Chapter | 3

Production of Energy Resources

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Production

Energy production and consequently its' availability directly affects future production, imports, exports and investment, all of which have a significant impact on a country's economy. Detailed and high-quality energy statistics provide policy makers with the information needed to make informed decisions and evaluate possible trade-offs including planning for global price shocks in energy commodities.

Data on production of energy commodities, and stock changes are also required for monitoring national energy security. In a rapidly changing energy scenario of the world in terms of trade, consumption and stock levels, problems with national energy supply often are perceived threatening to national independence, especially if national energy resources do not meet energy demands.

In Energy Statistics, