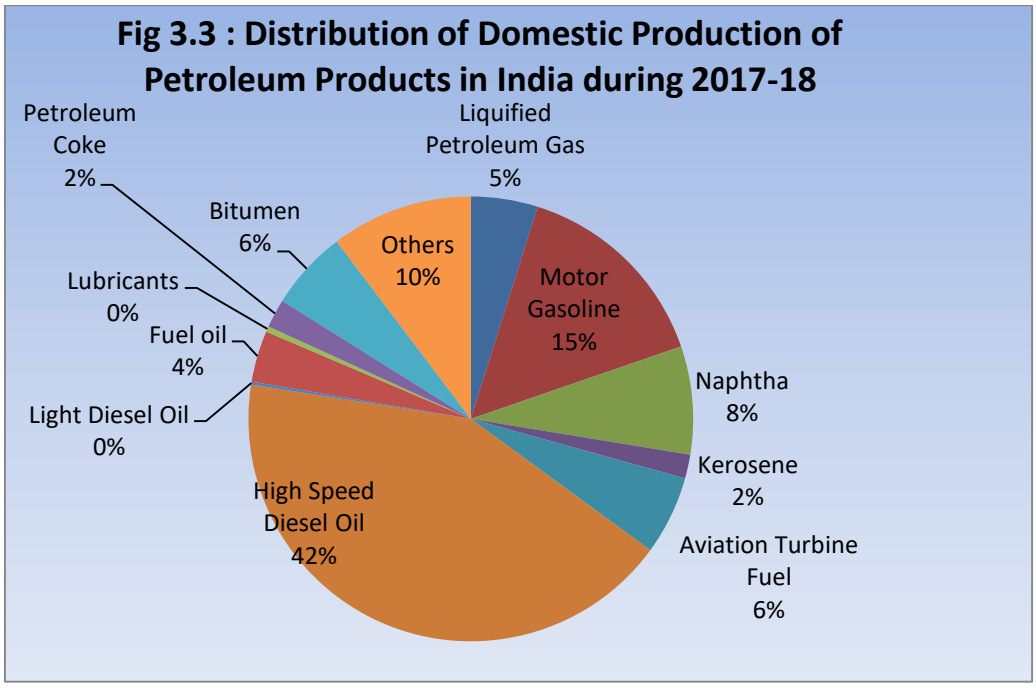
- Out of the total coking coal production of 40.15 MT in the country, 84.5% is produced by public sector, whereas for the private sector, the share of production is 15.5%. A similar pattern is observed for the production of non-coking coal in the country, where the public sector contributes a significant 95.7% (607.85 MTs) of the total production (635.25) and the private sector producing only 4.3% of non-coking coal in the country (27.4 MTs) (Table 3.3 A & B)

3.2 Production of Petroleum Products and Natural Gas

- In the year 2017-18, the production of Petroleum Products in the country was 254.40 MT as against 243.55 MT during 2016-17, an increase of 4.46% (Table 3.4).

- In the total production of Petroleum products during 2017-18, High speed diesel oil accounted for the maximum share (42.41%), followed by Motor Gasoline (14.85%). (Table 3.4).

- Net production of Natural Gas increased from 30.85 Billion Cubic Meters(BCM) in 2016-17 to 31.73 BCM in 2017-18 registering a growth of 2.86% (Table 3.5).



3.3 Generation of electricity

- The All India gross electricity generation from utilities, excluding that from the captive generating plants, was 7,41,167 Giga Watt-Hours(GWh) during 2008-09. It rose to 13,03,493 GWh during 2017-18(Table 3.6).

- The production of electricity from utilities has increased from 12,35,358 GWh during 2016-17 to 13,03,493 GWh during 2017-18, registering an annual growth rate of about 5.52%.

- Total Electricity generation in the country, from utilities and non-utilities taken together during 2017-18 was 14,86,493 GWh. Out of the total electricity generated through utilities,10,37,184 GWh was generated from thermal and 1,26,123 GWh was from hydro and 38,346 GWh was generated from nuclear sources. Total output from non-utilities was 1,83,000 GWh.

Table 3.1 : Production of Commercial Sources of Energy in India

Year	Coal (million tonnes	Lignite (million tonnes)	Crude Oil (million tonnes)	Natural Gas (Billion Cubic Metres)	Electricity* (GWh)
1	2	3	4	5	6
2008-09	492.76	32.42	33.51	32.85	1,52,886.00
2009-10	532.04	34.07	33.69	47.50	1,59,642.84
2010-11	532.69	37.73	37.68	52.22	1,79,926.46
2011-12	539.95	42.33	38.09	47.56	2,14,024.08
2012-13	556.40	46.45	37.86	40.68	2,04,035.31
2013-14	565.77	44.27	37.79	35.41	2,34,595.01
2014-15	612.43	48.26	37.46	33.66	2,38,908.43
2015-16	639.23	43.84	36.94	32.25	2,24,571.11
2016-17	657.87	45.23	36.01	31.90	2,41,841.64
2017-18(P)	675.40	46.26	35.68	32.65	2,66,308.30
Growth rate of 2017-18 over 2016-17(%)	**2.66**	**2.27**	**-0.90**	**2.36**	**10.12**
CAGR 2008-09 to 2017-18 (%)	**3.20**	**3.62**	**0.63**	**-0.06**	**5.71**

(p): provisional

* Electricity from Hydro, Nuclear and other Renewable energy sources.

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

Download Table 3.1

Table 3.2 : Production of Energy in India by Commercial Sources

(in Petajoules) @

Year	Coal	Lignite	Crude Oil	Natural Gas	Electricity *	Total
1	2	3	4	5	6	7= 2 to 6
2008-09	7,455.41	368.63	1,402.90	1,265.38	550.39	11,042.71
2009-10	8,049.80	387.39	1,410.60	1,829.55	574.71	12,252.04
2010-11	8,059.66	429.02	1,577.82	2,011.46	647.74	12,725.70
2011-12	8,169.44	481.31	1,594.81	1,831.96	770.49	12,848.02
2012-13	8,418.36	528.17	1,585.28	1,566.96	734.53	12,833.31
2013-14	8,560.02	503.36	1,582.20	1,363.87	844.54	12,854.00
2014-15	9,266.07	548.72	1,568.49	1,296.48	860.07	13,539.83
2015-16	9,671.55	498.46	1,546.75	1,242.24	808.46	14,090.50
2016-17	9,953.57	514.27	1,507.69	1,228.66	870.63	14,074.82
2017-18(P)	10,218.80	525.92	1,494.10	1,257.65	958.71	14,455.19
Growth rate of 2017-18 over 2016-17(%)	**2.66**	**2.27**	**-0.90**	**2.36**	**10.12**	**2.70**
CAGR 2008-09 to 2017-18 (%)	**3.20**	**3.62**	**0.63**	**-0.06**	**5.71**	**2.73**

(P): provisional

* Electricity from hydro, Nuclear and other Renwable energy sources.

@ Conversion factors have been applied to convert production of primary sources of energy into petajoules

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

Download Table 3.2

Table 3.3 :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)
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	51.66	488.29	539.95	42.33	582.28
2012-13	51.88	504.52	556.40	46.60	603.00
2013-14	56.82	508.95	565.77	44.27	610.04
2014-15	57.45	554.98	612.43	48.27	660.70
2015-16	60.89	578.35	639.23	43.84	683.08
2016-17	61.66	596.21	657.87	45.23	703.10
2017-18(P)	40.15	635.25	675.40	46.26	721.66
Growth rate of 2017-18 over 2016-17(%)	-34.89	6.55	2.66	2.27	2.64
CAGR 2008-09 to 2017-18(%)	1.44	3.33	3.20	3.62	3.23

(P): Provisional

Source : Office of Coal Controller of India

Download Table 3.3

Table 3.3 A: Grade Wise Production of Coking Coal by Companies in 2016-17 & 2017-18

(Million Tonnes)

Grade of Coaking Coal	Public		Private		All India		Percentage Change
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	
Steel-I	0.023	0.155	0.000	0.000	0.023	0.155	573.91
Steel-II	1.004	0.051	0.000	0.000	1.004	0.051	-94.92
SC-1	0.110	0.182	0.000	0.000	0.110	0.182	65.45
Wash-I	0.315	0.176	0.000	0.000	0.315	0.176	-44.13
Wash-II	3.305	4.357	0.115	0.270	3.420	4.627	35.29
Wash-III	9.750	3.595	1.046	0.396	10.796	3.991	-63.03
Wash-IV	40.838	25.407	5.155	5.558	45.993	30.965	-32.67
SLV1	0.000	0.000	0.000	0.000	0.000	0.000	-
All India Total	55.345	33.923	6.316	6.224	61.661	40.147	-34.89
Met.Coal	8.938	6.754	6.316	6.224	15.254	12.978	-14.92
Non Met	46.407	27.169	0	0	46.407	27.169	-41.45
All India Total	55.345	33.923	6.316	6.224	61.661	40.147	-34.89

Source: Office of Coal Controller of India

Table 3.3 B: Grade Wise Production of Non-Coking Coal by Companies in 2016-17 & 2017-18

(Million Tonnes)

Grade of Non-Coaking Coal	Public		Private		All India		Percentage Change
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	
1	0.110	0.181	2.308	1.529	2.418	1.71	-29.28
2	0.309	0.264	0.000	0.000	0.309	0.264	-14.56
3	5.279	3.512	0.000	0.000	5.279	3.512	-33.47
4	17.319	13.905	0.000	0.000	17.319	13.905	-19.71
5	13.600	15.521	0.000	0.000	13.6	15.521	14.13
6	14.140	10.893	0.000	0.800	14.14	11.693	-17.31
7	35.574	40.175	0.000	0.600	35.574	40.775	14.62
8	28.840	38.421	0.734	0.270	29.574	38.691	30.83
9	38.744	25.295	0.18	0.000	38.924	25.295	-35.01
10	91.149	81.983	7.026	9.095	98.175	91.078	-7.23
11	128.12	165.838	15.113	14.136	143.233	179.974	25.65
12	91.342	52.715	0.444	0.702	91.786	53.417	-41.80
13	90.449	101.739	0.488	0.003	90.937	101.742	11.88
14	6.356	44.372	0.063	0.267	6.419	44.639	595.42
15	3.263	7.894	0.000	0.000	3.263	7.894	141.92
16	4.505	3.544	0.000	0.000	4.505	3.544	-21.33
17	0.459	1.454	0.000	0.000	0.459	1.454	216.78
UNG	0.293	0.145	0.000	0.000	0.293	0.145	-50.51
Total Non-Coaking Coal	569.851	607.851	26.356	27.402	596.207	635.253	6.55

Source: Office of Coal Controller of India

Download Table 3.3(A&B)

Table 3.4 :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
2008-09	9.16	16.02	16.45	8.39	8.07	62.91	0.61
2009-10	10.33	22.54	18.79	8.70	9.30	73.30	0.47
2010-11	9.71	26.14	19.20	7.81	9.59	78.06	0.59
2011-12	9.55	27.19	18.83	7.86	10.06	82.88	0.50
2012-13	9.82	30.12	19.02	7.97	10.09	91.10	0.40
2013-14	10.03	30.28	18.51	7.42	11.22	93.76	0.42
2014-15	9.84	32.33	17.39	7.56	11.10	94.43	0.36
2015-16	10.57	35.32	17.86	7.50	11.79	98.59	0.43
2016-17	11.33	36.59	19.95	6.04	13.83	102.48	0.63
2017-18(P)	12.38	37.78	20.01	4.41	14.59	107.90	0.56
Growth rate of 2017-18 over 2016-17(%)	**9.31**	**3.25**	**0.30**	**-27.03**	**5.52**	**5.29**	**-10.69**
CAGR 2008-09 to 2017-18 (%)	**3.06**	**8.96**	**1.98**	**-6.23**	**6.10**	**5.54**	**-0.76**

(p) : Provisional

Source : Ministry of Petroleum & Natural Gas.

Table 3.4 (Contd.): 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 (sum of 2 to 13)
2008-09	17.68	0.87	4.24	4.71	6.03	155.15
2009-10	18.35	0.95	3.71	4.89	13.28	184.61
2010-11	20.52	0.88	2.71	4.48	15.14	194.82
2011-12	18.43	1.03	7.84	4.61	14.43	203.20
2012-13	15.05	0.90	10.94	4.67	17.65	217.74
2013-14	13.41	0.94	12.07	4.79	17.93	220.76
2014-15	11.92	0.95	12.45	4.63	18.19	221.14
2015-16	9.73	1.04	13.32	5.16	20.62	231.92
2016-17	9.96	1.03	13.94	5.19	22.59	243.55
2017-18(P)	9.49	1.04	14.75	5.28	26.21	254.40
Growth rate of 2017-18 over 2016-17(%)	**-4.77**	**0.68**	**5.87**	**1.76**	**16.05**	**4.46**
CAGR 2007-08 to 2016-17(%)	**-6.04**	**1.71**	**13.28**	**1.14**	**15.82**	**5.07**

(P): Provisional

$: Includes other Light distillates from 2006-07

* : Others include VGO, Benzene, MTO, CBFS, Sulphur, Waxes, MTBE & Reformate, etc.

Source : Ministry of Petroleum & Natural Gas.

Download Table 3.4

Table 3.5 :Gross and Net Production of Natural Gas

(in Billion Cubic Metres)

Year	Gross Production	Internal Consumption	Flared	Losses	Net Production (For Sales)	Net Production (For Consumption)
1	2	3	4	5	6=2-3-4-5	7=2-4-5
2008-09	32.84	4.68	1.10	**	27.07	31.75
2009-10	47.50	5.66	0.97	**	40.87	46.53
2010-11	52.22	5.21	0.97	**	46.04	51.25
2011-12	47.56	5.28	1.08	0.03	41.17	46.45
2012-13	40.68	5.40	0.90	0.03	34.35	39.75
2013-14	35.41	5.59	0.77	0.07	28.98	34.57
2014-15	33.66	5.91	0.87	0.10	26.78	32.69
2015-16	32.25	5.83	1.01	0.12	25.30	31.12
2016-17	31.90	5.86	0.98	0.07	24.99	30.85
2017-18(P)	32.65	5.81	0.82	0.09	25.92	31.73
Growth rate of 2017-18 over 2016-17(%)	**2.36**	**-0.84**	**-15.60**	**31.37**	**3.73**	**2.86**
CAGR 2008-09 to 2017-18 (%)	**-0.06**	**2.18**	**-2.84**	**-**	**-0.43**	**-0.0046**

Note:

P : Provisional **:Included in Internal consumption

1. Total may not tally due to rounding off.

2: Net availability/Production denotes natural gas available for consumption which is derived by deducting gas flared/losses from gross production.

3: Net Production (for Sales)=Gross Production-Flared-Losses-Internal Consumtion

4: Net Production (for Consumption)= Gross Production-Flared-Losses

Source : Ministry of Petroleum & Natural Gas.

Download Table 3.5

Table 3.6 :Trends in Gross Generation of Electricity from utilities and non-utilities in India

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

Year	Utilities							
	Thermal				Hydro	Nuclear	ORS	Total
	Steam	Diesel	Gas	Total				
1	2	3	4	5	6	7	8	9
2008-09	5,11,895	4,789	71,597	5,88,281	1,10,099	14,927	27,860	7,41,167
2009-10	5,39,586	4,248	96,373	6,40,208	1,04,059	18,636	36,947	7,99,851
2010-11	5,61,298	3,181	1,00,342	6,64,822	1,14,416	26,266	39,245	8,44,748
2011-12	6,12,497	2,649	93,281	7,08,427	1,30,511	32,287	51,226	9,22,451
2012-13	6,91,341	2,448	66,664	7,60,454	1,13,720	32,866	57,449	9,64,489
2013-14	7,45,533	1,998	44,522	7,92,054	1,34,848	34,228	65,520	10,26,649
2014-15	8,35,291	1,576	41,075	8,77,941	1,29,244	36,102	73,563	11,16,850
2015-16	8,95,340	551	47,122	9,43,013	1,21,377	37,414	65,781	11,67,584
2016-17	9,44,022	401	49,094	9,93,516	1,22,378	37,916	81,548	12,35,358
2017-18(P)	9,86,591	386	50,208	10,37,184	1,26,123	38,346	1,01,839	13,03,493
Growth rate of 2017-18 over 2016-17(%)	**4.51**	**-3.64**	**2.27**	**4.40**	**3.06**	**1.13**	**24.88**	**5.52**
CAGR 2008-09 to 2017-18 (%)	**6.78**	**-22.26**	**-3.49**	**5.83**	**1.37**	**9.89**	**13.84**	**5.81**

(P)-Provisional

Source : Central Electricity Authority.

Table 3.6 (Conti) :Trends in Gross Generation of Electricity from utilities and non-utilities in India

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

Year	Non-Utilities							Grand Total
	Thermal				Hydro	ORS	Total	
	Steam	Diesel	Gas	Total				
1	10	11	12	13	14	15	16	
2008-09	73,626	10,082	15,306	99,015	146	560	99,721	8,40,888
2009-10	77,416	8,217	19,739	1,05,372	152	609	1,06,133	9,05,984
2010-11	96,657	7,754	15,435	1,19,846	149	922	1,20,917	9,65,665
2011-12	1,04,863	6,244	21,972	1,33,079	131	1,178	1,34,388	10,56,839
2012-13	1,13,167	8,205	20,769	1,42,141	118	1,750	1,44,010	11,08,499
2013-14	1,18,178	8,866	19,912	1,46,957	129	1,903	1,48,988	11,75,637
2014-15	1,28,401	9,720	21,135	1,59,256	145	2,656	1,62,057	12,78,907
2015-16	1,36,721	8,412	21,083	1,66,216	110	2,046	1,68,372	13,35,956
2016-17	1,37,588	9,182	22,855	1,69,625	144	2,277	1,72,046	14,07,404
2017-18(P)	1,47,036	10,038	23,316	1,80,391	148	2,461	1,83,000	14,86,493
Growth rate of 2017-18 over 2016-17(%)	**6.87**	**9.33**	**2.02**	**6.35**	**3.05**	**8.10**	**6.37**	**5.62**
CAGR 2008-09 to 2017-18(%)	**7.16**	**-0.04**	**4.30**	**6.18**	**0.14**	**15.95**	**6.26**	**5.86**

(P)-Provisional

Source : Central Electricity Authority.

Download Table 3.6

CHAPTER 4: FOREIGN TRADE IN COMMERCIAL SOURCES OF ENERGY

4.1 Import and export of coal

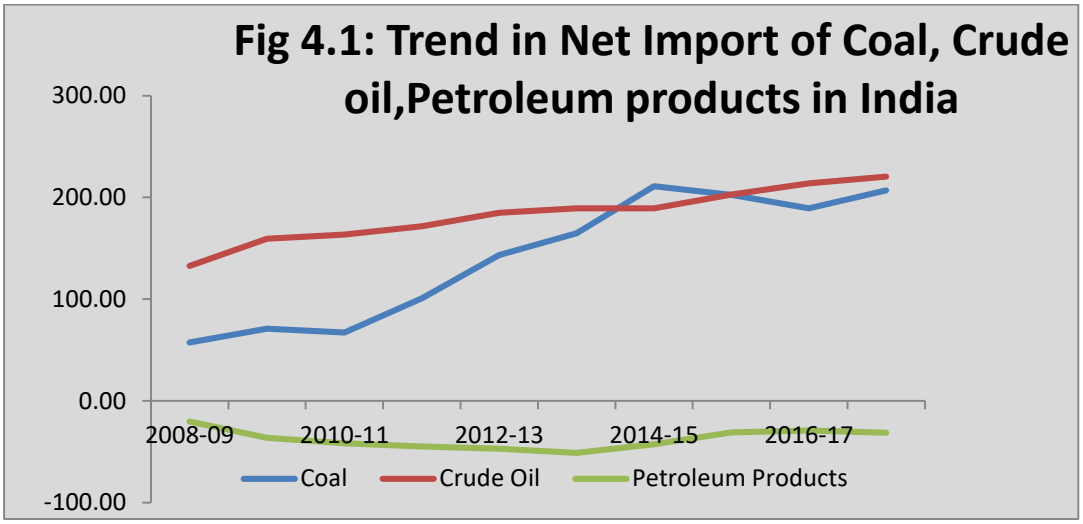
- The average quality of the Indian coal is not very high and this necessitates the import of high quality coal to meet the requirements of steel plants. There has been an increasing trend in the import of coal.

- Import of coal has steadily increased from 59.00 MTs during 2008-09 to 208.27 MTs during 2017-18. During this period, the quantum of coal exported decreased from 1.66 MTs during 2008-09 to1.50 MT during 2017-18. (Table 4.1)

- The gross import of coal increased at 9.07% whereas the export has decreased by 15.23% and Net Import of coal increased at 9.30% in 2017-18 over the previous year.

4.2 Crude oil and petroleum products

- India is highly dependent on import of crude oil. Net imports of crude oil have increased from 132.78 MTs during 2008-09 to 220.43 MTs during 2017-18.



- There has been an increase of 3.04% in the net imports of crude oil during 2017-18 over 2016-17, as the net import increased from 213.93 MTs to 220.43MTs (Table 4.1).

- The export of petroleum product has increased from 38.94 MT during 2008-09 to 66.83 MT during 2017-18. During 2017-18, exports recorded an increase of 2.01% from previous year (Table 4.1).

- The import of petroleum products has increased from 18.59 MT in 2008-09 to 35.46 MT during 2017-18(Table 4.1), whereas the imports of petroleum decreased in 2017-18 by 2.28% over the previous year.

4.3 Natural Gas

- The gross import of natural gas has increased from 8.06 BCM in 2008-09 to 19.87 BCM in 2017-18, recording a CAGR of 9.44%.

4.4 Electricity

- The gross import of electricity has decreased at CAGR of (-) 0.5% during the period 2008-09 (5897 GWh) to 2017-18 (5611GWh). Similarly, the export of electricity has increased from 58 GWh in 2008-09 to 7203 GWh in 2017-18.

- There is decline in net import of electricity during 2008-09 to 2017-18. For the second consecutive year net import of electricity has gone negative and percentage decrease in 2017-18 with respect to 2016-17 is 45.64%.

Table 4.1: Trends of Foreign Trade in Coal, Crude Oil, Petroleum Products, Natural Gas and Electricity 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)
2008-09	59.00	1.66	57.35	132.78	0.00	132.78	18.59	38.94	-20.36
2009-10	73.26	2.45	70.81	159.26	0.00	159.26	14.67	51.15	-36.49
2010-11	68.92	1.88	67.04	163.60	0.00	163.60	17.38	59.08	-41.70
2011-12	102.85	2.02	100.84	171.73	0.00	171.73	15.85	60.84	-44.99
2012-13	145.79	2.44	143.34	184.80	0.00	184.80	16.35	63.41	-47.05
2013-14	166.86	2.19	164.67	189.24	0.00	189.24	16.70	67.86	-51.17
2014-15	212.10	1.24	210.87	189.43	0.00	189.43	21.30	63.93	-42.63
2015-16	203.95	1.58	202.37	202.85	0.00	202.85	29.46	60.54	-31.08
2016-17	190.95	1.77	189.18	213.93	0.00	213.93	36.29	65.51	-29.23
2017-18 (P)	208.27	1.50	206.77	220.43	0.00	220.43	35.46	66.83	-31.37
Growth rate of 2017-18 over 2016-17(%)	**9.07**	**-15.23**	**9.30**	**3.04**	**-**	**3.04**	**-2.28**	**2.01**	**7.34**
CAGR 2008-09 to 2017-18 (%)	**13.44**	**-0.96**	**13.68**	**5.20**	**-**	**5.20**	**6.67**	**5.55**	**4.42**

Table 4.1 (Contd): Trends of Foreign Trade in Coal, Crude Oil, Petroleum Products, Natural Gas and Electricity in India

Year	Natural Gas (Billion Cubic Metres)			Electricity(Gwh)		
	Gross Imports	Exports	Net Imports	Gross Imports	Exports	Net Imports
1	11	12	13	14	15	16
2008-09	8.06	0.00	8.06	5897	58	5838
2009-10	9.15	0.00	9.15	5359	105	5254
2010-11	9.93	0.00	9.93	5611	128	5482
2011-12	13.21	0.00	13.21	5253	135	5118
2012-13	13.14	0.00	13.14	4795	154	4641
2013-14	12.99	0.00	12.99	5598	1651	3947
2014-15	14.09	0.00	14.09	5008	4433	575
2015-16	16.14	0.00	16.14	5244	5150	94
2016-17	18.63	0.00	18.63	5617	6710	-1093
2017-18 (P)	19.87	0.00	19.87	5611	7203	-1592
Growth rate of 2017-18 over 2016-17(%)	**6.65**	**-**	**6.65**	**-0.11**	**7.34**	**45.64**
CAGR 2008-09 to 2017-18 (%)	**9.44**		**9.44**	**-0.50**	**61.83**	

(P): Provisional.

Sources:

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

Download Table 4.1

CHAPTER 5 : AVAILABILITY OF ENERGY SOURCES

5.1 Availability of Coal and Lignite

- The total availability of raw coal in India in 2017-18 stood at 866.27 MT and that of lignite at 46.58 MT (Table 5.1).

- The availability of coal in the year 2017-18 increased by 0.90% compared to 2016-17. The availability of lignite decreased by 1.53% during the same period.

- The availability of coal has increased at a CAGR of about 4.64% during the period from 2008-09 to 2017-18. This increased availability (550.64 MTs during 2008-09 to 866.27MTs during 2017-18) might be attributed to the increase in the coal production supplemented by imports (Table 5.2).

- The availability of lignite has increased at a CAGR of about 3.51% during the period from 2008-09 to 2017-18(Table 5.1).

5.2 Availability of Natural Gas

- The availability of natural gas has steadily increased from a mere 40.91 BCM during 2008-09 to 52.52 BCMs during 2017-18, registering a CAGR of 2.53%. (Table 5.1).

5.3 Availability of Crude Oil and Petroleum Products

- The availability of crude oil in the country increased from 166.28 MT in 2008-09 to 256.12 MT during 2017-18 (Table 5.3).

- During this period, crude oil production increased from 33.51 MT to 35.68 MT and the net import increased from 132.78 MT to 220.43 MT between 2008-09 and 2017-18. There was increase of 2.47% in availability of crude oil during 2017-18 over 2016-17.

5.4 Availability of Electricity

- Electricity available for supply increased from 7,07,945 Gwh in 2008-09 to 12,28,766 Gwh in 2017-18, thus recording a CAGR of 5.67% during this period. The availability of electricity increased at 5.63% in 2017-18 over its value in 2016-17.

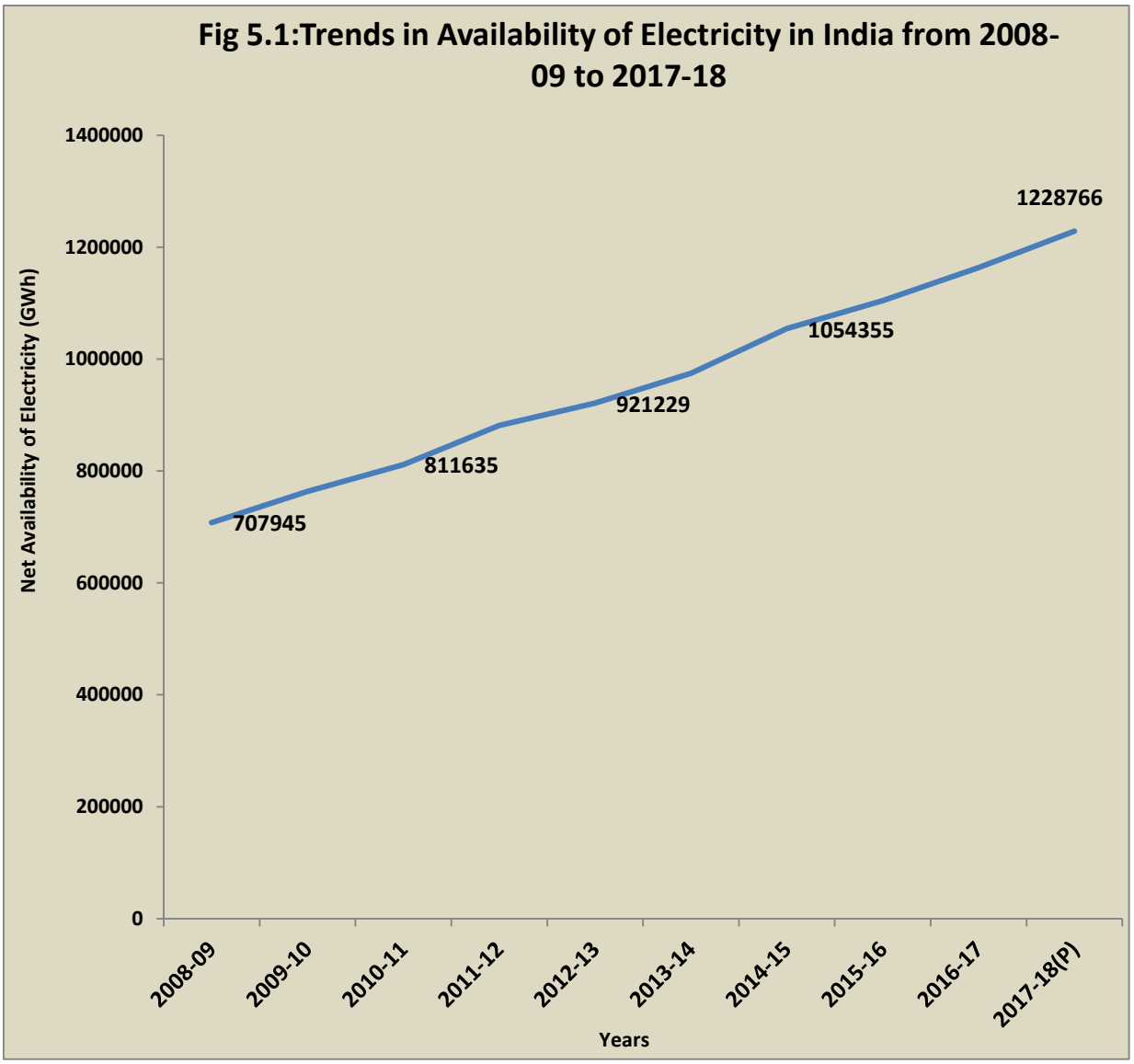


Fig 5.1:Trends in Availability of Electricity in India from 2008-09 to 2017-18
Net Availability of Electricity (GWh)
1400000
1200000
1000000
800000
600000
400000
200000
0
707945
811635
921229
1054355
1228766
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18(P)
Years

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

Year	Coal (Million Tonnes)	Lignite (Million Tonnes)	Crude Petroleum (Million Tonnes)	Natural Gas (Billion Cubic Metres)*
2008-09	550.64	33.00	166.28	40.91
2009-10	620.39	33.73	192.95	56.64
2010-11	604.53	37.78	201.28	62.15
2011-12	642.64	42.77	209.82	60.77
2012-13	680.14	46.89	222.66	53.81
2013-14	724.19	44.64	227.03	48.40
2014-15	824.26	49.57	226.90	47.75
2015-16	847.58	45.47	239.79	48.39
2016-17	858.58	47.30	249.94	50.53
2017-18(P)	866.27	46.58	256.12	52.52
Growth rate of 2017-18 over 2016-17(%)	**0.90**	**-1.53**	**2.47**	**3.94**
CAGR 2008-09 to 2017-18 (%)	**4.64**	**3.51**	**4.41**	**2.53**

(P) - Provisional

* : Availability of natural gas is equal to indigenous net production (Gross production-Flared & Losses) + net imports

Sources:

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

Download Table 5.1

Table 5.2 : Trends in Availability of Raw Coal and Lignite in India

(Million Tonnes)

Year	Coal					Lignite		
	Production (Coking + Non-coking)	Change of Vendible Stock (closing stock-Opening stock)	Imports	Exports	Availability for Consumption	Production	Change of Vendible Stock (closing stock-Opening stock)	Availability for Consumption
1	2	3	4	5	6=2+3+4-5	7	8	9=7+8
2008-09	492.76	0.54	59.00	1.66	550.64	32.42	0.58	33.00
2009-10	532.04	17.55	73.26	2.45	620.39	34.07	-0.34	33.73
2010-11	532.69	7.33	68.92	4.41	604.53	37.73	0.05	37.78
2011-12	539.95	1.85	102.85	2.02	642.64	42.33	0.44	42.77
2012-13	556.40	-10.99	137.56	2.83	680.14	46.45	0.44	46.89
2013-14	565.77	-7.87	168.44	2.15	724.19	44.27	0.37	44.64
2014-15	609.18	4.21	212.10	1.24	824.26	48.26	1.32	49.57
2015-16	639.23	5.97	203.95	1.58	847.58	43.84	1.63	45.47
2016-17	657.87	11.53	190.95	1.77	858.58	45.23	2.07	47.30
2017-18 (P)	675.40	-15.91	208.27	1.50	866.27	46.26	0.33	46.58
Growth rate of 2016-17 over 2015-16 (%)	**2.66**	**-237.97**	**9.07**	**-15.23**	**0.90**	**2.27**	**-84.23**	**-1.53**

(P): Provisional

Source : Office of the Coal Controller, Ministry of Coal

Download Table 5.2

Table 5.3 : Trends in Availability of Crude Oil, Petroleum Products and Natural Gas in India

Year	Crude Oil (Million Tonne)			Petroleum Products (Million Tonne)			Natural Gas (Billion Cubic Meter)*		
	Production	Net Imports	Availability	Production	Net Imports	Availability	Production	Net Imports	Availability
1	2	3	4=2+3	5	6	7=5+6	8	9	10 = 8+9
2008-09	33.51	132.78	166.28	155.15	-20.36	134.79	32.85	8.06	40.91
2009-10	33.69	159.26	192.95	184.61	-36.49	148.12	47.50	9.15	56.64
2010-11	37.68	163.60	201.28	194.82	-41.70	153.12	52.22	9.93	62.15
2011-12	38.09	171.73	209.82	203.20	-44.99	158.21	47.56	13.21	60.77
2012-13	37.86	184.80	222.66	217.74	-47.05	170.69	40.68	13.14	53.81
2013-14	37.79	189.24	227.03	220.76	-51.17	169.59	35.41	12.99	48.40
2014-15	37.46	189.43	226.90	221.14	-42.63	178.51	33.66	14.09	47.75
2015-16	36.94	202.85	239.79	231.92	-31.08	200.84	32.25	16.14	48.39
2016-17	36.01	213.93	249.94	243.55	-29.23	214.32	31.90	18.63	50.53
2017-18(P)	35.68	220.43	256.12	254.40	-31.37	223.03	32.65	19.87	52.52
Growth rate of 2017-18 over 2016-17(%)	**-0.90**	**3.04**	**2.47**	**4.45**	**7.34**	**4.06**	**2.36**	**6.65**	**3.94**

Note: For Natural gas, production and availibility is Net and for Crude Oil and Petroleum Products, the Gross availability is taken equivalent to Net.

* : Availability of natural gas is equal to indigenous net production (Gross production-Flared/Losses) + net imports

(P): Provisional

Source : Ministry of Petroleum & Natural Gas.

Download Table 5.3

Table 5.4 : Trends in Availability of Electricity in India from 2008-09 to 2017-18

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

Year	Gross Electricity Generated from Utilities	Consumption in Power Station Auxiliaries	Net Electricity Generated from Utilities	Purchases from Non-Utilities + Net Import from Other Countries	Net Electricity Available for Supply
1	2	3	4=2-3	5	6=4+5
2008-09	7,41,168	47,404	6,93,764	14,181	7,07,945
2009-10	7,99,851	50,723	7,49,128	14,391	7,63,519
2010-11	8,44,748	52,952	7,91,796	19,839	8,11,635
2011-12	9,22,451	56,499	8,65,952	15,514	8,81,466
2012-13	9,64,489	64,109	9,00,380	20,849	9,21,229
2013-14	10,26,649	70,161	9,56,488	17,948	9,74,436
2014-15	11,16,850	76,268	10,40,582	13,773	10,54,355
2015-16	11,67,584	79,302	10,88,282	15,947	11,04,228
2016-17	12,35,358	81,044	11,54,314	8,977	11,63,290
2017-18(P)	13,03,493	84,727	12,18,766	10,000	12,28,766
Growth rate of 2017-18 over 2016-17 (%)	**5.52**	**4.54**	**5.58**	**11.40**	**5.63**
CAGR 2008-09 to 2017-18(%)	**5.81**	**5.98**	**5.80**	**-3.43**	**5.67**

(P): Provisional

Source:Central Electricity Authority.

Download Table 5.4

CHAPTER 6: CONSUMPTION OF ENERGY RESOURCES

6.1 Consumption of Coal and Lignite

- The estimated total consumption of raw coal by industry has increased from 549.57MT during 2008-09 to 896.34 MT during 2017-18 with a CAGR of 5.01% The annual growth rate from 2016-17 to 2017-18 is 7.06% (Table 6.1).

- Consumption of Lignite increased from 31.85 MT in 2008-09 to 45.82 MT in 2017-18 registering a compound growth of 3.70% (Table 6.1).

- Consumption of Lignite in Electricity Generation sector is the highest, accounting for about 83.7% of the total lignite consumption (Table 6.5).

- The maximum consumption of raw coal is in Electricity generation, followed by steel industry. Industry-wise estimates of consumption of coal shows that during 2017-18, electricity generating units consumed 576.19 MT of coal, followed by steel & washery industries (58.50 MT), sponge iron industries (8.51 MT) and cement industries (7.70 MT) (Table 6.4).

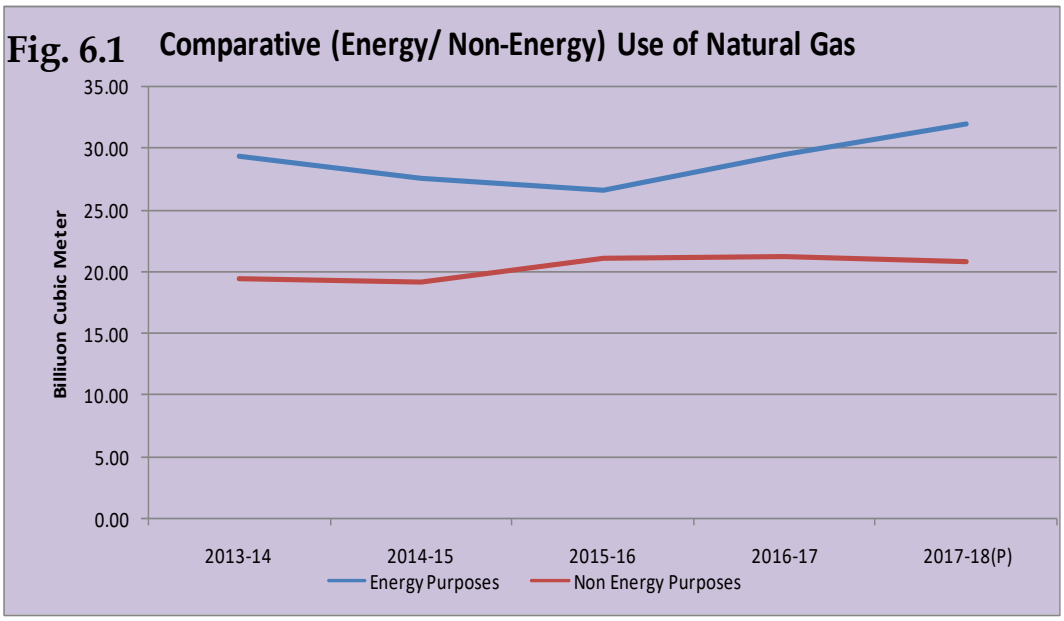
6.2 Consumption of Crude Oil and Natural Gas

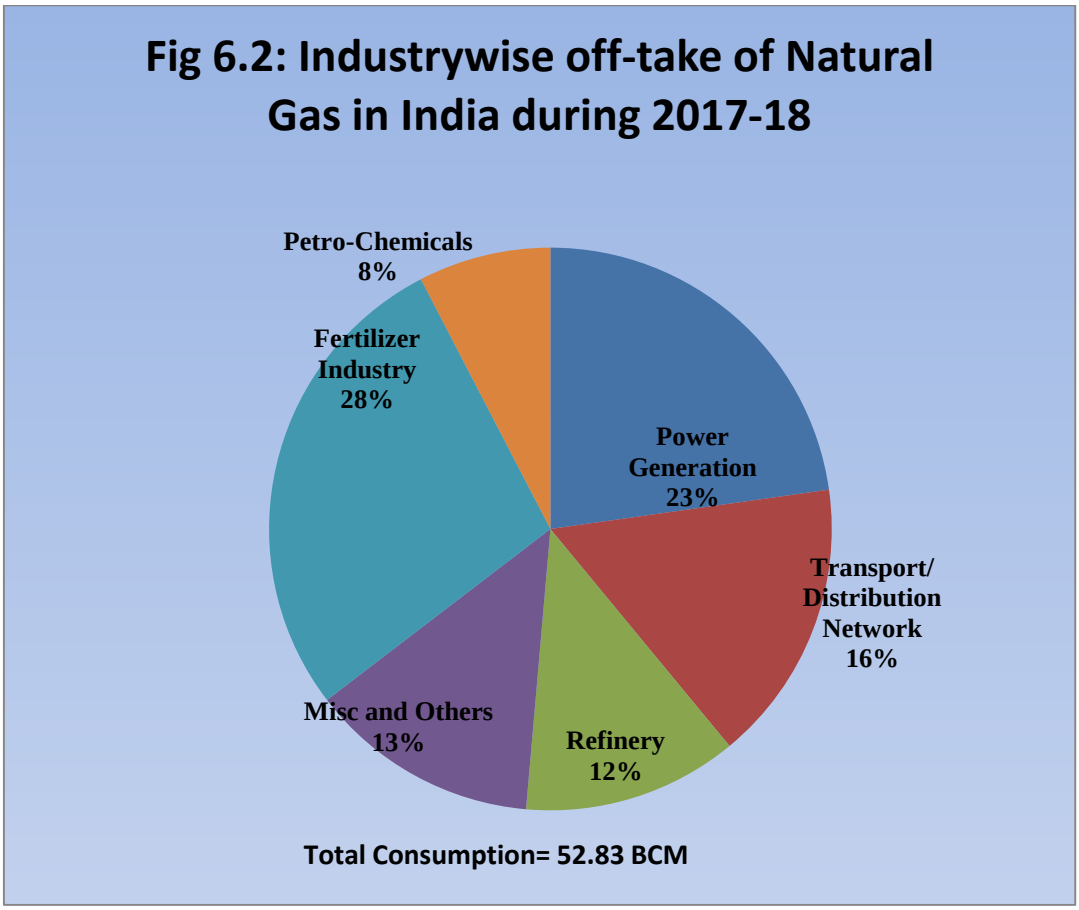
- The estimated consumption of crude oil has a steady increased from 160.77 MMT during 2008-09 to 251.93 MMT during 2017-18 with CAGR of 4.59%. It increased from 245.36MMT in 2016-17 to 251.93 MMT in 2017-18 registering a growth of 2.7% (Table 6.1).

- The maximum use of Natural Gas is in fertilizers industry (27.78%) followed by power generation (22.77%) and 16.25% natural gas was used for domestic fuel for transport sector. (Table 6.8).

- Industry wise off-take of natural gas shows that natural gas has been used both for Energy (60.68%) and Non-energy (39.32%) purposes (Table 6.8).

Fig. 6.1 Comparative (Energy/ Non-Energy) Use of Natural Gas

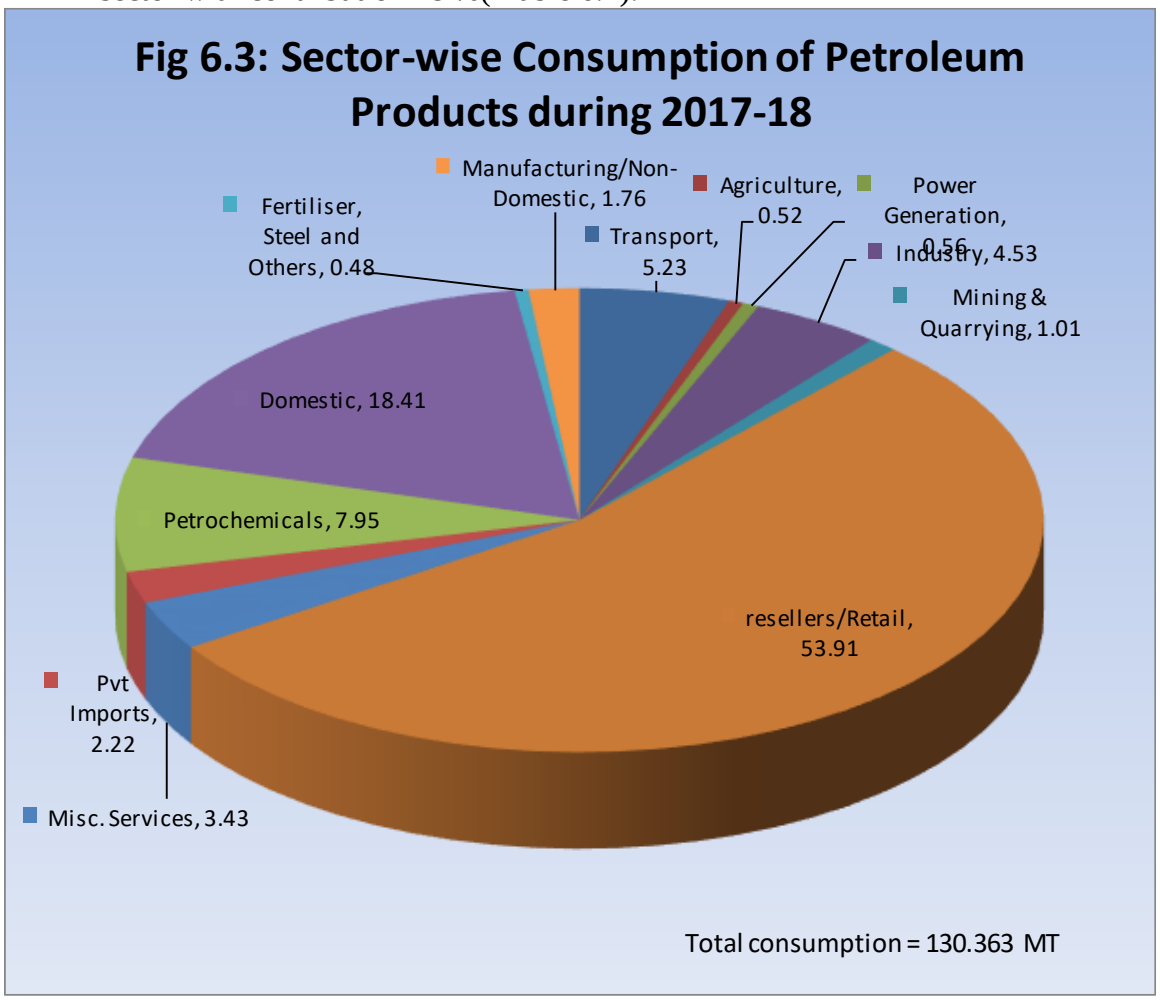




6.3 Consumption of Petroleum Products

- High speed diesel oil accounted for 39.3% of total consumption (Excluding refinery fuel and loses) of all types of petroleum products in 2017-18. This was followed by Petrol (12.7%), Pet Coke (12.4%) LPG (11.3%), Naphtha (6.1%) (Tables 6.6).

- Sector-wise consumption of different petroleum products reveals that Reseller/Retail contributes 54% in the total consumption followed by Domestic sector with contribution 18 %(Table 6.7).

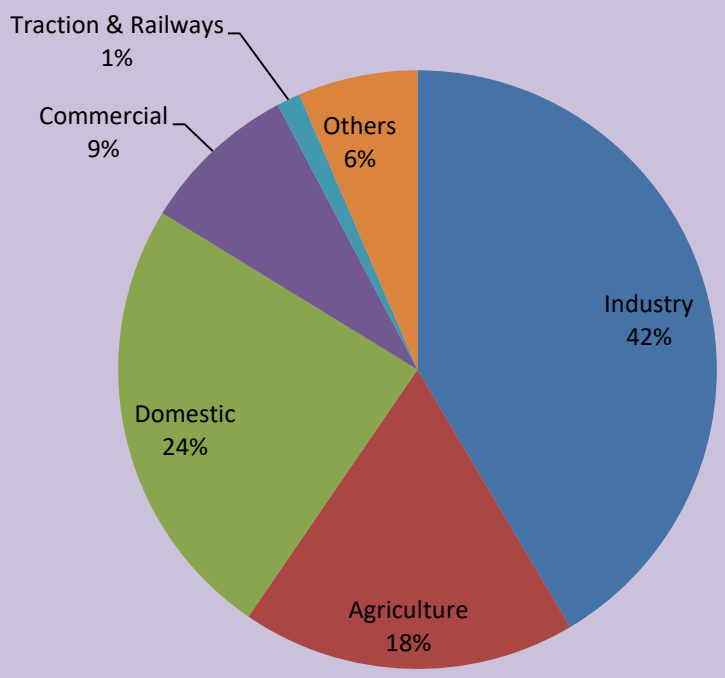


6.4 Consumption of Electricity

- The estimated electricity consumption increased from 553995 GWh during 2008-09 to 11,30,244GWh during 2017-18, showing a CAGR of 7.39%. The percentage increase in electricity consumption is 6.51% from 2016-17 (10, 61,183GWh) to 2017-18 (11, 30,244 GWh) (Table 6.9).

- Of the total consumption of electricity in 2017-18, industry sector accounted for the largest share (41.48%), followed by domestic (24.20%), agriculture (18.08%) and commercial sectors (8.51%).

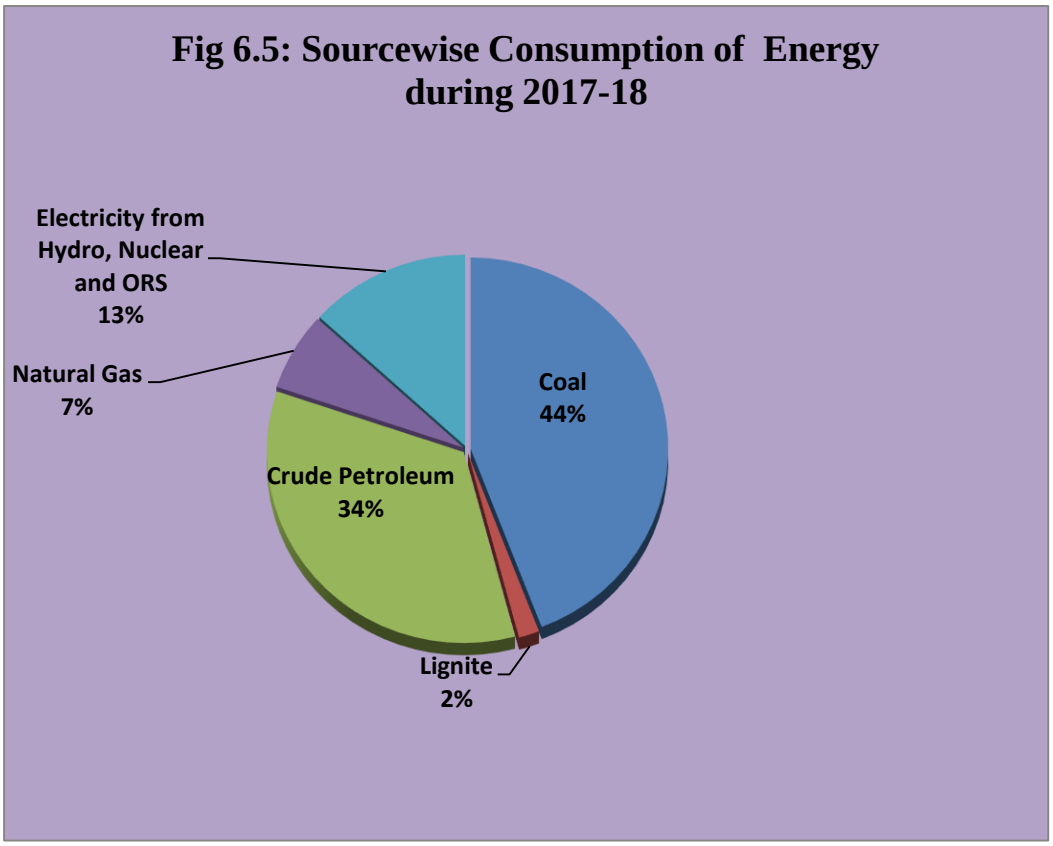
Fig 6.4: Consumption of Electricity by Sectors in India during 2017-18



Total consumption = 11,30,244 GWh

- The electricity consumption in industry sector and domestic sector has increased at a much faster pace compared to other sectors during 2008-09 to 2017-18 with CAGRs of 8.39% and 7.58% respectively (Table 6.9).

- Loss of electricity due to transmission has decreased from 25.47% during 2008-09 to 21.15% during 2017-18 (Table 6.10).



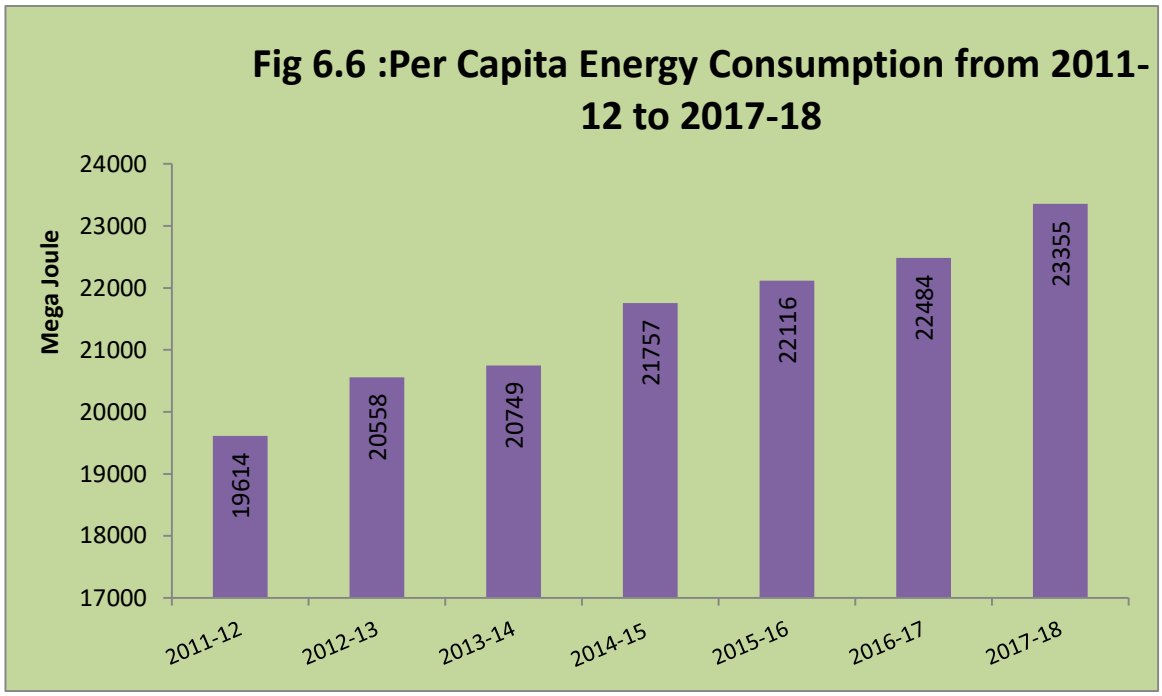
6.5 Per-Capita Energy Consumption & Energy Intensity

- The consumption of energy in petajoules in the form of Coal and Lignite was highest which accounted for about 44.1% of the total consumption during 2017-18. Crude Oil was second (34.32%), while Electricity (13.24%) was third. (Table 6.2)

- The total consumption of energy from conventional sources increased from 29,207 petajoules during 2016-17 to 30,735 petajoules during 2017-18, showing an increase of 5.23% (Table 6.2).

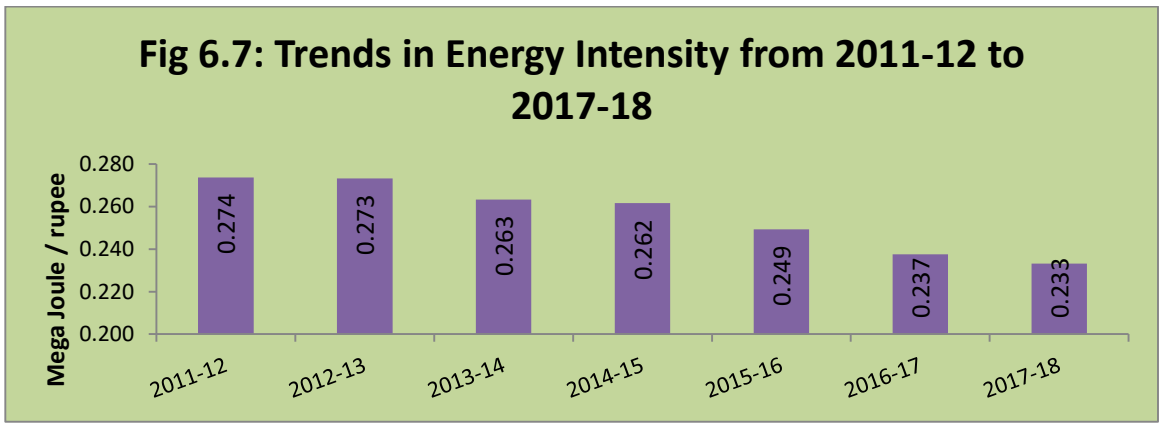
- Per-capita Energy Consumption (PEC) during a year is computed as the ratio of the estimate of total energy consumption during the year to the mid-year population of that year.

- Per-capita Energy Consumption (PEC) increased from 19,599 Megajoules in 2011-12 to 23,355 Megajoules in 2017-18, The annual increase in PEC for 2017-18 over 2016-17 was 3.87% (Table 6.3).



- 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 these two indicators are generally computed on the basis of consumption of conventional energy.



- The Energy Intensity (at 2011-12 prices) decreased from 0.274 Megajoules per rupee in 2011-12 to 0.233 Mega Joules in 2017-18 (Table 6.3).

- Energy intensity has decreased over the last decade. This decline may be attributed to faster growth of GDP than energy demand, the services sector having a growing share of the economy, use of energy efficiency programmes, etc.

Table 6.1: Trends in Consumption of Energy Sources in India

Year	Coal #	Lignite	Crude Oil** MMT	Natural Gas (Billion Cubic Metres)	Electricity (GWh)
	(Million Tonnes)				
1	2	3	4	5	6
2008-09	549.57	31.85	160.77	32.99	5,53,994.71
2009-10	585.30	34.41	186.55	48.34	6,12,644.99
2010-11	589.87	37.69	196.99	52.02	6,94,392.00
2011-12	642.64	41.89	204.12	60.68	7,85,194.00
2012-13	688.75	46.01	219.21	53.91	8,24,300.99
2013-14	724.18	43.90	222.50	48.99	8,74,208.57
2014-15	821.85	46.94	223.24	46.95	9,48,521.82
2015-16	836.73	42.21	232.86	47.85	10,01,190.68
2016-17	837.22	43.16	245.36	50.78	10,61,182.64
2017-18(p)	896.34	45.82	251.93	52.83	11,30,243.84
Growth rate of 2017-18 over 2016-17(%)	**7.06**	**6.17**	**2.68**	**4.05**	**6.51**
CAGR 2008-09 to 2017-18(%)	**5.01**	**3.70**	**4.59**	**4.82**	**7.39**

(p): Provisional

Data on electricity has been revised as per the inputs from CEA and hence may not match with the previous year data.

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

**Crude oil in terms of refinery crude throughput.

Does not include Lignite

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

Download Table 6.1

Table 6.2 Consumption of Energy Sources

(In Petajoules)

Year	Coal	Lignite	Crude Oil *	Natural Gas	Electricity #	Total
1	2	3	4	5	6	7
2008-09	8315	362	6732	1271	1994	18674
2009-10	8856	391	7811	1862	2206	21125
2010-11	8925	429	8248	2004	2500	22105
2011-12	9723	476	8547	2338	2827	23910
2012-13	10421	523	9178	2077	2967	25167
2013-14	10957	499	9316	1887	3147	25806
2014-15	12435	534	9347	1809	3415	27539
2015-16	12660	480	9750	1843	3604	28337
2016-17	12667	491	10273	1956	3820	29207
2017-18(P)	13562	521	10549	2035	4069	30735
% Distribution in 2017-18(P)	44.1	1.7	34.3	6.6	13.2	100.0
Growth rate in 2017-18 over 2016-17 (%)	**7.06**	**6.17**	**2.68**	**4.05**	**6.51**	**5.23**
CAGR 2008-09 to 2017-18(%)	**5.01**	**3.70**	**4.59**	**4.82**	**7.39**	**5.11**

*: Crude oil in terms of refinery crude throughput. (P): Provisional.

#: Include Hydro, Nuclear and other renewable sources electricity from utilities

Note: Here the value of energy in peta joules relates to the production value from Hydro and Nuclear only. Due to non availability of the data the consumption value is taken equivalent to production value

Sources:

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

Download Table 6.2

Table 6.3 : Per-Capita Energy Consumption (PEC) and Energy Intensity in India

Year	Energy Consumption in petajoules	Mid year population (in Million)	GDP at 2011-12 prices (Rs. crore)	Per Capita Energy Consumption (in Megajoules)	Energy Intensity (Megajoules per rupee)
2011-12	23910	1220	8736329	19599	0.2737
2012-13	25167	1235	9213017	20378	0.2732
2013-14	25806	1251	9801370	20629	0.2633
2014-15	27539	1267	10527674	21735	0.2616
2015-16	28337	1283	11369493	22087	0.2492
2016-17	29207	1299	12298327	22484	0.2375
2017-18 (P)	30735	1316	13179857	23355	0.2332
Growth rate of 2017-18 over 2016-17 (%)	**5.23**	**1.31**	**7.17**	**3.87**	**-1.81**
CAGR 2011-12 to 2017-18(%)	**3.65**	**1.09**	**6.05**	**2.54**	**-2.26**

(P): Provisional

* Estimated value based on sourcewise availability of Coal, Crude Oil, 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.

** GDP estimates are at base 2011-12 price as per the National Accounts Divisions data dated 31.01.2019

Mid year Polpulation has been taken from Statement 2 of Press Relaese dated 31.01.2019 of National Accounts Division, CSO

Download Table 6.3

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

(Million tonnes)

Year	Electricity	Steel & Washery	Cement	Paper	Textile	Sponge Iron	Fertilizers &chemicals	Brick	Others *	Total
1	2	3	4	5	6	7	8	9	10	11 = 2 to 10
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	437.67	47.86	26.36	2.03	0.26	21.69	2.82	0.13	69.36	608.17
2012-13	485.47	51.70	31.79	2.12	0.30	20.90	2.86	2.01	116.24	713.39
2013-14	493.25	53.05	32.46	1.91	0.36	18.49	2.64	4.01	133.19	739.34
2014-15	497.70	56.24	11.36	1.65	0.42	17.77	2.29	0.09	216.93	804.45
2015-16	517.77	56.83	8.99	1.21	0.27	7.76	2.74	0.07	241.09	836.73
2016-17	535.04	51.98	6.36	1.18	0.24	5.56	2.45	0.10	234.313	837.22
2017-18(P)	576.19	58.50	7.70	1.51	0.24	8.51	2.16	0.11	241.427	896.34
Distribution (%)	**64.28%**	**6.53%**	**0.86%**	**0.17%**	**0.03%**	**0.95%**	**0.24%**	**0.01%**	**26.93%**	**100.00%**
Growth rate of 2017-18 over 2016-17(%)	**7.69**	**12.54**	**21.11**	**27.86**	**-2.88**	**53.09**	**-11.73**	**15.15**	**3.04**	**7.06**
CAGR 2008-09 to 2017-18(%)	**4.33**	**13.44**	**-5.19**	**-3.51**	**-21.13**				**12.03**	**6.24**

(P): Provisional

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

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

Source : Office of the Coal Controller, Ministry of Coal

Download Table 6.4

Table 6.5 : Trends in Industrywise Consumption of Lignite in India

(Million tonnes)

Year	Electricity	Steel & Washery	Cement	Paper	Textile	Others *	Total
1	2	3	4	5	6	7	8=2 to 7
2008-09	25.71	-	0.34	0.36	-	6.01	32.42
2009-10	28.14	-	0.38	0.82	-	4.09	33.43
2010-11	29.90	-	0.36	0.84	1.18	6.25	38.53
2011-12	32.06	0.03	1.01	0.63	3.67	4.48	41.88
2012-13	37.20	0.05	1.10	0.69	0.30	3.81	43.15
2013-14	36.34	0.03	1.49	1.29	0.73	4.02	43.90
2014-15	39.47	0.02	1.27	0.65	2.89	2.65	46.95
2015-16	37.56	0.01	0.23	0.43	1.73	2.26	42.21
2016-17	38.82	0.04	0.29	0.53	1.29	2.19	43.16
2017-18(P)	38.34	0.21	1.42	0.83	2.46	2.55	45.82
Distribution (%)	**83.68%**	**0.46%**	**3.10%**	**1.81%**	**5.36%**	**5.57%**	**100.00%**
Growth rate of 2017-18 over 2016-17(%)	**-1.24**	**508.57**	**388.32**	**57.98**	**90.17**	**16.78**	**6.17**
CAGR 2008-09 to 2017-18(%)	**4.08**		**15.31**	**8.85**		**-8.20**	**3.52**

(P): Provisional

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

From 2008-09 onwards cotton is also included in others.

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

Download Table 6.5

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
2008-09	12.19	11.26	13.91	9.30	4.42	51.71	0.55
2009-10	13.14	12.82	10.13	9.30	4.63	56.24	0.46
2010-11	14.33	14.19	10.68	8.93	5.08	60.07	0.46
2011-12	15.35	14.99	11.22	8.23	5.54	64.75	0.41
2012-13	15.60	15.74	12.29	7.50	5.27	69.08	0.40
2013-14	16.29	17.13	11.31	7.16	5.50	68.36	0.39
2014-15	18.00	19.08	11.08	7.09	5.72	69.42	0.37
2015-16	19.62	21.85	13.27	6.83	6.26	74.65	0.41
2016-17	21.61	23.76	13.24	5.40	7.00	76.03	0.45
2017-18(P)	23.34	26.17	12.89	3.85	7.63	81.07	0.52
% Distribution in 2017-18(P)	**11.32**	**12.70**	**6.25**	**1.87**	**3.70**	**39.32**	**0.25**
Growth rate of 2017-18 over 2016-17(%)	**8.02**	**10.14**	**-2.65**	**-28.75**	**9.08**	**6.64**	**16.66**
CAGR 2008-09 to 2017-18 (%)	**6.71**	**8.80**	**-0.76**	**-8.46**	**5.61**	**4.60**	**-0.53**

(P) : Provisional

Download Table 6.6

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

(Million Tonnes)

Year	Heavy Ends				Others*	Total Consumption	Refinery Fuel and Losses	Total including Refinery Fuel and losses
	Fuel Oil	Lubricants	Bitumen	Petcoke				
	9	10	11	13	14	15=2 to 14	16	17
2008-09	12.59	2.00	4.75	6.17	4.75	133.60	12.36	145.96
2009-10	11.63	2.54	4.93	6.59	5.40	137.81	15.12	152.92
2010-11	10.79	2.43	4.54	4.98	4.57	141.04	16.38	157.42
2011-12	9.31	2.63	4.64	6.14	4.92	148.13	17.29	165.43
2012-13	7.66	3.20	4.68	10.13	5.51	157.06	18.35	175.40
2013-14	6.24	3.31	5.01	11.76	5.96	158.41	17.87	176.27
2014-15	5.96	3.31	5.07	14.56	5.87	165.52	17.67	183.19
2015-16	6.63	3.57	5.94	19.30	6.35	184.67	18.77	203.45
2016-17	7.15	3.47	5.94	23.96	6.59	194.60	20.07	214.67
2017-18(P)	6.72	3.88	6.09	25.66	8.34	206.17	21.16	227.33
% Distribution in 2017-18(P)	3.26	1.88	2.95	12.44	4.04	100.00	-	-
Growth rate of 2017-18 over 2016-17(%)	**-6.01**	**11.92**	**2.53**	**7.06**	**26.47**	**5.95**	**5.45**	**5.90**
CAGR 2008-09 to 2017-18 (%)	**-6.08**	**6.86**	**2.52**	**15.32**	**5.79**	**4.43**	**5.53**	**4.53**

(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 : Sectorwise (end use) Consumption of Selected Petroleum Products in India

('000 tonnes)

Petroleum Product	Year	Transport	Agriculture	Power Generation	Industry	Mining & Quarrying	Resellers/ Retail	Misc. Services	Pvt Imports	Total
1	2	3	4	5	6	7	8	9	10	11 =3 to10
High Speed Diesel Oil	2008-09	5293	490	336	1,310	1,025	**	43,195	62	51,710
	2009-10	5365	594	303	1,502	1,248	**	47,137	94	56,242
	2010-11	5417	616	166	1,440	1,366	48704	2,170	193	60,071
	2011-12	5529	684	168	1,649	1,181	53208	2,262	70	64,750
	2012-13	5160	617	214	1,628	1,073	58,021	2,319	47	69,080
	2013-14	3203	429	204	687	873	61,465	1,426	77	68,364
	2014-15	4617	575	197	794	998	60403	1748	83	69,416
	2015-16	5765	630	224	1096	1184	63772	1922	55	74,647
	2016-17	5658	607	208	1033	1224	65089	2162	46	76,027
	2017-18(P)	6015	609	211	1120	1243	69866	1928	82	81,073
Growth rate of 2017-18 over 2016-17(%)		**6.32**	**0.37**	**1.18**	**8.46**	**1.52**	**7.34**	**-10.82**	**78.22**	**6.64**
CAGR 2008-09 to 2017-18 (%)		**1.29**	**2.20**	**-4.56**	**-1.55**	**1.94**	**-**	**-26.72**	**2.96**	**4.60**

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

('000 tonnes)

Petroleum Product	Year	Transport	Agriculture	Power Generation	Industry	Mining & Quarrying	resellers/ Retail	Misc. Services	Pvt Imports	Total
1	2	3	4	5	6	7	8	9	10	11 =3 to10
Light Diesel Oil	2008-09	15	4	175	171	5	**	182	0	552
	2009-10	6	3	152	143	2	**	152	0	457
	2010-11	5	2	137	127	3	**	182	0	455
	2011-12	3	1	127	102	2	**	180	0	415
	2012-13	3	1	142	74	2	1	175	0	399
	2013-14	4	1	132	64	3	1	182	0	386
	2014-15	5	1	132	55	4	4	165	0	365
	2015-16	4	1	154	61	2	1	184	0	407
	2016-17	7	2	174	60	2	1	203	0	449
	2017-18(P)	8	9	143	145	7	2	210	0	524
Growth rate of 2017-18 over 2016-17(%)		**8.85**	**353.04**	**-18.22**	**143.60**	**186.91**	**128.65**	**3.79**	**-**	**16.66**
CAGR 2008-09 to 2017-18 (%)		**-6.31**	**7.94**	**-2.00**	**-1.67**	**2.72**	**-**	**1.46**	**-**	**-0.53**

Note: ** denotes that the data of Resellers / Retail are included in Miscellaneous services

Contd…

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

('000 tonnes)

Petroleum Product	Year	Transport	Agriculture	Power Generation	Industry	Mining & Quarrying	resellers/ Retail	Misc. Services	Pvt Imports	Total
1	2	3	4	5	6	7	8	9	10	11 =3 to10
Furnace Oil	2008-09	469	55	749	2,843	35	**	4,355	913	9,419
	2009-10	560	68	688	3,135	22	**	4,133	538	9,145
	2010-11	780	70	823	2,773	7	**	3,979	374	8,807
	2011-12	371	70	647	2,408	45	**	3,300	706	7,547
	2012-13	277	79	587	2,019	12	351	2,357	608	6,290
	2013-14	315	75	536	1,833	38	309	1,985	696	5,787
	2014-15	346	56	446	1,748	45	197	2,175	570	5,584
	2015-16	380	57	430	2,136	53	270	2,564	592	6,482
	2016-17	444	51	361	2,492	71	357	2,485	784	7,046
	2017-18(P)	613	47	306	2,299	62	319	2,227	732	6,605
Growth rate of 2017-18 over 2016-17(%)		**37.95**	**-8.03**	**-15.28**	**-7.75**	**35.67**	**32.23**	**-10.41**	**-6.61**	**-6.27**
CAGR 2008-09 to 2017-18 (%)		**2.72**	**-1.59**	**-8.57**	**-2.10**	**5.98**	**-**	**-6.49**	**-2.19**	**-3.49**

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

('000 tonnes)

Petroleum Product	Year	Transport	Agriculture	Power Generation	Industry	Mining & Quarrying	resellers/ Retail	Misc. Services	Pvt Imports	Total
1	2	3	4	5	6	7	8	9	10	11 =3 to10
Low Sulphur Heavy Stock	2008-09	-	1	1,347	1,294	0	0	526	0	3,169
	2009-10	-	2	936	1,225	0	0	320	0	2,484
	2010-11	-	0	469	1,031	0	0	482	0	1,982
	2011-12	-	0	399	1,067	1	0	292	0	1,759
	2012-13	-	0	439	778	0	0	149	0	1,366
	2013-14	-	0	328	76	0	0	44	0	449
	2014-15	-	0	226	104	0	0	47	0	377
	2015-16	-	0	51	70	0	0	29	0	150
	2016-17	-	0	16	51	0	0	37	0	104
	2017-18(P)	-	1	0	54	0	15	46	0	116
Growth rate of 2017-18 over 2016-17(%)		-	-	-	**5.70**	-	-	**25.00**	-	**11.56**
CAGR 2008-09 to 2017-18 (%)		-	**-0.19**	-	**-27.24**	-	-	**-21.61**	-	**-28.15**

Contd…

Table 6.7 (Contd.) : Sectorwise (end use) Consumption of Selected Petroleum Products in India

('000 tonnes)

Petroleum Product	Year	Transport	Agriculture	Power Generation	manufacturing/Non domestic	Domestic Distribution	Reseller/ Retail	Misc. Services	Private import	Total
1	2	3	4	5	6	7	8	9	10	11=3 to 10
Liquefied Petroleum Gas	2008-09	182	1	0	825	10637	**	136	409	12191
	2009-10	225	4	0	1014	11364	**	133	395	13135
	2010-11	224	2	0	1150	12369	**	156	430	14331
	2011-12	224	5	0	1255	13296	**	150	421	15350
	2012-13	215	4	0	1312	13568	59	45	398	15601
	2013-14	195	4	3	1208	14412	58	46	369	16294
	2014-15	165	6	3	1259	16040	45	53	429	18000
	2015-16	172	7	3	1666	17182	45	60	489	19623
	2016-17	168	8	2	1996	18871	67	67	429	21608
	2017-18(P)	185	7	1	2290	20352	73	67	367	23343
Growth rate of 2016-17 over 2015-16 (%)		**10.03**	**-3.82**	**-42.84**	**14.73**	**7.84**	**9.36**	**1.02**	**-14.54**	**8.03**
CAGR 2007-08 to 2016-17(%)		**0.16**	**18.81**	**-**	**10.74**	**6.70**	**-**	**-6.79**	**-1.08**	**6.71**

Table 6.7 (Contd.) : Sectorwise (end use) Consumption of Selected Petroleum Products in India

('000 tonnes)

Petroleum Product	Year	Fertiliser Sector	Petrochemicals	Power Sector	Steel Plants	Others	Private import	Total
1	2	3	4	5	6	7	8	9 =3 to 8
Naptha	2008-09	1803	5889	1147	71	694	4307	13911
	2009-10	844	6968	639	3	560	1121	10134
	2010-11	892	7500	419	0	155	1710	10676
	2011-12	962	8141	187	0	163	1768	11222
	2012-13	898	9412	342	0	203	1434	12289
	2013-14	516	9464	215	0	240	870	11305
	2014-15	301	9530	199	0	208	844	11082
	2015-16	316	10350	50	0	37	2517	13271
	2016-17	349	10351	60	0	58	2423	13241
	2017-18(P)	364	10362	67	0	389	1707	12889
Growth rate of 2017-18 over 2016-17(%)		**4.14**	**0.11**	**10.52**	**-**	**575.24**	**-29.53**	**-2.66**
CAGR 2008-09 to 2017-18 (%)		**-14.79**	**5.81**	**-24.78**	**-**	**-5.62**	**-8.84**	**-0.76**

Table 6.7 (Contd.) : Sectorwise (end use) Consumption of Selected Petroleum Products in India

Petroleum Product	Year	Domestic	Commercial/ Industry	Others	Total
1	2	3	4	5	6=3 to 5
SKO(Kerosene)	2008-09	9131	43	128	9303
	2009-10	9101	69	134	9304
	2010-11	8722	67	139	8928
	2011-12	8045	61	123	8229
	2012-13	7349	37	115	7502
	2013-14	7009	107	49	7165
	2014-15	6917	60	109	7087
	2015-16	6649	64	113	6826
	2016-17	5204	77	116	5397
	2017-18(P)	3644	86	115	3845
Growth rate of 2017-18 over 2016-17(%)		**-29.98**	**11.82**	**-0.72**	**-28.75**
CAGR 2008-09 to 2017-18 (%)		**-8.78**	**7.18**	**-1.11**	**-8.46**

Download Table 6.7

Table 6.8 INDUSTRYWISE OFF-TAKE OF NATURAL GAS IN INDIA

(Billion Cubic Metres)

Year	Energy Purpose							
	Power Generation	Industrial Fuel	Tea Plantation	Transport/ Distribution Network	Refinery	Internal consumption	Miscellaneous	Total
1	2	3	4	5	7	8	9	10
2008-09	12.60		0.15	6.01	-		3.42	22.19
2009-10	21.37	-	0.17	2.57	-		7.27	31.37
2010-11	25.79	-	0.19	3.43	-		7.55	36.95
2011-12	22.63	0.28	0.18	5.60	4.26	0.39	9.36	42.42
2012-13	16.08	0.27	0.18	5.78	3.89	0.39	8.25	34.56
2013-14	11.28	0.16	0.20	5.84	3.97	0.37	7.59	29.46
2014-15	10.72	0.39	0.18	5.42	4.58	0.35	6.08	27.72
2015-16	10.89	0.40	0.19	5.46	5.08	0.41	4.25	26.68
2016-17	11.62	0.69	0.18	7.35	5.37	0.47	3.86	29.53
2017-18(P)	12.03	0.87	0.19	8.58	6.53	0.50	3.36	32.06
Distribution (%)	**22.77**	**1.65**	**0.36**	**16.25**	**12.37**	**0.95**	**6.35**	**60.68**
Growth rate of 2017-18 over 2016-17 (%)	**3.55**	**26.86**	**2.85**	**16.80**	**21.56**	**6.38**	**-12.97**	**8.54**

Contd….

Note: includes Consumption of LNG in 2011-12 & onwards.

NA :Non Availability of data

Source: Ministry of Petroleum & Natural Gas

Table 6.8 (contd)

(Billion Cubic Metres)

Year	Non-Energy Purposes					Grand Total
	Fertilizer Industry	Petro-Chemicals	LPG Shrinkage	Sponge Iron	Total	
1	9	10	11	12	13=9 to 12	14
2008-09	9.08	1.11	-	-	-	22.19
2009-10	13.17	1.26	-	-	-	31.37
2010-11	11.46	1.31	-	-	-	36.95
2011-12	14.00	1.86	1.07	1.33	18.26	60.68
2012-13	14.73	2.49	1.03	1.11	19.35	53.91
2013-14	15.87	2.40	0.98	0.27	19.53	48.99
2014-15	15.19	2.89	1.01	0.15	19.24	46.95
2015-16	16.13	3.73	0.75	0.54	21.17	47.85
2016-17	15.43	4.17	0.76	0.89	21.24	50.78
2017-18(P)	14.68	4.02	0.80	1.28	20.78	52.83
Distribution (%)	**27.78**	**7.62**	**1.51**	**2.42**	**39.32**	**100.00**
Growth rate of 2017-18 over 2016-17 (%)	**-4.88**	**-3.50**	**5.06**	**44.40**	**-2.20**	**4.05**

Note: Includes of Consumption of LNG in 2011-12 & onwards.

NA :Non Availability of data

Source: Ministry of Petroleum & Natural Gas

Download Table 6.8

Table 6.9: Consumption of Electricity by Sectors in India

in Giga Watt Hour = 10^6 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
2008-09	2,09,474	1,09,610	1,31,720	54,189	11,425	37,577	5,53,995
2009-10	2,36,752	1,20,209	1,46,080	60,600	12,408	36,595	6,12,645
2010-11	2,72,589	1,31,967	1,69,326	67,289	14,003	39,218	6,94,392
2011-12	3,52,291	1,40,960	1,71,104	65,381	14,206	41,252	7,85,194
2012-13	3,65,989	1,47,462	1,83,700	72,794	14,100	40,256	8,24,301
2013-14	3,84,418	1,52,744	1,99,842	74,247	15,540	47,418	8,74,209
2014-15	4,18,346	1,68,913	2,17,405	78,391	16,177	49,289	9,48,522
2015-16	4,23,523	1,73,185	2,38,876	86,037	16,594	62,976	10,01,191
2016-17	4,40,206	1,91,151	2,55,826	89,825	15,683	68,493	10,61,183
2017-18(P)	4,68,825	2,04,293	2,73,550	96,141	14,356	73,079	11,30,244
Distribution (%)	**41.48**	**18.08**	**24.20**	**8.51**	**1.27**	**6.47**	**100.00**
Growth rate of 2017-18 over 2016-17 (%)	**6.50**	**6.88**	**6.93**	**7.03**	**-8.46**	**6.70**	**6.51**
CAGR 2008-09 to 2017-18(%)	**8.39**	**6.42**	**7.58**	**5.90**	**2.31**	**6.88**	**7.39**

(P): Provisional

Source : Central Electricity Authority.

Download Table 6.9

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

in Giga Watt hour =10^6 Kilo Watt hour

Year	Net Electricity Generated from Utilities	Purchases from Non-Utilities + Net Import from Other Countries	Net Electricity Available for Supply	Sold to Ultimate Consumers & Other Countries	Loss in transmission & distribution	Loss in transmission & distribution (%)
1	2	3	4=2+3	5	6=4-5	7
2008-09	6,93,764	14,181	7,07,945	5,27,623	1,80,322	25.47
2009-10	7,49,128	14,391	7,63,519	5,69,723	1,93,796	25.38
2010-11	7,91,796	19,839	8,11,635	6,17,098	1,94,537	23.97
2011-12	8,65,952	15,514	8,81,466	6,73,068	2,08,398	23.64
2012-13	9,00,380	20,849	9,21,229	7,08,997	2,12,232	23.04
2013-14	9,56,488	17,948	9,74,436	7,51,908	2,22,528	22.84
2014-15	10,40,582	13,773	10,54,355	8,14,250	2,40,105	22.77
2015-16	10,88,282	15,947	11,04,228	8,63,364	2,40,864	21.81
2016-17	11,54,314	8,977	11,63,290	9,14,093	2,49,197	21.42
2017-18(P)	12,18,766	10,000	12,28,766	9,68,938	2,59,827	21.15
Growth rate of 2017-18 over 2016-17 (%)	**5.58**	**11.40**	**5.63**	**6.00**	**4.27**	**-1.29**
CAGR 2008-09 to 2017-18(%)	**5.80**	**-3.43**	**5.67**	**6.27**	**3.72**	**-1.84**

(P): Provisional

Source : Central Electricity Authority.

Download Table 6.10

CHAPTER 7: 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 the commodity remains homogeneous at each point in the balance.

- International Recommendations on Energy Statistics (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.

- **Energy Balance:** An energy balance is a framework to complete data on all energy products entering, existing and used within a given country during a reference period (e.g. a year). It expresses all data in common energy units, which makes it possible to define a "total" product.

- The purpose of compiling an energy balance starting from the various commodity balances are numerous; they are to:

    - Provide a comprehensive overview of the energy profile of a country, to monitor energy security, energy markets, relevant policy goals and to formulate adequate energy policies;
    - Provide the basis for aggregate socio-economic indicators, as well as for estimates of CO_2 emissions;
    - Compare data of different reference periods and different countries;
    - Provide a tool to ensure completeness, consistency and comparability of basic statistics;
    - Calculate efficiencies of transformation processes, as well as relative shares of different sectors or products in the country's total supply or consumption

- An energy balance generally takes the form of a matrix of products and flows, with varying levels of disaggregation, although graphical formats also exist (e.g. sankey diagram).

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

- Within a balance, the total final consumption is disaggregated into sectors, like industry, transport, residential, services and others. However, the level of disaggregation of such energy data is not enough to monitor energy efficiency, as no information is available, for example on the residential or services end uses, nor on the transport vehicle types or segments. The energy balance will therefore be useful to assess the largest consuming sectors within a country where the energy saving potential will have more impact, before starting more detailed collection programmes on data for energy efficiency indicators.

7.2 Methodology used for Energy Balance

- **Energy (in KToe) = Quantity of Commodity * Conversion factor**

- **1Toe = 41868 MJ**

- **Conversion factor =** $\dfrac{\text{Net Calorific Value (NCV)}}{\text{Mega joules per ton of oil equivalent}}$ where NCV is in kj per kg

- **Net Calorific Value(NCV) =** Gross calorific value (GCV) – (% Moisture Content) [1NCV = 0.9 GCV]
  - The difference between net and gross calorific values are typically about 5% to 6% of the gross value of solid and liquid fuels and about 10% for Natural gas.
  - Net Calorific Values are, as recommended by IEA for all commodities.

7.3 Highlights of Energy Balance:

- In 2017-18, Primary Energy Supply added up to 8,37,370 Kilo Tonne of Oil equivalent (ktoe). The share of Coal accounted for 62.92% and the contribution of Crude Oil was 31.26%. (Table 7.2).

- In 2017-18, National Energy Consumption was 5,53,904 ktoe. The industrial sector used 55.51 % of the total final energy consumption (table 7.2).

- Within the industry sector, the most energy intensive industries were iron and steel, which accounted for 15.05 % of the industrial energy use followed by Chemicals and petrochemicals 4.54 % and construction 2.12 % (Table 7.2).

- The transport sector accounted for 9.44% of Total Final Consumption. The consumption of the residential, commercial and public sectors represented 31.59%. (Table 7.2).

- Efforts are being made to reduce the statistical difference, by incorporating more data.

7.3 Sankey Diagram (2017-18):

- The concept of data visualization in the digital age has revived interest in a style of chart called a Sankey diagram. This style of diagram makes it easy to see the dominant flows within a system and highlights where losses occur.

- The Sankey diagram is very useful tool to represent an entire input and output energy flow in energy system after carrying out energy balance calculation. The thicker the line, the greater the amount of energy involved.

- The data of Energy Balance (Table 7.2) is used to construct the Sankey diagram, in which flows of energy are traced from energy sources to end-use consumption. The resulting diagram provides a convenient and clear snapshot of existing energy transformations in India which can usefully be compared with a similar global analysis. It gives a basis for examining and communicating future energy scenarios.

Table 7.1 : Energy Commodity Balance for the year 2017-18(P)

Supply	Coal	Lignite	LPG	Naphtha	Kerosene	Diesel	Fuel Oil	Lubricants	Bitumin	Petrol/Motor Spirit	Other Petroleum Products*	Natural Gas	Electricity
	(000 tonnes)											(MMSCM)	(GWh)
Production	675400	46255	12380	20006	4408	108466	9486	1036	5277	37784	55562	32649	1303493
From Other Sources													183000
Imports	208273	10	11382	2150		1353	1273	2434	869	174	16257	19870	5611
Exports	-1503	-4	-359	-8951	-17	-29676	-2492	-13	-64	-14035	-11150		-7203
Stock changes	-15905	327											
Domestic Supply	**866265**	**46588**	**23403**	**13205**	**4391**	**80143**	**8267**	**3457**	**6082**	**23923**	**60669**	**52519**	**1484901**
Transfer													
Statistical difference	30075	-27	2251	-316	-546	1454	-1507	427	4	2251	-19041	9572	-10103
Transformation	**576190**	**38342**		**67**		**354**	**306**					**12028**	**84727**
Electricity plants	**576190**	**38342**		**67**		**354**	**306**					**12028**	**84727**
Energy industry own use												**9889**	
Coal mines													
Petroleum refineries												6533	
Other energy sector												3356	
Distribution losses													259827
Final Consumption	**320150**	**8219**	**23340**	**12822**	**3845**	**81243**	**6454**	**3884**	**6086**	**26174**	**41628**	**30919**	**1130244**
Industry Sector	**320150**	**8219**	**2290**	**12822**		**2513**	**2415**				**33995**	**873**	**468825**
Iron and steel	67005	213				199	939						
Chemical and petroleum	2160	447		10726		142	753						
Non-ferrous metals						48	223						
Machinery						147	12						
Mining & Quarrying						1249	62						
Paper, pulp and print	1510	831											
Construction	7812	1721				630	207						
Textile and leather	236	2457				33	46						
Non-specified	241427	2550	2290	2096		65	173				33995	873	468825
Transport Sector			**185**			**6023**	**613**			**26174**	**7633**	**496**	**14356**
Road			185			2731	21			26174			
Domestic Aviation						3							
Rail						2638							14356
Pipeline transport												496	
Domestic navigation						651	592				7633		
Non-specified													
Other Sectors			**20865**		**3845**	**72707**	**3426**	**3884**	**6086**		**0**	**8774**	**647063**
Residential			20352		3644							8585	273550
Comm. And public services					86								96141
Agriculture/forestry			7			618	48					189	204293
Non-specified			506		115	72089	3378	3884	6086				73079
Non-Energy Use												**20776**	

(P): Provisional

Statistical Difference is defined as final consumption + use for transformation processes and consumption by energy industry own use + losses - domestic supply

Final consumption = Total Consumption in Transport + Total Industrial Consumption+Consumption by Other sectors+Non energy Use

* Incluse ATF, LDO, Pet Coke, Paraffin waxes, petroleum jelly, LSWR, MTBE and reformate, BGO, Benzene, MTO, CBFS and Sulfur etc.

Download Table 7.1

Table 7.2:Energy Balance of India for 2017-18 (P)

All figures in KToe

	Coal	Crude Oil	Oil Products	Natural Gas	Nuclear	Hydro	Solar, Wind, Others	Electricity	Total
Production	4,02,271.15	36,468.97	-	30,032.71	9,993.20	10,859.31	8,969.80	-	4,98,595.13
Imports	1,34,756.92	2,25,282.02	34,232.99	24,355.62	-	-	-	482.55	4,19,110.10
Exports	-1,013.25	-	-69,552.72	-	-	-	-	-619.46	-71,185.43
Stock changes	-9,150.18	-	-	-	-	-	-	-	-9,150.18
Total primary energy supply	**5,26,864.64**	**2,61,750.99**	**-35,319.73**	**54,388.32**	**9,993.20**	**10,859.31**	**8,969.80**	**-136.91**	**8,37,369.62**
Statistical differences	87,477.08	17,354.54	-15,913.85	396.96	-	-	-0.00	-868.86	88,445.87
Main activity producer electricity plants	-3,96,832.20	-	-733.06	-11,064.32	-9,993.20	-10,846.58	-8,758.15	1,12,100.40	-3,26,127.12
Autoproducer electricity plants	-	-	-	-	-	-12.73	-211.65	15,738.00	15,513.63
Oil refineries	-	-2,57,476.99	2,59,636.19	-6,009.55	-	-	-	-	-3,850.35
Energy industry own use	-	-		-6,100.31	-	-	-	-7,286.52	-13,386.84
Losses	-	-21,628.54		-86.71	-	-	-	-22,345.12	-44,060.37
Final consumption	**2,17,509.52**	**-**	**2,07,669.55**	**31,524.39**	**-**	**-**	**-**	**97,200.98**	**5,53,904.45**
Industry	**2,17,509.52**	**-**	**48,861.83**	**803.04**	**-**	**-**	**-**	**40,318.95**	**3,07,493.33**
Iron and steel	45,179.48	-	1,107.40	-	-	-	-	-	46,286.87
Chemical and petrochemical	1,556.78	-	12,398.23	-	-	-	-	-	13,955.01
Non-ferrous metals	-	-	263.76	-	-	-	-	-	263.76
Machinery	-	-	163.55	-	-	-	-	-	163.55
Mining and quarrying	-	-	1,351.25	-	-	-	-	-	1,351.25
Paper, pulp and print	1,206.52	-	-	-	-	-	-	-	1,206.52
Construction	5,654.13	-	850.30	-	-	-	-	-	6,504.43
Textile and leather	719.16	-	78.30	-	-	-	-	-	797.45
Non-specified (industry)	1,63,193.46	-	32,649.04	803.04	-	-	-	40,318.95	2,36,964.49
Transport	**-**	**-**	**43,164.61**	**7,897.31**	**-**	**-**	**-**	**1,234.62**	**52,296.54**
Road	-	-	31,060.53	-	-	-	-	-	31,060.53
Domestic aviation	-	-	8,134.18	-	-	-	-	-	8,134.18
Rail	-	-	2,728.23	-	-	-	-	1,234.62	3,962.84
Pipeline transport	-	-	-	7,897.31	-	-	-	-	7,897.31
Domestic navigation	-	-	1,241.68	-	-	-	-	-	1,241.68
Non-specified (transport)	-	-	-	-	-	-	-	-	-
Other	**-**	**-**	**1,15,643.11**	**3,713.39**	**-**	**-**	**-**	**55,647.42**	**1,75,003.92**
Residential	-	-	26,804.64		-	-	-	23,525.30	50,329.94
Commercial and public services	-	-	89.97	-	-	-	-	8,268.13	8,358.09
Agriculture/forestry	-	-	693.13	173.44	-	-	-	17,569.20	18,435.77
Non-specified (other)	-	-	88,055.37	3,539.95	-	-	-	6,284.79	97,880.11
Non-energy use	**-**	**-**	**-**	**19,110.66**	**-**	**-**	**-**	**-**	**19,110.66**
Non-energy use industry/transformation/energy				**1,175.59**					**1,175.59**
Non-energy use in transport				**733.93**					**733.93**
Non-energy use in other	-	-	-	17,201.15	-	-	-	-	17,201.15
Elect. output in GWh	**-**	**-**	**-**	**-**	**38,346.00**	**1,26,271.00**	**1,04,300.00**	**-**	**2,68,917.00**
Elec output-main activity producer ele plants	-	-	-	-	38,346.00	1,26,123.00	1,01,839.00	-	2,66,308.00
Elec output-autoproducer electricity plants	-	-	-	-	-	148.00	2,461.00	-	2,609.00

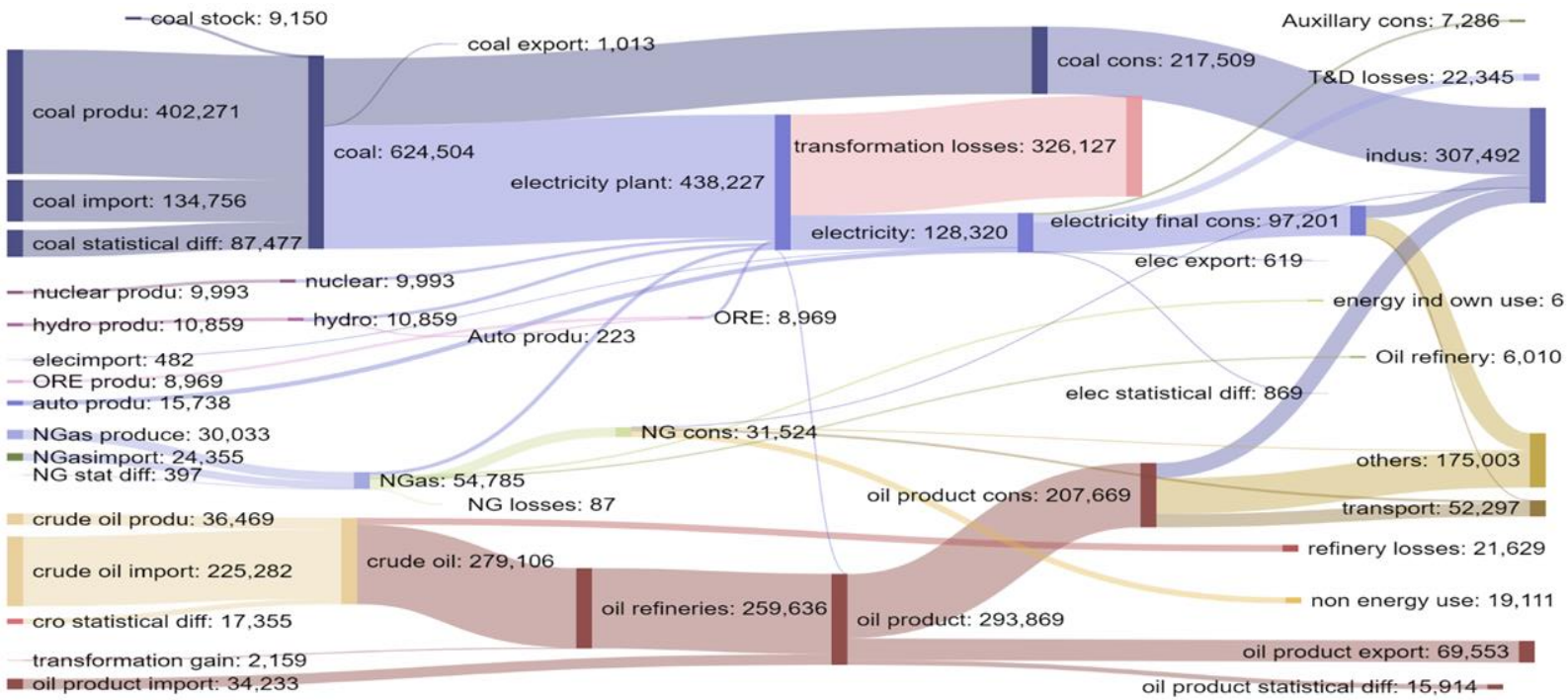
*** Final consumption refers to End Use Consumption**

P: Provisional

Download Table 7.2

SANKEY DIAGRAM (INDIA)
BALANCE (2017-18)
KILO TONNE OF OIL EQUIVALENT

Total supply =837370 **Total Final Consumption =553904**



Coal cons -Coal Final Consumption
NGas -Natural Gas
St diff -Statistical Difference
produ - production
Cons -Consumption
T&D -Transmission & distribution

Indus -Industries
SW-Solar & Wind
pp-pulp

Source programe for diagram: Sankey MATIC

SANKEY DIAGRAM (INDIA)
FINAL CONUMPTION(2017-18)
KILO TONNE OF OIL EQUIVALENT

Total Consumption =553904

Consumption by Subsector

Chem$petro- chemical and petroleum
constr -construction
trans- transport
produ - production
Cons -Consumption

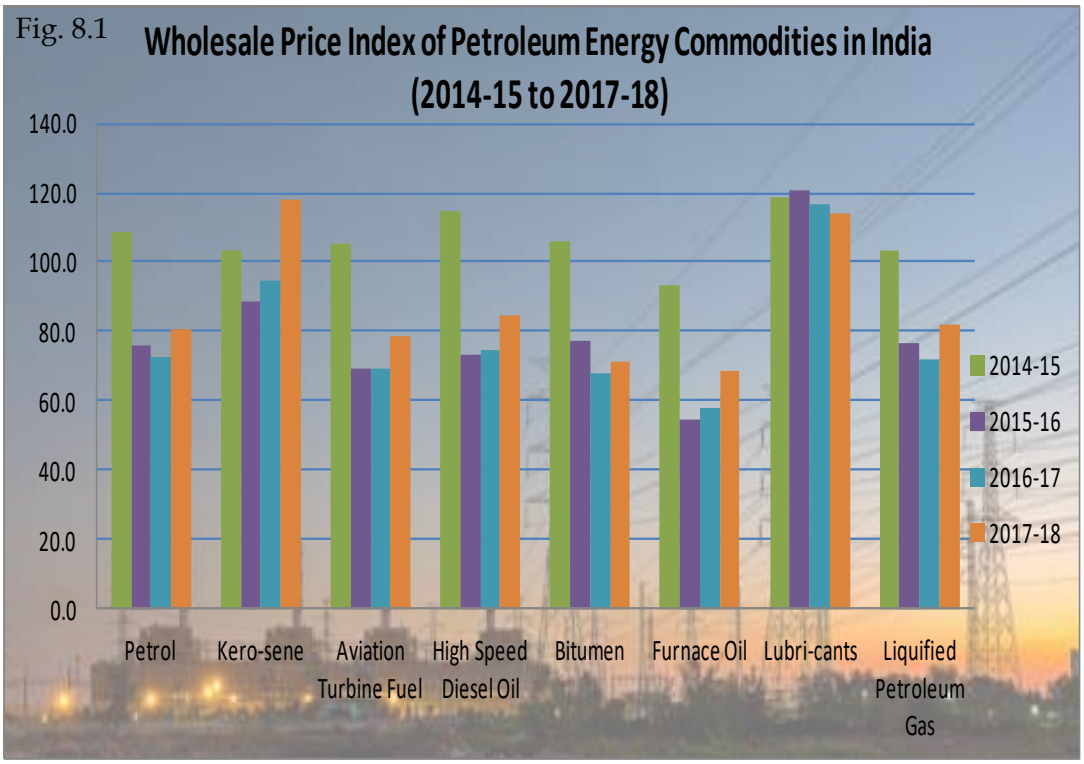
Indus -Industries
SW-Solar & Wind
pp-pulp
spec-specific

CHAPTER 8: WHOLESALE PRICE INDEX OF ENERGY COMMODITIES

8.1 The Wholesale Price Index of Petroleum Products

- Annual increase (2017-18 over 2016-17) in Wholesale Price Index of Petroleum Products varied for different products ranging from 24.92% (Kerosene), 18.42% (Furnace Oil), 13.56% (Aviation Turbine Fuel), 13.44% (High Speed Diesel Oil), 10.91% (Petrol), 4.85% (Bitumen) and -2.4% (Lubricants) (Table 8.1).

Fig. 8.1



8.2 The Wholesale Price Index of Non-Petroleum Products

- The wholesale price index for Petroleum Coke was 117.2 for 2017-18 which registered a maximum growth of 26.02% in comparison with its value in 2016-17 followed by 23.94% (Coking coal) and 15.52% (Lignite) among other non-petroleum products.

- Wholesale price index of electricity recorded a decrease of -0.48% during 2017-18 over 2016-17.

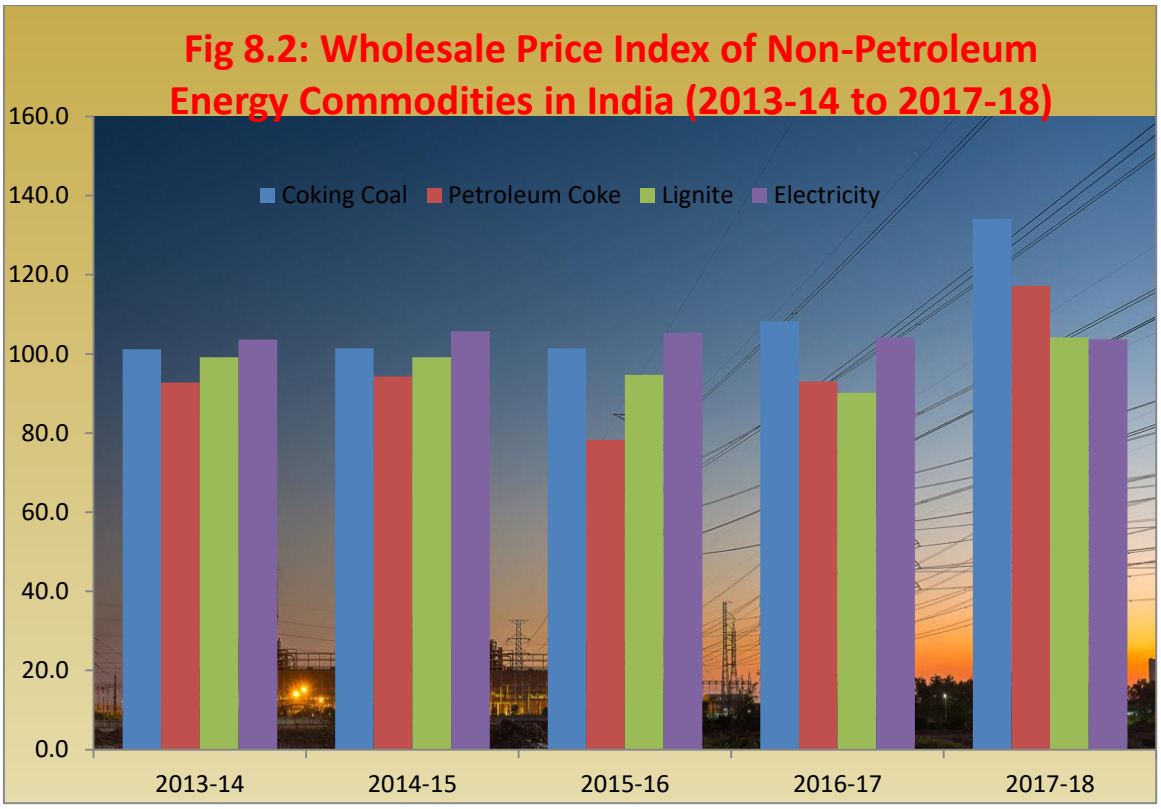


Table 8.1 : Wholesale Price Indices of Energy Commodities in India

(2011-12=100)

	Petroleum Products								Non-Petroleum Products			
Year	Petrol	Kero-sene	Aviation Turbine Fuel	High Speed Diesel Oil	Bitumen	Furnace Oil	Lubri-cants	Liquified Petroleum Gas	Coking Coal	Petroleum Coke	Lignite	Electricity
1	2	3	4	5	6	7	8	9	10	11	12	13
2012-13	114.9	107.1	112.6	111.6	101.3	107.7	109.6	107.8	100.0	99.4	98.9	100.5
2013-14	124.6	109.3	119.7	126.3	112.1	111.5	114.2	118.6	101.2	92.8	99.2	103.6
2014-15	108.6	103.5	105.1	114.8	106.1	93.6	118.8	103.5	101.4	94.3	99.2	105.7
2015-16	75.7	88.4	69.5	73.4	77.1	54.3	120.8	76.7	101.4	78.3	94.7	105.3
2016-17	72.4	94.3	69.3	74.4	68.0	58.1	116.8	72.0	108.2	93.0	90.2	104.2
2017-18	80.3	117.8	78.7	84.4	71.3	68.8	114.0	82.2	134.1	117.2	104.2	103.7
Increase in 2017-18 over 2016-17 (%)	**10.91**	**24.92**	**13.56**	**13.44**	**4.85**	**18.42**	**-2.40**	**14.17**	**23.94**	**26.02**	**15.52**	**-0.48**

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

Download Table 8.1

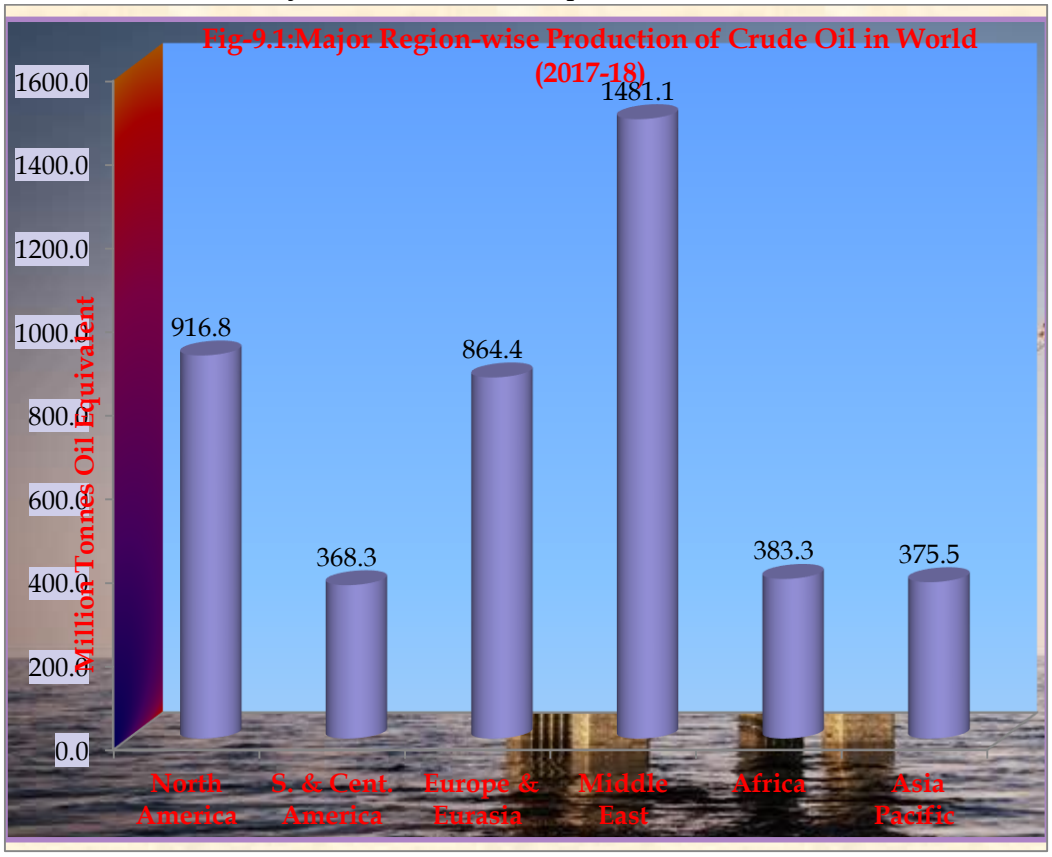
CHAPTER 9: WORLD PRODUCTION AND CONSUMPTION OF CRUDE OIL & NATURAL GAS

9.1 Production and consumption of crude oil

- The total estimated production of crude oil in the world has increased from about 4002.3 MT in 2008-09 to about 4127.0 MT during 2013-14, and further increased to 4389.4MT during 2017-18. The production increase by 0.24 percentage from 2016-17 to 2017-18 (Table 9.1).

- Geographical distribution of total world production during 2017-18 across major regions reveals that Middle East accounted for the highest share (33.74%), followed by North America (20.88%), Europe & Eurasia (19.69%), Africa (8.73%) Asia Pacific (8.55%), and South & Central America (8.39%). (Table 9.1)

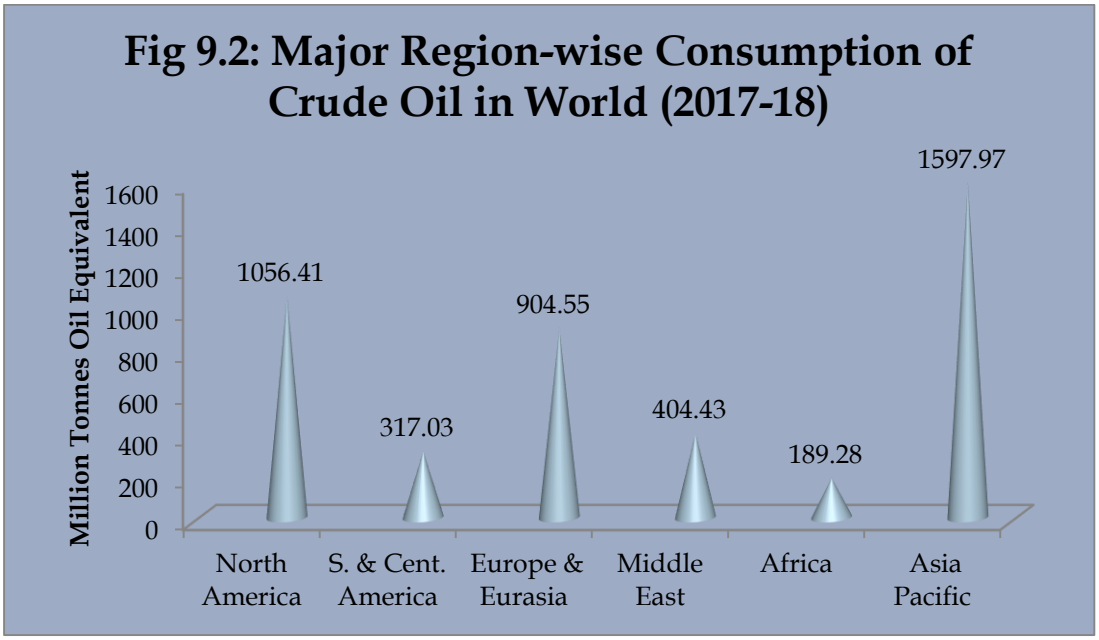
- Distribution of total world production according to countries shows that USA and Saudi Arabia were the first and second highest producers with 13.01% and 12.80% respectively. They were followed by Russian Federation (12.63%), Canada (5.38%), Iran (5.33%), Iraq (5.05%), China (4.36%), UAE(4.02%), Brazil (3.35%), Kuwait (3.33%), Mexico (2.49%) Venezuela (2.47%), and Nigeria (2.17%) . India has accounted for only 0.92% of the world production.



- Region-wise consumption (Table 9.2) shows that Asia Pacific accounted for the highest share (35.75%) of total world consumption, followed by North America (23.64%), and Europe & Eurasia (20.24%). African countries accounted for the lowest share in the world consumption (4.23%).

- Country-wise distribution of consumption reveals that the United States was the largest consumer of crude oil, consuming 19.47% of the world consumption during 2017-18. China was the second largest consumer (13.32%), followed by **India (4.96%)**, Japan (4.06%), Saudi Arabia (3.71%) and Russian federation (3.31%).

- India was the third largest consumer of crude oil in the world and the second largest crude oil consumer in the Asia-Pacific region after China.



9.2 Production and Consumption of Natural Gas

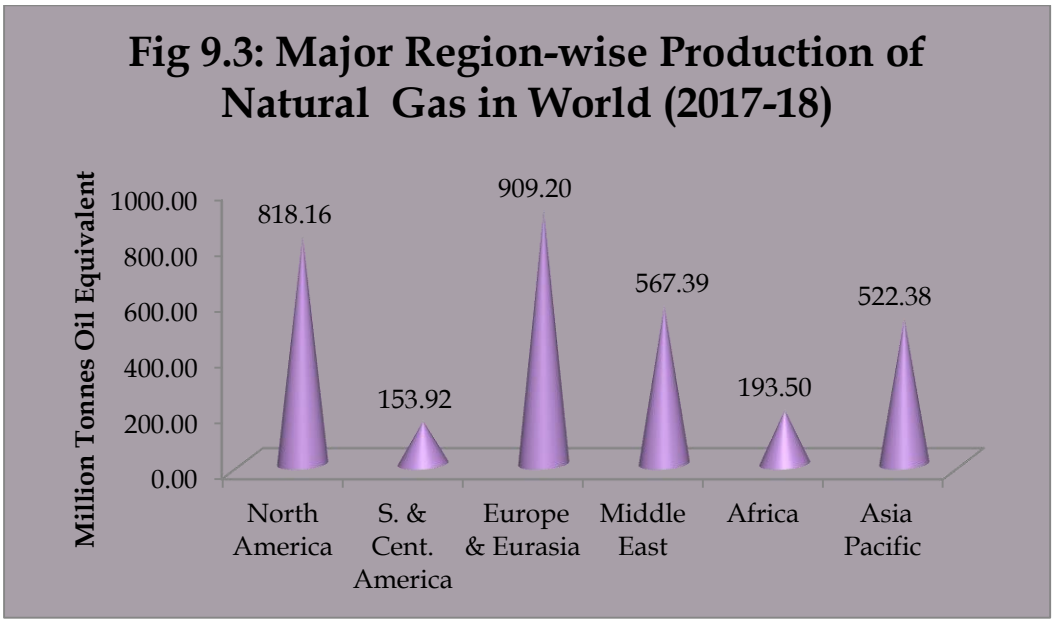
- The total world production of Natural Gas increased from2618.6 Million Tonne oil equivalent (Mtoe) in 2008-09 to 3164.5 Mtoe in 2017-18. The production has increased by 3.7% from 2016-17 to 2017-18 (Table 9.3).

- Distribution of production of natural gas over major regions shows that Europe & Eurasia (28.73%) and North America (25.85%) are the highest and the second highest producers, together accounting for 54.58% of the total world production.

- Country-wise, USA was the largest producer of natural gas (19.96%) in the world during 2017-18, followed by the Russian Federation (17.27%), Iran (6.08%) and Canada (4.79%). India's share in the total world production of natural gas during 2017-18 was only 0.77% (24.5 Mtoe) (Table 9.3)

- The growth in production of natural gas from 2016-17 to 2017-18 was the highest in Africa (8.7%), Europe & Eurasia (4.9%), Asia pacific (4.7%), followed by Middle East (4.6%), North America (0.7%) and South & Central America (0.1%). (Table 9.3)

- The total world consumption of natural gas has increased from 2607.2 Mtoe in 2008-09 to 3156.0 Mtoe in 2017-18 (Table 9.4).



- Country-wise distribution of consumption of natural gas indicates that USA was the largest consumer (20.15%), followed by Russian federation (11.57%), China (6.55%) and Iran (5.84%) respectively. India with a consumption of 46.6Mtoe accounted for only 1.48% of total world consumption (Table 9.4).

- Consumption of natural gas over major regions shows that North America (25.7%) Asia Pacific (20.97%) and Commonwealth Independent States (CIS) (15.66%) followed by Europe & Eurasia (14.49%) combining together accounting for 66.33% of the total world consumption (Table 9.4).

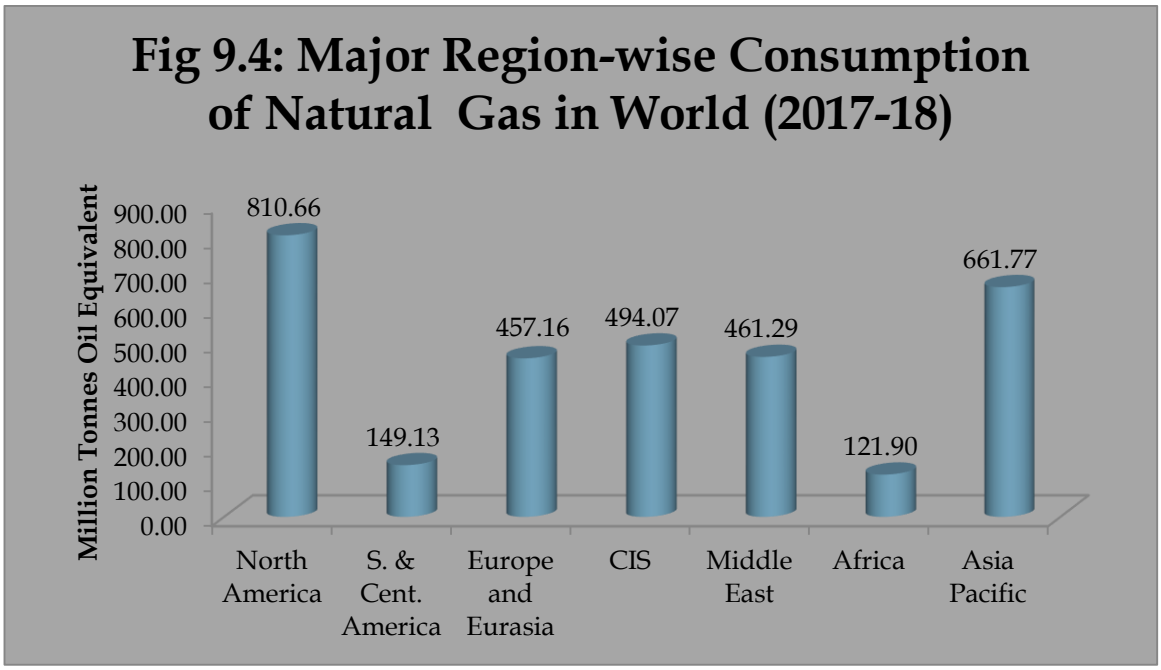


Fig 9.4: Major Region-wise Consumption of Natural Gas in World (2017-18)
Million Tonnes Oil Equivalent
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
810.66
149.13
457.16
494.07
461.29
121.90
661.77
North America
S. & Cent. America
Europe and Eurasia
CIS
Middle East
Africa
Asia Pacific

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

(Million tonnes)

Country/ Region	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over	2017-18 % Share of World's Total
North America												
US	302.3	322.4	332.7	344.8	393.8	447.0	522.5	565.3	543.1	571.0	5.1	13.01
Canada	152.9	152.8	160.3	169.8	182.6	195.1	209.4	215.6	218.6	236.3	8.1	5.38
Mexico	156.9	146.7	145.6	144.5	143.9	141.8	137.1	127.5	121.4	109.5	-9.8	2.49
Total North America	**612.0**	**621.9**	**638.6**	**659.1**	**720.3**	**783.9**	**869.0**	**908.4**	**883.0**	**916.8**	**3.8**	**20.9**
South and Central America												
Argentina	37.9	34.1	33.3	31.2	30.9	30.3	29.8	30.1	29.0	27.4	-5.8	0.6
Brazil	99.1	106.0	111.6	114.0	112.4	110.2	122.5	132.2	136.7	142.7	4.4	3.3
Colombia	31.1	35.3	41.4	48.2	49.9	52.9	52.2	53.0	46.8	44.8	-4.2	1.0
Ecuador	27.2	26.1	26.1	26.8	27.1	28.2	29.8	29.1	29.5	28.5	-3.4	0.6
Peru	5.7	6.5	7.0	6.7	6.7	7.1	7.3	6.2	5.3	5.4	0.3	0.1
Trinidad & Tobago	7.0	6.8	6.2	5.9	5.2	5.1	5.0	4.8	4.3	4.4	1.2	0.1
Venezuela	165.8	155.9	145.8	141.5	139.3	137.8	138.5	135.4	123.1	108.3	-12.0	2.5
Other S. & Cent. America	7.1	6.6	7.0	7.1	7.4	7.6	8.0	7.6	7.0	6.8	-3.2	0.2
Total S. & Cent.	**380.9**	**377.3**	**378.5**	**381.5**	**378.9**	**379.2**	**393.1**	**398.4**	**381.9**	**368.3**	**-3.6**	**8.4**
Europe and Eurasia												
Azerbaijan	45.3	50.9	51.3	46.1	43.7	43.8	42.5	42.0	41.4	39.2	-5.4	0.89
Denmark	14.0	12.9	12.2	10.9	10.0	8.7	8.1	7.7	6.9	6.7	-2.7	0.15
Italy	5.2	4.6	5.1	5.3	5.4	5.5	5.8	5.5	3.8	4.1	10.3	0.09
Kazakhstan	70.7	76.5	79.7	80.1	79.3	82.3	81.1	80.2	78.6	86.9	10.5	1.98
Norway	114.8	108.7	98.9	93.7	87.3	83.2	85.3	87.9	90.4	88.8	-1.8	2.02
Romania	4.7	4.5	4.3	4.2	4.0	4.1	4.1	4.0	3.8	3.6	-4.8	0.08
Russian Federation	494.4	501.5	512.5	519.6	526.9	532.3	535.1	541.9	555.9	554.4	-0.3	12.63
Turkmenistan	11.0	10.7	10.4	10.6	11.0	11.3	11.7	12.7	12.3	12.4	1.2	0.28
United Kingdom	72.0	68.3	63.2	52.1	44.7	40.7	40.0	45.4	47.5	46.6	-2.0	1.06
Uzbekistan	4.8	4.5	3.6	3.6	3.2	2.9	2.8	2.7	2.6	2.5	-6.3	0.06
Other Europe & Eurasia	23.6	24.0	23.4	21.7	21.6	20.6	19.9	19.2	19.2	19.2	-0.5	0.44
Total Europe &	**860.5**	**867.0**	**864.5**	**847.9**	**837.0**	**835.5**	**836.4**	**849.2**	**862.5**	**864.4**	**0.2**	**19.69**
Middle East												
Iran	215.6	207.4	212.3	213.0	180.7	169.9	174.3	180.5	216.8	234.2	8.0	5.34
Iraq	119.3	119.7	120.8	135.8	151.3	152.0	158.8	195.6	217.6	221.5	1.8	5.05
Kuwait	136.1	120.9	123.3	140.8	153.9	151.3	150.1	148.1	152.6	146.0	-4.3	3.33
Oman	37.1	39.7	42.2	43.2	45.0	46.1	46.2	48.0	49.3	47.6	-3.6	1.08
Qatar	64.7	62.6	71.1	78.0	82.5	84.5	83.8	82.1	82.5	79.9	-3.2	1.82
Saudi Arabia	509.9	456.7	473.8	525.9	549.8	538.4	543.4	567.9	586.6	561.7	-4.2	12.80
Syria	19.6	19.3	18.5	16.9	8.1	2.7	1.5	1.2	1.1	1.1	-2.1	0.02
United Arab Emirates	145.2	128.8	134.2	149.8	156.5	161.8	163.2	175.0	181.6	176.3	-2.9	4.02
Yemen	14.8	14.4	14.3	10.2	8.2	9.0	6.9	2.6	1.6	2.1	26.6	0.05
Other Middle East	9.5	9.4	9.4	9.9	9.0	10.3	10.5	10.5	10.6	10.9	2.6	0.25
Total Middle East	**1271.7**	**1179.0**	**1220.0**	**1323.6**	**1345.1**	**1326.0**	**1338.8**	**1411.5**	**1500.3**	**1481.1**	**-1.3**	**33.74**

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

(Million tonnes)

Country/	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over 2016-	2017-18 % Share of World's Total
Africa												
Algeria	85.6	77.2	73.8	71.7	67.2	64.8	68.8	67.2	68.4	66.6	-2.6	1.52
Angola	92.3	86.0	88.9	82.0	85.3	85.7	81.6	87.0	86.3	81.8	-5.1	1.86
Chad	6.7	6.2	6.4	6.0	5.3	4.8	4.7	5.8	5.4	5.4	0.2	0.12
Rep. of Congo (E	12.2	14.1	16.0	15.3	14.3	12.6	13.3	12.4	12.6	14.7	16.6	0.33
Egypt	34.7	35.3	35.0	34.6	34.7	34.4	35.1	35.4	33.8	32.2	-4.9	0.73
Equatorial Guinea	18.0	16.0	14.8	14.5	15.5	13.6	13.7	12.5	10.7	9.5	-11.4	0.22
Gabon	12.0	12.0	12.4	12.3	12.1	11.3	11.3	11.2	11.0	10.0	-9.6	0.23
Libya	85.6	77.4	77.9	22.5	71.2	46.6	23.4	20.3	20.1	40.8	103.2	0.93
Nigeria	105.8	106.9	122.1	118.5	116.5	109.5	109.4	105.8	91.4	95.3	4.2	2.17
South Sudan	n/a	n/a	n/a	n/a	1.5	4.9	7.7	7.3	5.8	5.3	-7.7	0.12
Sudan	22.6	23.4	22.8	14.3	5.1	5.8	5.9	5.4	5.1	4.2	-17.2	0.10
Tunisia	4.5	4.2	3.9	3.6	3.8	3.5	3.3	2.9	2.8	2.4	-12.4	0.06
Other Africa	9.2	9.1	7.4	9.8	9.8	11.2	11.6	13.7	12.8	15.1	17.4	0.34
Total Africa	**489.1**	**468.0**	**481.5**	**405.1**	**442.3**	**408.5**	**389.7**	**387.0**	**366.2**	**383.3**	**4.7**	**8.7**
Asia Pacific												
Australia	24.1	22.4	24.5	21.5	21.4	17.8	19.1	17.0	15.5	14.8	-4.5	0.34
Brunei	8.6	8.2	8.4	8.1	7.8	6.6	6.1	6.2	5.9	5.5	-7.0	0.12
China	190.4	189.5	203.0	202.9	207.5	210.0	211.4	214.6	199.7	191.5	-4.1	4.36
India	**37.8**	**38.0**	**41.3**	**42.9**	**42.5**	**42.5**	**41.6**	**41.2**	**40.2**	**40.4**	0.5	0.92
Indonesia	49.4	48.4	48.6	46.3	44.6	42.7	41.2	40.7	43.0	46.4	7.8	1.06
Malaysia	33.7	31.9	32.9	29.7	30.1	28.7	29.8	32.3	32.6	32.2	-1.4	0.73
Thailand	14.0	14.5	14.9	15.4	16.6	16.5	16.2	17.0	17.5	16.8	-4.1	0.38
Vietnam	15.2	16.7	15.6	15.8	17.4	17.4	18.0	19.5	18.0	16.1	-10.7	0.37
Other Asia	14.9	14.4	13.8	13.0	12.6	12.0	13.6	13.3	12.5	11.8	-5.7	0.27
Total Asia	**388.1**	**384.0**	**403.0**	**395.5**	**400.4**	**394.0**	**397.3**	**401.7**	**385.0**	**375.5**	**-2.5**	**8.55**
TOTAL	**4002.3**	**3897.2**	**3986.2**	**4012.8**	**4124.0**	**4127.0**	**4224.3**	**4356.2**	**4378.9**	**4389.4**	**0.2**	**100.00**

* 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.

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

Source : Ministry of Petroleum & Natural Gas.

Download Table 9.1

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

(in Million tonnes)

Country/ Region	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over 2016-17	2017-18 % Share of World's Total Consumption
North America												
US	875.4	833.2	850.1	834.9	817.0	832.1	838.1	856.5	865.1	870.1	0.58	19.47
Canada	100.6	94.5	101.1	104.3	102.3	103.5	103.7	100.3	102.2	103.6	1.44	2.32
Mexico	92.5	89.3	89.4	91.0	92.9	90.3	85.9	84.9	86.1	82.7	-4.01	1.85
Total North America	**1068.4**	**1017.0**	**1040.5**	**1030.2**	**1012.2**	**1025.9**	**1027.7**	**1041.7**	**1053.3**	**1056.4**	**0.3**	**23.64**
South and Central America												
Argentina	24.9	24.3	28.1	28.3	29.6	31.9	31.5	32.5	31.9	30.9	-3.23	0.69
Brazil	116.1	116.9	126.7	131.9	135.1	145.0	151.4	148.2	139.9	139.6	-0.23	3.12
Chile	18.6	18.2	16.0	17.6	17.5	16.8	16.3	16.5	17.4	17.6	1.31	0.39
Colombia	11.7	10.7	11.9	12.8	13.9	13.9	14.8	15.4	15.9	16.0	1.15	0.36
Ecuador	8.7	8.9	10.3	10.5	10.9	11.6	12.2	11.8	11.1	10.8	-2.51	0.24
Peru	8.0	8.2	8.6	9.5	9.6	10.1	10.0	10.6	11.3	11.5	1.98	0.26
Trinidad & Tobago	2.2	2.1	2.2	2.1	2.0	2.3	2.1	2.2	2.2	2.1	-1.68	0.05
Venezuela	33.8	34.2	34.1	34.6	37.2	36.7	33.6	29.6	25.0	23.2	-7.10	0.52
Other S. &	17.1	16.8	17.0	18.1	18.2	18.2	18.8	19.9	20.9	21.4	2.60	0.48
Other Caribbean	37.7	35.7	35.7	35.8	34.2	32.6	32.3	33.7	34.3	34.3	-0.02	0.77
Other South America	7.7	8.1	8.8	8.7	9.2	9.1	9.2	9.2	9.4	9.5	1.17	0.21
Total S. & Cent.	**286.5**	**284.0**	**299.4**	**309.6**	**317.4**	**328.1**	**332.1**	**329.7**	**319.2**	**317.0**	**-0.68**	**7.09**
Europe and Eurasia												
Austria	13.4	12.8	13.4	12.7	12.5	12.7	12.5	12.6	12.8	12.9	0.94	0.29
Belgium	36.0	31.5	32.7	30.5	29.6	30.1	29.7	31.0	31.4	31.2	-0.80	0.70
Bulgaria	4.8	4.3	3.9	3.8	3.9	3.6	3.9	4.4	4.4	4.8	8.74	0.11
Croatia	4.5	4.4	3.7	3.5	3.2	3.1	3.2	3.3	3.3	3.2	-3.87	0.07
Cyprus	3.0	3.0	2.9	2.8	2.6	2.3	2.3	2.4	2.6	2.6	0.64	0.06
Czech Republic	9.9	9.7	9.2	9.0	9.0	8.5	9.1	8.9	8.3	9.4	13.78	0.21
Denmark	9.2	8.3	8.4	8.3	7.8	7.7	7.8	7.9	8.1	8.0	-0.67	0.18
Estonia	1.5	1.3	1.4	1.3	1.6	1.6	1.5	1.4	1.4	1.4	0.92	0.03
Finland	10.7	10.1	10.6	9.7	9.1	9.0	8.6	9.3	9.7	9.4	-3.49	0.21
France	90.8	87.5	84.5	83.0	80.3	79.3	76.9	76.7	76.3	76.9	0.75	1.72
Germany	118.9	113.9	115.4	112.0	111.4	113.4	110.4	110.0	112.3	114.7	2.13	2.57
Greece	20.4	19.5	18.1	17.0	15.3	14.5	14.4	14.9	15.3	15.3	0.15	0.34
Hungary	7.5	7.1	6.7	6.4	6.0	5.9	6.6	7.0	7.1	7.6	7.50	0.17
Iceland	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.22	0.02
Ireland	9.0	8.0	7.6	6.9	6.5	6.6	6.5	6.8	7.1	7.1	0.12	0.16
Italy	80.4	75.1	73.1	70.5	64.2	59.4	55.8	57.6	57.9	58.6	1.17	1.31
Latvia	1.7	1.5	1.7	1.6	1.6	1.6	1.6	1.7	1.8	1.8	4.09	0.04
Lithuania	3.1	2.6	2.7	2.6	2.7	2.6	2.6	2.8	3.0	3.0	0.29	0.07
Luxembourg	2.9	2.7	2.8	2.9	2.8	2.7	2.6	2.6	2.6	2.7	6.04	0.06
Macedonia	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.9	0.9	-0.57	0.02
Netherlands	46.6	44.6	45.2	46.1	43.7	41.4	39.6	38.7	39.9	39.6	-0.84	0.89
Norway	10.4	10.7	10.8	10.6	10.5	10.8	10.2	10.3	9.8	9.8	0.44	0.22
Poland	26.2	26.1	27.6	27.5	26.6	24.7	24.8	25.8	28.1	30.4	8.32	0.68
Portugal	14.1	13.2	13.0	12.1	11.0	11.3	11.1	11.5	11.7	12.2	4.95	0.27
Romania	10.4	9.2	8.8	9.1	9.2	8.4	9.0	9.2	9.7	9.8	0.31	0.22
Slovakia	3.9	3.7	3.9	3.9	3.6	3.6	3.4	3.7	3.8	4.2	11.07	0.09
Slovenia	3.0	2.7	2.6	2.6	2.5	2.4	2.4	2.3	2.5	2.5	-1.20	0.06
Spain	78.0	73.5	72.1	68.8	64.7	59.3	59.0	61.2	63.2	63.6	0.64	1.42
Sweden	17.0	15.8	15.9	14.9	14.8	14.5	14.6	14.1	15.0	15.1	0.54	0.34
Switzerland	12.1	12.3	11.4	11.0	11.2	11.8	10.6	10.7	10.2	10.5	2.97	0.23
Turkey	32.1	32.6	31.8	31.1	33.1	36.0	36.7	43.7	46.7	48.3	3.44	1.08
United Kingdom	79.5	75.8	74.9	73.6	71.4	70.3	70.1	71.7	73.2	73.2	0.08	1.64
Other Europe	15.8	15.8	16.1	16.1	15.2	14.9	14.8	15.2	16.3	16.6	1.68	0.37
Azerbaijan	3.6	3.3	3.3	4.0	4.2	4.5	4.4	4.5	4.5	4.2	-6.82	0.09
Belarus	7.9	9.3	7.5	8.6	10.4	7.1	8.1	6.9	6.7	6.6	-1.17	0.15
Kazakhstan	11.4	9.2	9.8	11.5	11.5	12.1	12.1	13.0	13.8	14.1	2.33	0.31
Russian Federation	133.6	128.2	133.3	142.2	144.6	144.3	152.4	144.9	147.5	147.8	0.20	3.31
Turkmenistan	5.2	5.0	5.5	5.8	6.0	6.2	6.5	6.5	6.8	7.0	2.20	0.16
Ukraine	14.2	13.5	12.6	13.1	12.5	11.9	10.2	9.0	9.5	9.6	0.83	0.21
USSR	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-	-
Uzbekistan	4.6	4.3	3.6	3.4	3.0	2.9	2.7	2.7	3.1	3.1	0.34	0.07
Other CIS	2.9	3.0	3.0	3.1	3.7	3.6	3.4	3.6	4.0	3.9	-1.83	0.09
Total Europe & Eurasia	**961.6**	**916.8**	**912.8**	**905.2**	**885.3**	**868.3**	**863.7**	**872.4**	**893.1**	**904.5**	**1.29**	**20.24**

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Table 9.2(Contd.) : COUNTRYWISE ESTIMATES OF CONSUMPTION OF CRUDE OIL

(Million tonnes)

Country/ Region	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over 2016-17	2017-18 % Share of World's Total Consumption
Middle East												
Iran	91.9	90.9	82.5	84.0	85.5	93.4	90.2	80.3	77.3	81.0	4.77	1.81
Iraq	22.4	25.6	27.3	30.0	32.0	34.4	32.8	33.4	36.9	38.4	4.04	0.86
Israel	12.0	10.8	11.2	11.8	13.9	11.5	9.6	10.3	10.4	11.2	7.79	0.25
Kuwait	19.0	20.4	20.9	19.3	21.6	22.5	19.1	19.8	19.7	19.3	-1.95	0.43
Oman	5.9	5.6	6.3	6.6	7.2	8.4	8.6	8.7	9.1	9.0	-1.53	0.20
Qatar	6.3	6.0	6.5	8.0	8.2	9.3	9.8	10.7	11.8	12.3	4.27	0.27
Saudi Arabia	114.4	125.9	136.6	139.1	146.1	146.5	160.9	167.3	167.2	165.8	-0.87	3.71
United Arab Emirates	30.2	29.3	31.2	33.7	35.1	38.7	39.2	41.8	43.9	43.1	-1.84	0.96
Other Middle East	38.6	37.3	34.3	33.5	31.0	29.5	29.9	27.0	24.7	24.4	-0.97	0.55
Total Middle East	**340.6**	**351.8**	**356.9**	**366.0**	**380.7**	**394.2**	**400.2**	**399.2**	**401.0**	**404.4**	**0.86**	**9.05**
Africa												
Algeria	14.0	14.9	14.8	15.8	16.8	17.6	18.3	19.3	18.9	18.7	-0.81	0.42
Egypt	32.6	34.4	36.3	33.7	35.3	35.7	38.3	39.8	40.7	38.4	-5.68	0.86
Morocco	10.9	11.0	12.3	13.1	13.2	13.3	12.5	12.3	12.6	12.9	2.20	0.29
South Africa	24.4	24.1	25.7	25.8	26.6	27.3	27.2	28.3	27.8	27.9	0.34	0.62
Eastern Africa	18.8	19.7	20.3	21.6	21.9	23.0	24.0	26.2	28.3	29.6	4.43	0.66
Middle Africa	7.7	8.6	9.3	9.9	10.4	11.5	12.2	12.3	12.6	12.6	-0.08	0.28
Western Africa	23.2	23.4	24.3	24.3	25.8	27.6	25.9	26.2	28.0	31.5	12.64	0.71
Other Northern Africa	17.8	18.9	19.1	12.5	16.0	16.9	17.2	15.2	14.3	14.9	4.45	0.33
Other Southern Africa	2.1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.8	1.49	0.06
Total Africa	**151.6**	**157.1**	**164.4**	**159.1**	**168.5**	**175.4**	**178.2**	**182.4**	**185.9**	**189.3**	**1.81**	**4.23**
Asia Pacific												
Australia	43.2	43.5	43.7	46.1	47.5	47.8	48.5	47.7	48.3	50.2	3.80	1.12
Bangladesh	3.8	3.5	3.9	5.1	5.4	5.3	5.8	6.2	6.6	7.3	11.81	0.16
China	378.1	392.8	448.5	465.1	487.1	508.1	528.0	561.8	574.0	595.5	3.82	13.32
China Hong Kong SAR	14.5	16.5	17.8	18.0	17.2	17.6	16.6	18.3	18.9	21.4	13.53	0.48
India	**144.7**	**152.6**	**155.4**	**163.0**	**173.6**	**175.3**	**180.8**	**195.8**	**216.6**	**221.8**	2.64	4.96
Indonesia	60.1	60.8	64.7	73.1	75.2	75.8	76.2	70.3	70.8	73.7	4.13	1.65
Japan	224.8	200.4	202.7	203.7	217.7	207.4	197.0	189.5	184.4	181.3	-1.66	4.06
Malaysia	29.5	29.2	29.3	31.5	32.8	34.9	34.9	34.3	34.9	35.1	0.33	0.78
New Zealand	7.2	6.9	7.0	7.0	7.0	7.1	7.2	7.5	7.6	8.2	7.50	0.18
Pakistan	19.4	20.7	20.5	20.7	20.0	21.9	22.6	24.6	27.5	28.3	3.36	0.63
Philippines	13.3	14.0	14.6	13.8	14.4	15.1	16.1	18.3	19.7	20.7	5.52	0.46
Singapore	51.4	55.5	60.9	63.7	63.4	64.2	65.8	69.5	72.2	74.8	3.83	1.67
South Korea	103.1	103.7	105.0	105.8	108.8	108.3	107.9	113.8	122.5	122.6	0.07	2.74
Sri Lanka	4.0	4.2	4.2	4.4	4.6	3.8	4.2	4.5	4.8	5.1	6.30	0.11
Taiwan	45.9	46.1	47.2	44.5	44.6	45.1	46.5	46.2	46.5	47.2	1.64	1.06
Thailand	44.4	46.3	47.7	49.7	52.3	54.5	54.9	57.2	58.8	60.6	3.02	1.35
Vietnam	14.1	14.2	15.3	16.7	16.8	18.2	18.8	19.9	21.0	22.1	5.20	0.49
Other Asia Pacific	12.0	12.7	13.5	15.1	15.4	17.2	19.0	20.7	20.9	22.4	6.78	0.50
Total Asia Pacific	**1213.3**	**1223.7**	**1302.1**	**1347.0**	**1403.8**	**1427.6**	**1450.8**	**1506.3**	**1556.1**	**1598.0**	**2.69**	**35.75**
TOTAL WORLD	**4022.0**	**3950.3**	**4076.0**	**4117.1**	**4167.9**	**4219.5**	**4252.6**	**4331.6**	**4408.6**	**4469.7**	**1.39**	**100.00**

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.

Note: 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.

Download Table 9.2

Table 9.3: Countrywise Estimates of Production of Natural Gas*

(Million tonnes oil equivalent)

Country/ Region	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over 2016-17	2017-18 % Share of World's Total
North America												
USA	469.5	479.4	494.5	530.8	558.1	563.8	606.0	636.5	627.1	631.6	0.7	19.96
Canada	143.2	133.3	128.6	129.9	129.2	130.6	136.8	138.4	147.6	151.6	2.7	4.79
Mexico	40.6	45.2	44.0	44.8	43.7	45.1	44.1	41.2	37.5	35.0	-6.8	1.11
Total North Ame	**653.3**	**658.0**	**667.2**	**705.5**	**731.1**	**739.6**	**786.9**	**816.2**	**812.2**	**818.2**	**0.7**	**25.85**
South and Central America												
Argentina	36.8	34.6	33.5	32.4	31.5	29.7	29.7	30.5	32.1	31.9	-0.4	1.01
Bolivia	11.9	10.2	11.8	12.9	14.7	16.8	17.4	16.8	15.1	14.7	-2.8	0.46
Brazil	12.6	10.7	13.1	15.1	17.3	19.2	20.4	20.8	21.1	23.7	12.1	0.75
Colombia	7.5	8.7	9.3	9.1	9.9	11.4	10.6	10.0	9.4	8.7	-6.8	0.28
Peru	3.0	3.1	6.3	9.9	10.3	10.7	11.3	10.9	12.1	11.2	-7.2	0.35
Trinidad & Tobag	35.1	36.5	37.4	36.0	35.7	35.8	35.2	33.1	28.8	29.1	0.9	0.92
Venezuela	28.7	27.3	26.2	26.0	27.4	26.3	27.3	31.0	32.7	32.2	-1.6	1.02
Other S. & Cent. America	3.2	3.2	3.2	2.6	2.4	2.2	2.1	2.4	2.5	2.4	-2.8	0.08
Total S. & Cent.	**138.8**	**134.4**	**140.8**	**144.0**	**149.4**	**152.1**	**154.0**	**155.5**	**153.7**	**153.9**	**0.1**	**4.86**
Europe and Eurasia												
Azerbaijan	13.7	13.7	14.0	13.7	14.5	15.0	15.8	16.2	15.7	15.2	-3.1	0.48
Denmark	9.0	7.5	7.3	5.9	5.2	4.3	4.1	4.1	4.0	4.3	7.0	0.14
Germany	11.7	11.0	9.6	9.0	8.1	7.4	7.0	6.5	6.0	5.5	-6.4	0.17
Italy	7.6	6.6	6.9	7.0	7.1	6.4	5.9	5.6	4.8	4.6	-3.2	0.14
Kazakhstan	15.7	16.3	17.6	17.3	17.1	18.4	18.6	18.9	19.7	23.3	19.6	0.74
Netherlands	59.9	56.4	63.4	57.7	57.4	61.8	52.1	39.0	36.1	31.5	-7.5	0.99
Norway	85.4	89.1	91.5	86.4	97.9	92.8	92.9	99.9	99.6	106.0	6.9	3.35
Poland	3.7	3.7	3.7	3.8	3.9	3.8	3.7	3.7	3.6	3.5	-2.1	0.11
Romania	9.0	8.9	8.6	8.7	8.7	8.6	8.8	8.8	7.8	8.9	12.6	0.28
Russian Federatio	525.8	461.0	514.5	530.4	517.5	528.4	508.3	502.5	506.7	546.5	7.5	17.27
Turkmenistan	59.4	32.7	38.1	53.5	56.0	56.1	60.3	62.6	57.6	53.3	-7.5	1.69
Ukraine	17.5	17.5	16.7	16.8	16.7	17.3	17.4	16.2	16.4	16.7	2.1	0.53
United Kingdom	62.6	52.6	49.8	39.6	33.7	31.8	32.2	35.0	35.9	36.0	0.4	1.14
Uzbekistan	51.9	50.0	48.9	46.4	46.3	46.3	46.6	47.0	45.7	45.9	0.5	1.45
Other Europe & Eurasia	8.3	8.1	8.2	8.1	7.4	6.3	5.6	5.4	7.7	8.0	4.8	0.25
Total Europe &]	**941.2**	**835.2**	**898.9**	**904.4**	**897.4**	**904.6**	**879.4**	**871.2**	**867.1**	**909.2**	**4.9**	**28.73**
Middle East												0.00
Bahrain	10.3	10.4	10.7	10.9	11.2	12.0	12.6	12.7	12.6	13.0	2.7	0.41
Iran	110.8	121.7	129.0	135.4	140.7	141.3	157.4	164.6	174.7	192.5	10.2	6.08
Iraq	5.6	5.9	6.1	5.4	5.5	6.1	6.5	6.3	8.5	8.9	5.0	0.28
Kuwait	10.4	9.4	9.6	11.1	12.7	13.3	12.3	13.8	14.1	14.9	5.8	0.47
Oman	20.8	20.6	22.1	23.3	24.4	26.5	25.2	26.4	27.0	27.7	2.6	0.88
Qatar	68.5	79.5	106.5	129.3	139.8	144.2	145.4	150.7	152.2	151.1	-0.7	4.77
Saudi Arabia	65.7	64.1	71.6	75.4	81.1	81.7	83.6	85.3	90.6	95.8	5.8	3.03
Syria	4.8	5.3	7.2	6.4	5.2	4.3	4.0	3.5	3.1	2.7	-14.8	0.08
United Arab Emirates	42.1	40.9	43.0	43.9	45.5	45.8	45.5	50.5	51.2	52.0	1.5	1.64
Yemen	0.0	0.7	5.4	8.1	6.5	8.9	8.4	2.5	0.5	0.6	1.8	0.02
Other Middle East	3.0	2.4	2.8	3.6	2.2	5.4	6.3	6.9	7.8	8.2	5.4	0.26
Total Middle Ea	**341.9**	**360.8**	**414.1**	**452.7**	**474.8**	**489.4**	**507.2**	**523.1**	**542.4**	**567.4**	**4.6**	**17.93**

◆ Less than 0.05%

Contd....

Table 9.3 (contd.): Countrywise Estimates of Production of Natural Gas*

(Million Tonnes Oil Equivalent)

Country/ Regio	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over 2016-17	2017-18 % Share of World's Total Production
Africa												
Algeria	71.0	65.8	66.5	68.4	67.4	68.2	68.9	70.0	78.6	78.5	-0.2	2.48
Egypt	48.8	51.9	50.7	50.9	50.4	46.4	40.4	36.6	34.6	42.1	21.8	1.33
Libya	13.0	13.0	13.7	6.4	10.0	10.5	10.2	10.6	9.7	9.9	2.6	0.31
Nigeria	29.5	21.2	30.5	33.1	35.4	29.6	36.8	40.9	36.7	40.6	10.7	1.28
Other Africa	14.4	13.9	15.7	15.4	15.5	15.9	16.2	16.9	18.4	22.4	21.4	0.71
Total Africa	**176.7**	**165.8**	**177.2**	**174.2**	**178.7**	**170.5**	**172.5**	**175.1**	**178.0**	**193.5**	**8.7**	**6.11**
Asia Pacific												
Australia	35.8	40.2	46.4	47.9	51.2	53.1	57.3	65.4	82.9	97.6	17.7	3.08
Bangladesh	14.1	16.1	16.6	16.8	18.3	18.9	19.8	22.2	22.7	22.9	0.5	0.72
Brunei	10.2	9.6	10.3	10.7	10.5	10.2	9.9	10.5	10.1	10.3	2.2	0.33
China	69.6	73.9	83.0	91.3	95.9	104.7	112.8	116.7	118.6	128.3	8.2	4.05
India	**25.3**	**30.7**	**41.2**	**37.8**	**32.9**	**27.4**	26.0	**25.1**	**23.5**	**24.5**	**4.2**	**0.77**
Indonesia	64.3	67.1	74.8	71.1	67.3	66.7	**65.7**	65.5	60.8	58.4	-3.9	1.85
Malaysia	59.5	57.5	58.1	57.6	59.5	62.7	61.9	63.5	65.0	67.4	3.8	2.13
Myanmar	10.5	9.8	10.5	10.8	10.8	11.1	14.2	16.5	15.7	15.5	-1.6	0.49
Pakistan	29.8	29.8	30.4	30.4	31.5	30.6	30.1	30.1	29.8	29.8	-0.1	0.94
Thailand	25.6	27.5	32.2	32.9	36.9	37.2	37.5	35.4	34.7	33.3	-4.2	1.05
Vietnam	6.2	6.6	7.8	7.0	7.8	8.1	8.5	8.8	8.8	8.1	-7.7	0.26
Other Asia Pacif	15.7	16.0	15.6	15.7	15.5	16.0	20.2	25.2	26.2	26.3	0.4	0.83
Total Asia Paci	**366.6**	**384.8**	**426.9**	**430.0**	**438.0**	**446.8**	**463.8**	**485.0**	**498.9**	**522.4**	**4.7**	**16.51**
TOTAL WORI	**2618.6**	**2538.9**	**2725.1**	**2810.8**	**2869.4**	**2902.9**	**2963.7**	**3026.1**	**3052.3**	**3164.5**	**3.7**	**100.0**

* Excluding gas flared or recyled

Source : Ministry of Petroleum & Natural Gas

Download Table 9.3

Table 9.4 : Country-wise estimates of Consumption of Natural Gas (in Million Tonnes Oil Equivalent)

Country/ Region	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over 2016-17	% Share of World's Total Consumption for 2016-17
North America												
USA	540.7	531.1	557.3	566.0	591.7	607.9	621.0	639.4	645.1	635.8	-1.4	20.15
Canada	76.8	74.4	76.3	82.2	79.8	84.3	88.8	88.5	94.1	99.5	5.7	3.15
Mexico	51.6	56.0	56.8	60.9	63.3	67.5	68.9	67.1	79.0	75.3	-4.6	2.39
Total North America	**669.2**	**661.5**	**690.4**	**709.0**	**734.8**	**759.7**	**778.7**	**794.9**	**818.2**	**810.7**	**-0.9**	**25.7**
South and Central America												
Argentina	37.1	35.2	36.3	37.8	39.3	39.4	39.8	40.1	41.6	41.7	0.3	1.32
Brazil	22.4	18.1	24.1	24.0	28.5	33.6	35.6	37.5	32.4	33.0	1.7	1.04
Chile	2.4	2.4	4.9	5.0	4.6	4.6	3.8	4.1	5.1	5.2	1.4	0.16
Colombia	6.3	7.2	7.5	7.3	8.1	9.0	9.8	9.6	9.2	8.6	-6.0	0.27
Ecuador	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.5	-10.1	0.02
Peru	2.8	2.9	4.2	4.6	5.2	5.1	5.8	6.1	6.5	5.8	-11.3	0.18
Trinidad & Tobago	17.8	18.5	19.4	19.5	18.6	18.7	18.4	18.0	16.0	15.9	-0.7	0.50
Venezuela	30.2	28.5	27.7	28.0	29.3	28.3	28.2	31.4	33.0	32.4	-1.8	1.03
Central America	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Other Caribbean	2.1	2.0	2.2	2.4	2.8	3.1	3.2	3.2	3.2	3.0	-6.7	0.09
Other South America	1.9	2.1	2.2	2.6	2.7	2.8	3.0	2.9	3.1	3.2	2.4	0.10
Total S. & Cent. Ameri	**123.4**	**117.5**	**129.1**	**131.6**	**139.4**	**145.1**	**148.1**	**153.6**	**150.6**	**149.1**	**-1.0**	**4.73**
Europe and Eurasia												
Austria	7.7	7.5	8.1	7.6	7.3	7.0	6.4	6.8	7.1	7.7	8.7	0.25
Belgium	14.8	15.1	17.0	14.2	14.4	14.2	12.4	13.6	13.9	14.1	1.4	0.45
Bulgaria	2.9	2.1	2.3	2.6	2.5	2.4	2.4	2.6	2.7	2.8	3.0	0.09
Croatia	2.6	2.4	2.6	2.6	2.4	2.3	2.0	2.1	2.2	2.3	6.5	0.07
Cyprus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Czech Republic	7.2	6.8	8.1	6.8	6.9	6.9	6.2	6.5	7.0	7.2	2.6	0.23
Denmark	4.1	3.9	4.5	3.7	3.5	3.3	2.8	2.8	2.9	2.8	-3.9	0.09
Estonia	0.8	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	-5.0	0.01
Finland	3.6	3.2	3.6	3.1	2.7	2.6	2.3	1.9	1.7	1.6	-8.1	0.05
France	39.9	38.4	42.6	37.0	38.2	38.8	32.6	35.1	38.3	38.5	0.4	1.22
Germany	77.0	72.6	75.7	69.5	69.7	73.1	63.5	66.2	73.0	77.5	6.2	2.46
Greece	3.5	2.9	3.2	4.0	3.6	3.2	2.4	2.6	3.4	4.1	20.6	0.13
Hungary	10.6	9.2	9.8	9.4	8.4	7.8	7.0	7.5	8.0	8.5	6.4	0.27
Iceland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Ireland	4.5	4.3	4.7	4.1	4.0	3.8	3.7	3.8	4.2	4.4	3.1	0.14
Italy	70.0	64.4	68.6	64.3	61.8	57.8	51.1	55.7	58.5	62.0	6.0	1.96
Latvia	1.4	1.2	1.5	1.3	1.2	1.2	1.1	1.1	1.1	1.0	-9.3	0.03
Lithuania	2.6	2.2	2.5	2.7	2.7	2.2	2.1	2.1	1.8	1.9	4.1	0.06
Luxembourg	1.1	1.1	1.2	1.0	1.1	0.9	0.8	0.8	0.7	0.7	-2.3	0.02
Macedonia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	28.5	0.01
Netherlands	34.6	35.0	39.2	34.3	32.4	32.8	28.6	28.3	29.7	31.0	4.4	0.98
Norway	3.7	3.5	3.5	3.5	3.4	3.4	3.7	3.9	3.8	3.9	3.5	0.12
Poland	13.5	13.0	14.0	14.1	15.0	15.0	14.6	14.7	15.7	16.5	4.8	0.52
Portugal	4.1	4.1	4.5	4.5	3.9	3.7	3.5	4.1	4.4	5.3	21.1	0.17
Romania	12.2	10.6	10.8	11.1	10.8	9.8	9.5	9.0	8.9	10.2	14.3	0.32
Slovakia	5.2	4.4	5.0	4.6	4.4	4.8	3.8	3.9	3.9	3.9	-0.7	0.12
Slovenia	0.9	0.8	0.9	0.7	0.7	0.7	0.6	0.7	0.7	0.7	5.3	0.02
Spain	34.9	31.2	31.1	28.9	28.6	26.1	23.7	24.5	25.0	27.5	9.9	0.87
Sweden	0.8	1.0	1.3	1.1	0.9	0.9	0.8	0.8	0.8	0.7	-19.3	0.02
Switzerland	2.5	2.4	2.7	2.4	2.6	2.8	2.4	2.6	2.7	2.7	0.4	0.09
Turkey	30.4	29.0	30.8	36.0	37.2	37.8	40.1	39.5	38.2	44.4	16.3	1.41
United Kingdom	84.1	78.5	84.7	70.4	66.1	65.6	60.2	61.7	69.6	67.7	-2.7	2.15
Other Europe	3.1	2.5	3.1	3.6	3.4	3.6	3.6	3.9	4.0	4.8	22.0	0.15
Total Europe & Eurasi	**484.2**	**453.9**	**488.1**	**450.0**	**440.5**	**435.2**	**394.6**	**409.1**	**434.7**	**457.2**	**5.2**	**14.49**
Commonwealth Independent States (CIS)												
Azerbaijan	8.6	7.4	7.0	7.7	8.0	8.1	8.5	9.6	9.4	9.1	-3.1	0.29
Belarus	17.3	14.5	17.8	16.6	16.8	16.8	16.0	15.0	15.2	15.5	1.9	0.49
Kazakhstan	9.1	8.7	9.5	10.5	11.1	11.7	12.9	13.2	13.6	14.0	3.1	0.44
Russian Federation	363.5	343.5	363.4	374.5	369.4	363.8	364.2	352.2	361.3	365.2	1.1	11.57
Turkmenistan	19.2	17.7	20.3	21.2	23.7	20.6	23.0	26.5	26.5	24.4	-8.0	0.77
Ukraine	54.0	42.1	46.9	48.3	44.6	38.9	33.1	25.9	26.1	25.6	-1.7	0.81
USSR	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Uzbekistan	43.8	35.9	36.7	38.0	37.5	37.3	39.0	41.7	35.8	35.8	0.0	1.13
Other CIS	5.0	4.8	4.5	4.7	5.1	4.4	4.5	4.7	4.7	4.4	-6.1	0.14
Total CIS	**520.5**	**474.5**	**506.2**	**521.3**	**516.3**	**501.4**	**501.0**	**488.7**	**492.6**	**494.1**	**0.3**	**15.66**

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

Country/ Region	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	% Change 2017-18 over 2016-17	% Share of World's Total Consumption for 2016-17
Middle East												
Iran	112.8	120.9	129.5	137.4	136.8	137.9	155.6	165.0	173.1	184.4	6.5	5.84
Iraq	5.6	5.9	6.1	5.4	5.5	6.1	6.5	6.3	8.5	10.3	20.9	0.33
Israel	3.1	3.4	4.4	4.1	2.1	5.7	6.2	6.9	8.0	8.5	7.1	0.27
Kuwait	10.4	10.2	12.0	13.6	15.1	15.3	15.1	17.5	18.1	19.0	5.2	0.60
Oman	11.5	11.8	14.0	15.6	16.9	18.6	18.3	19.8	19.7	20.0	1.9	0.64
Qatar	16.6	16.8	21.3	23.5	29.0	30.1	33.4	37.9	37.1	40.8	10.0	1.29
Saudi Arabia	65.7	64.1	71.6	75.4	81.1	81.7	83.6	85.3	90.6	95.8	5.8	3.04
United Arab Emirates	49.8	49.5	51.0	53.0	55.0	55.4	54.5	61.0	62.3	62.1	-0.4	1.97
Other Middle East	17.8	19.5	21.7	19.1	17.7	18.0	18.0	19.3	20.3	20.4	0.7	0.65
Total Middle East	**293.2**	**302.1**	**331.6**	**347.1**	**359.1**	**368.9**	**391.2**	**418.9**	**437.6**	**461.3**	**5.4**	**14.62**
Africa												
Algeria	21.0	22.5	21.8	23.0	25.7	27.6	31.0	32.6	33.2	33.4	0.7	1.06
Egypt	33.8	35.2	37.3	41.1	43.5	42.6	39.7	39.6	42.4	48.1	13.4	1.53
Morocco	0.5	0.6	0.6	0.8	1.0	1.0	1.0	1.0	1.0	1.0	-0.9	0.03
South Africa	3.4	2.9	3.5	3.7	3.7	3.5	3.7	3.8	4.0	3.9	-2.6	0.12
Eastern Africa	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.4	1.7	1.9	6.9	0.06
Middle Africa	2.0	2.1	2.5	2.6	2.7	2.2	2.4	2.7	3.2	3.4	6.0	0.11
Western Africa	14.1	9.6	11.2	12.5	12.9	11.9	16.4	20.9	18.6	19.2	3.4	0.61
Other Northern Africa	9.4	10.0	10.6	8.7	9.4	10.6	9.7	9.5	10.4	11.0	6.1	0.35
Other Southern Africa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Africa	**84.8**	**83.6**	**88.2**	**93.1**	**99.9**	**100.3**	**105.0**	**111.4**	**114.5**	**121.9**	**6.5**	**3.86**
Asia Pacific												
Australia	24.5	25.1	29.0	30.3	30.4	32.0	34.5	36.2	35.9	36.0	0.3	1.14
Bangladesh	14.1	16.1	16.6	16.8	18.3	18.9	19.8	22.2	22.7	22.9	0.5	0.72
China	70.4	77.6	93.6	116.2	129.7	147.8	162.0	167.4	180.1	206.7	14.8	6.55
China Hong Kong SAR	2.6	2.5	3.1	2.5	2.3	2.2	2.1	2.7	2.7	2.7	-0.3	0.09
India	**34.4**	**41.6**	**51.2**	**52.7**	**48.7**	**42.8**	**42.7**	**39.9**	**43.7**	**46.6**	6.6	**1.48**
Indonesia	34.1	36.2	37.9	36.7	36.9	35.6	35.7	35.3	32.9	33.7	2.4	1.07
Japan	84.4	78.7	85.1	95.0	105.3	105.2	103.6	102.1	100.1	100.7	0.6	3.19
Malaysia	37.4	34.4	34.2	32.9	36.1	38.3	38.4	37.8	36.1	36.8	2.1	1.17
New Zealand	3.4	3.6	3.9	3.5	3.8	4.0	4.4	4.0	4.2	4.2	-0.8	0.13
Pakistan	29.8	29.8	30.4	30.4	31.5	30.6	30.1	31.4	32.9	35.0	6.4	1.11
Philippines	3.2	3.2	3.0	3.3	3.1	2.9	3.0	2.9	3.3	3.2	-0.9	0.10
Singapore	7.5	7.9	7.2	7.1	7.7	8.6	8.9	10.0	10.2	10.6	3.2	0.33
South Korea	32.1	30.5	38.7	41.7	45.2	47.3	43.0	39.3	41.0	42.4	3.6	1.35
Sri Lanka	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Taiwan	10.5	10.2	12.7	14.0	14.7	14.7	15.5	16.5	17.2	19.1	10.9	0.60
Thailand	31.8	32.8	37.2	38.1	41.8	42.0	42.9	43.8	43.5	43.1	-1.0	1.36
Vietnam	6.2	6.6	7.8	7.0	7.8	8.1	8.5	8.8	8.8	8.1	-7.7	0.26
Other Asia Pacific	5.5	4.7	5.8	6.5	7.3	7.4	8.7	10.3	9.8	10.0		
Total Asia Pacific	**431.9**	**441.6**	**497.3**	**534.7**	**570.6**	**588.4**	**603.7**	**610.6**	**625.1**	**661.8**	**5.9**	**20.97**
TOTAL WORLD	**2607.2**	**2534.6**	**2730.8**	**2786.8**	**2860.8**	**2899.0**	**2922.3**	**2987.3**	**3073.2**	**3156.0**	**2.7**	**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.

Download Table 9.4

CHAPTER 10: ENERGY INDICATORS

The availability of resources and the reliability of their supply are essential for a sustainable economic growth. All sectors of the economy including residential, commercial, transportation, service and agricultural sectors depend on secure, sufficient and efficient energy services. Job availability, industrial productivity, urban and rural development and all major economic activities are strongly affected by energy input. The most important form of energy, viz. electricity is an important and sometimes irreplaceable input to modern productive activities, communication, dissemination of information and other service industries.

10.1 ENERGY INDICATORS

Energy indicators are the medium to provide a snap shot of the energy scenario of the country. They help to understand the various aspects of energy and are capable of detecting the grey areas in the complete chain of energy flow. Energy and energy efficiency indicators are indispensable tools for identifying and understanding the key drivers of trends, and for prioritizing interventions to control energy consumption growth. Indicators are also effective in quantifying the potential impact and benefits of interventions. While defining and constructing energy indicators is rather flexible, their accuracy strongly depends on the quality and detail of available energy end-use data.

As per “Energy Indicators for Sustainable Development: Guidelines and Methodology” the list of indicators includes indicators on Social, Economic and Environment. While the importance of these various indicators is recognized and since Social and Environmental indicators require additional levels of detail than that are presented in Energy Statistics his report is restricted to the economic dimension only due to non-availability of data or Energy Balance and therefore only Economic Indicators are presented in this publication.

Yet, choosing and developing appropriate indicators to support the development of policies is not straightforward. This publication should enable energy analysts and policy makers to: Identify priority areas for the development of energy sector and develop a strategy to advance policy development through the improved use of indicators to track progress of energy policies. No set of energy indicators can be final and definitive. To be useful, indicators must evolve over time to fit country-specific conditions, priorities and capabilities. The information inherent in these indicators is not only meaningful for internal management, but also of interest for external users.

10.2 ECONOMIC DIMENSION AND ENERGY INDICATORS

Modern Economies are highly dependent on reliable and adequate energy supply owing to the fact that it's the prerequisite for industrialization. All sectors of the economy-residential, commercial, transport, services and agriculture, demand energy in different forms. In turn, these sectors foster growth on economic and social front. Energy supply affects employment, productivity and development. Owing to the economic importance of energy it is important to develop the economic energy indicators and provide a profound basis for strategic changes and policy making.

The economic indicators have two themes: Use & production patterns and Security. The first has the sub theme of Overall Use, Overall Productivity, Supply Efficiency, Production, End Use, Diversification (Fuel Mix) and Prices. The second has the sub themes of Imports and strategic Fuel stocks.

Table: 10.1 List of Energy Indicators

Theme	Sub-theme	
Use and Production Pattern	Overall Use	Energy use per capita
	Overall Productivity	Energy use per unit of GDP
	Supply Efficiency	Efficiency of energy conversion and distribution
	Production	Reserves-to-production ratio
		Resources-to-production ratio
	End Use	Industrial energy intensities
		Agricultural energy intensities
		Transport energy intensities
	Diversification (Fuel Mix)	Fuel shares in energy and electricity
		Non-carbon energy share in energy and electricity
		Renewable energy share in energy and electricity
	Prices	WPI of energy sources
Security	Imports	Net Energy Import Dependency
	Strategic fuel stocks	Stocks of critical fuels per corresponding fuel consumption

The indicators as indicated in the earlier chapter have been classified under two themes Use and Production Pattern and Security. Indian scenario for each of these indicatorshas been presented in the current chapter. The indicators have been numbered irrespective of their theme and sub- theme

10.3. THEME: USE AND PRODUCTION PATTERN

This theme is further sub classified into sub themes as Overall Use, Overall Productivity, Supply Efficiency, Production, End Use, Diversification (Fuel Mix) and Prices.

- SUB THEME: OVERALL USE

10.3.1. Energy Indicator: Energy Use per Capita-

- Purpose and Measurement method**:** This indicator measures the level of energy use on per capita basis and reflects the energy-use patterns and aggregate energy intensity of a society. It is calculated as the ratio of the total annual use of energy to the mid-year population. It may be further classified as follows:

    a) Total Primary energy supply per capita
    b) Total Final consumption of energy per capita
    c) Electricity use per capita

- SUB THEME: OVERALL PRODUCTIVITY

10.3.2. Energy Indicator: Energy Use Per Unit of GDP

- **Purpose and Measurement method: This indicator reflects the trends in overall** energy use relative to GDP, indicating the general relationship of energy use to economic development. This indicator is calculated as the ratio of energy use to economic output. Here Energy Use indicates Total Primary Energy Supply (TPES), Total Final Consumption (TFC) and final electricity consumption and Output is taken as GDP measured in thousand INR. It may be further classified as follows:

    a) Total Primary energy supply per 000’ rupees
    b) Total Final consumption of energy per 000’rupees
    c) Electricity Use per 000’ rupees

- SUB THEME: PRODUCTION

10.3.3. Energy Indicator:

I. Reserve-to-Production Ratio

- **Purpose and Measurement method:** – The purpose of this indicator is to measure the availability of national energy reserves with respect to corresponding fuel production. Reserves are generally defined as identified

(demonstrated and inferred) resources that are economically recoverable at the time of assessment. The indicator provides a basis for estimating future energy supplies in years with respect to current availability of energy reserves and levels of production.

It is computed by dividing the proven energy reserves of a commodity at the end of a year by the total production of that commodity in that year.

II. Resources To Production Ratio

- **Purpose and Measurement method:** – The purpose of this indicator is to measure the availability of national energy resources with respect to corresponding fuel production. Total resources include reserves, and hypothetical and speculative undiscovered resources. It provides a relative measure of the length of time that resources would last if production were to continue at current levels.

  The lifetime of fuel resources in terms of years by using resources-to-production ratio is computed by dividing the total energy resources of a commodity at the end of a year by the total production of that commodity in that year.

➢ SUB THEME: END USE

10.3.4. Energy Indicator: End Use Energy Intensities

I. Industrial Energy Intensities-

- **Purpose and Measurement method:** – This set of indicators measures the aggregate energy use of the industrial sector and selected energy intensive industries per corresponding value added. Intensities provide information about the relative energy use per thousand units of output. The set is used to analyze trends in energy efficiency and evaluating trends in technological improvements. It is measured as Energy Use per thousand units of value added by industrial sector and by selected energy intensive industries.

II. Agricultural Energy Intensities

- **Purpose and Measurement method:** – This indicator is a measure of aggregate energy intensity in the agricultural sector that can be used for analyzing trends, particularly in renewable and non-commercial energy use. It is measured as Energy Use per thousand units of value added by Agriculture sector.

III. Transport Energy Intensities

- **Purpose and Measurement method:** – This indicator is used to monitor trends in energy use in the Transport sector. It is measured as Energy Use per thousand units of value added by Transport sector. The transport indicators measure how much energy is used for moving both goods and people. Transport is a major user of energy, mostly in the form of oil products, which makes transport the most important driver behind growth in global oil demand.

  It is evident from the value of the indicator that industrial sector and transport sector are energy intensive. It must be noted that changes in the aggregate indicator can also be due to change in relative output of the sector. Hence we can say that the difference seen across the time development do not necessarily reflect differences in energy efficiency.

➢ SUB THEME: DIVERSIFICATION

10.3.5. Energy Indicator: Fuel share in energy and electricity

I. Fuel Share in Energy
II. Fuel Share in Electricity

- **Purpose and Measurement method:** – This indicator provides the share of fuels in TPES, TFC and electricity generation. This indicator is computed by calculating the ratio of consumption or production of the specific energy fuels identified above to total energy use or production with respect to:
  i. TPES,
  ii. TFC and
  iii. Electricity generation

10.3.6. Energy Indicator: Non carbon energy share in energy and electricity

I. Non Carbon Energy Share in Energy
II. Non Carbon Energy Share in Electricity

- **Purpose and Measurement method:** – This indicator measures the share of non-carbon energy sources in TPES and electricity generation. Share of non-carbon energy in TPES is computed by calculating the ratio of primary supply of non-carbon energy to TPES. The share of non-carbon in electricity generation is the total electricity generated from non-carbon energy sources divided by total electricity generated.

10.3.7. Energy Indicator: Renewable energy share in energy and electricity

I. Renewable Energy Share in TPES
II. Renewable Energy Share in TFC

III. Renewable Energy Share in Electricity

- **Purpose and Measurement method:** – This indicator measures the share of Renewable energy in TPES, TFC and electricity generation. This indicator is computed by calculating the ratio of the consumption and production of renewables to total final energy supply and production. The share of renewables in electricity is the electricity generated from renewables divided by total electricity generated.

➢ SUB THEME: PRICES

10.3.8. Energy Indicator: WPI of Energy Sources

- **Purpose and Measurement method:** – This is a price indicator of energy sources and reflects the price change with respect to base year 2011-12. It is to be noted that energy prices are driving forces for incentive or conservation, or efficiency improvements. Also, it shows affordability and therefore is one of the factors responsible for fuel diversification.

➢ SUB THEME: SUPPLY EFFICIENCY

10.3.9. Energy Indicator: **Efficiency of energy conversion and distribution**

- **Purpose and Measurement method:** – This indicator measures the efficiency of energy conversion and distribution systems in various energy supply chains including losses occurring during electricity transmission and distribution, and gas transportation and distribution. Due to constraint of data availability only the losses in transmission of electricity are used. The indicator is calculated as ratio of losses in transmission of electricity to electricity generated.

10.4 THEME: SECURITY

➢ SUB THEME: STRATEGIC FUEL STOCKS

10.4.1 Energy Indicator: Stock of Critical Fuels per Corresponding Fuel consumption

- **Purpose and Measurement method:** – The purpose of this indicator is to measure the availability of national stocks of critical fuels, such as oil, with respect to corresponding fuel consumption. Many countries maintain stocks of oil in anticipation of disruptions in oil supply. For some countries, the critical fuel might be natural gas or other types of fuel. In Indian context we have taken coal as critical fuel. The indicator provides a relative measure of the length of time that stocks would last if supply were disrupted and fuel use were to continue at current levels. This indicator is defined by dividing the stocks of

the critical fuels maintained by countries by the corresponding annual fuel consumption.

- SUB THEME: IMPORTS

10.4.2 Energy Indicator: Net energy import dependency

- **Purpose and Measurement method:** – This indicator measures the extent to which a country relies on imports to meet its energy requirements. This indicator is computed by calculating the ratio of net imports to consumption. Petroleum products are excluded as India is net exporter of them and have taken into account only the import value of different energy sources to calculate the indicator.

Table 10.2 : ENERGY INDICATORS (2017-18) AT A GLANCE

Theme	Sub-theme	Indicator	Category	Unit	Value
Use and Production Pattern	Overall Use	Energy use per capita	TPES	toe/person	0.64
			TFC	toe/person	0.42
			Electricity	Kwh/person	858.85
	Overall Productivity	Energy use per unit of GDP	TPES	toe/000'rupees	0.006
			TFC	toe/000'rupees	0.004
			Electricity	Kwh/000'rupees	8.64
	Supply Efficiency	Efficiency of energy conversion and distribution	All	%	19.93
	Production	Reserves-to-production ratio	All	years	178.00
			coal	years	220.00
			lignite	years	141.00
		Resources-to-production ratio	All	years	402.00
			Crude oil	years	17.00
			Natural Gas	years	41.00
			Coal	years	472.00
			Lignite	years	987.00
	End Use	Sectoral Energy Intensities	Industry	toe/000'rupees	0.009
			Agriculture	toe/000'rupees	0.001
			Transport	toe/000'rupees	0.009
		Sectoral Electricity Intensities	Industry	Kwh/000'rupees	13.35
			Agriculture	Kwh/000'rupees	11.33
			Transport	Kwh/000'rupees	2.43
	Diversification (Fuel Mix)	Fuel shares in TPES	Crude Oil	%	31.26
			Natural Gas	%	6.50
			Coal	%	62.92
			RE &Others	%	-0.67
		Fuel share in TFC	Oil Products	%	37.49
			Natural Gas	%	5.69
			Coal	%	39.27
			Electricity	%	17.55
		Fuel share in electricity	Thermal	%	81.91
			Nuclear	%	2.58
			Hydro	%	8.49
			RE (other than Hydro)	%	7.02
Security	Imports	Net energy import dependency	Overall	%	39.21
			Crude Oil	%	86.07
			Natural gas	%	44.78
			Coal	%	25.58
			Electricity	%	0.43
	Strategic Fuel Stocks	Stocks of critical fuels per corresponding fuel consumption	Coal	%	6.80

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.

iv. **Proved Reserves**: A 'Proven Mineral Reserve' is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified.

v. **Indicated Reserves:** An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

vi. **Inferred Reserves**: An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. Due to the uncertainty that may be attached

to Inferred Mineral Resources, it cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration. Confidence in the estimate is insufficient to allow the meaningful application of technical and economic parameters or to enable an evaluation of economic viability worthy of public disclosure. Inferred Mineral Resources must be excluded from estimates forming the basis of feasibility or other economic studies

2. Liquid fuels

i. **Crude petroleum/Oil** 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 Gas** LPG refers to liquefied propane (C_3H_8) and butane (C_4H_{10}) 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** 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 percent 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 gas liquids (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. **Non-Utilities**: An Independent Power Producer which is not a public utility, but which owns facilities to generate electric power for sale to utilities and end users. They may be privately held facilities, corporations, cooperatives such as rural solar or wind energy producers, and non-energy industrial concerns capable of feeding excess energy into the system

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

v. **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.

vi. **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.

5. Production of Energy Products 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.

6. **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**.**

7. **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**.**

8. **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.

9. **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.

10. 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 fiber which remains after juice extraction in sugar cane processing.

11. Other important definitions:

i. **Gross Domestic Product** (GDP) is the broadest quantitative measure of a nation's total economic activity. More specifically, GDP represents the monetary value of all goods and services produced within a nation's geographic borders over a specified period of time.

ii. **Energy Use** indicates Total Primary Energy Supply (TPES), Total Final Consumption (TFC) and final electricity consumption.

iii. **Transformation/Conversion Losses:** When one form of energy is converted into another form, the amount of losses are referred as transformation/conversion losses.

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	=	15.13 petajoules of energy
One million tonnes of oil equivalent (MTOE)	=	15.13 petajoules of energy
One billion cubic meter of natural gas	=	38.52 petajoules of energy
One million cubic meter of natural gas	= =	38.52 terajoules of energy 0.03852 petajoules of energy
One billion kilowatt hour of electricity	=	3.60 petajoules 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

Categorisation of Coal in India

Grading of Coking Coal based on ash content

Grade	Ash Content
Steel Gr I	Ash content < 15%
Steel Gr II	15%<=Ash content<18%
Washery Gr.I	18%<=Ash content<21%
Washery Gr.II	21%<=Ash content<24%
Washery Gr.III	24%<=Ash content<28%
Washery Gr.IV	28%<=Ash content<35%

Grading of Non Coking Coal based on Gross Calorific Value(GCV)

Grade	GCV Range (Kcal/Kg)
G1	GCV exceeding 7000
G2	GCV between 6701 and 7000
G3	GCV between 6401 and 6701
G4	GCV between 6101 and 6400
G5	GCV between 5801 and 6100
G6	GCV between 5501 and 5800
G7	GCV between 5201 and 5500
G8	GCV between 4901 and 5200
G9	GCV between 4601 and 4900
G10	GCV between 4301 and 4600
G11	GCV between 4001 and 4300
G12	GCV between 3700 and 4000
G13	GCV between 3400 and3700
G14	GCV between3101 and 3400
G15	GCV between 2801 and 3100
G16	GCV between 2501 and2800
G17	GCV between 2201 and 2500

Source: Office of the Coal Controller

ANNEX- V

Energy Data Collection Mechanisms

I. Coal and Coal Derivatives

I.1 Organizational set up: The Coal controller's Office is a subordinate office of Ministry of Coal having headquarters 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) look's after the 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)	Monthly
4. Pit head closing stock (from coal/ lignite company)	Monthly
5. Price (for non-captive coal mines)	Monthly
6. Wagon Loading (Rail)(from CIL/ SCCL)	Monthly
7. Import & Export (DGC&S)	Monthly
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, Middling, 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 entrusted with the responsibility of exploration and production of oil and natural gas, their refining, distribution and marketing, import, export and conservation of petroleum products and liquefied natural gas.

II.1. Organizational set up and activities

Ministry of Petroleum and Natural Gas has an Economic and Statistics Division headed by Senior Adviser. The Division provides economic and statistics related inputs to all the Divisions of the Ministry as well as other Ministries / Departments. An exhaustive data base is maintained on important parameters of oil and gas sector. This Division is involved in the plan formulation exercise of the Central public sector enterprises (CPSEs) associated with petroleum exploration, production, refining, distribution & marketing, import, export and conservation of Petroleum products. This Division also handles matters related to foreign direct investment (FDI) policy in the Oil and Gas sector and issues related to Double Taxation, Action plan under Swachh Bharat Abhiyaan / Swachhta Pakhwada by CPSEs as well as MoPNG. The Division is also involved in monitoring projects of Oil & Gas CPSEs and facilitating pending issues of projects under Oil and Gas Sector with Centre & States at various fora like PRAGATI, e-Samiksha, Project Monitoring Group (PMG) of PMO and in meetings chaired by the Hon'ble Prime Minister.

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

- **Weekly &Monthly Reports on Petroleum Statistics:** Collection, compilation and submission of Reports on:

  (i) Weekly Production Report: Weekly report on Crude Oil and Natural Gas production in the country and by ONGC Videsh Ltd. abroad.
  (ii) Monthly Production Report: Monthly report on production of Crude Oil, Natural Gas, refinery production, refinery capacity utilization prepared by the 25th day of the following month and circulated to Ministries / Departments.
  (iii) Monthly data on Imports / Exports: Monthly data on import of Crude Oil, Petroleum products and export of Petroleum products compiled and circulated to relevant Ministries / Departments.
  (iv) Joint Organization Data Initiative (JODI): JODI data on Oil and Gas summited monthly to United Nations Statistics Division.

- **Annual Publication: Indian Petroleum & Natural Gas Statistics**

II.2. Details of the data flows and items

Data Collected: Production of Crude Oil, Natural Gas, Petroleum Products, Imports of Crude Oil, Petroleum products & LNG, export of Petroleum products and Consumption of

Petroleum Products and Natural Gas are collected on monthly basis. Data published in Indian Petroleum and Natural Gas Statistics are collected annually.

Periodicity & Data Sources: Data are collected from all Public Sector Undertakings and Private Oil Companies and Joint Venture companies of Oil and Gas Sector on weekly, monthly, quarterly and yearly basis as applicable for a given dataset.

Methods of Data Collection: Data collected through e-mail, FAX as well as hard copies by post.

Data Dissemination Methods: Monthly, Quarterly and Annual Reports circulated to all concerned and also uploaded on Ministry's website.

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

(i) For Returns on Crude Oil and Natural Gas

(a) Principal Legislation:

The Oilfields (Regulation and Development) Act, 1948 (53 of 1948) (8th September, 1948)

XXXXXX

5. Power to make rules as respects mining leases

XXXXXX

6. Power to make rules as respects development of mineral oil

XXXXXX

(b) Subordinate Legislation:

The Petroleum and Natural Gas Rules, 1959 (As amended from time to time)

G.S.R.1288. In exercise of the powers conferred by sections 5 and 6 of the Oilfields (Regulation and Development) Act, 1948 (53 of 1948) and in supersession of the Petroleum Concession Rules, 1949, the Central Government hereby makes the following rules, regulating the grant of exploration licenses and mining leases in respect of petroleum and natural gas which belongs to Government, and for conservation and development thereof, namely: -

THE PETROLEUM AND NATURAL GAS RULES, 1959

XXXXXX

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

XXXXXX

(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 quality 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 returns 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

(a) Principal Legislation:
The Industries (Development and Regulation) Act, 1951, (Act No. 65 of 1951)

30. Power to make rules:
(1) The Central Government may, subject to the condition of previous publication, make rules for carrying out the purposes of this Act.
(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely: -

XXXXXX

(g) the collection of any information or statistics in respect of any scheduled industry;

XXXXXX

XXXXXX

2. Fuels:

XXXXXX

(2) Mineral oil (crude oil), motor and aviation spirit, diesel oil, kerosene oil, fuel oil, diverse hydrocarbon oils and their blends including synthetic fuels, lubricating oils and the like.
(3) Fuel gases-(coal gas, natural gas and the like)

(b) Subordinate Legislation:

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

8. (1) 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".

8. (2) "Every marketing 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 refinery, stocking, movements (onshore or offshore), transfers, imports, exports and sales of crude and or all products, refined there from, at such period, in such manner and from such of the sources, as may 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.

i. Delay in furnishing data.
ii. Furnishing incomplete/ incorrect data.
iii. Non submission of data.

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

IV. New and Renewable Energy

IV.1. Nodal ministry

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

IV.2. Organisational setup

It is broadly organized into eight Groups dealing with 'Bio-Energy, Research & Development and TIFAD (Technology Information Forecasting, Assessment and Databank), Solar Energy', and Remote Village Electrification', Biomass and Wind Power', 'Energy for Urban, Industrial & Commercial Applications', 'Small Hydro and Information & Public Awareness', 'Hydrogen Energy' and 'Administration and Coordination'. In

addition, the Ministry has an Integrated Finance Division, which is functioning under the Special Secretary and Financial Adviser. The Ministry is classified as a Scientific Ministry.

IV.3. Current responsibilities

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

(a) Coordinating and intensifying research and development activities in new and renewable sources of energy;

(b) Ensuring implementing of Government's policies in regard to all matters concerning new and renewable sources of energy.

IV.4. Data flows

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

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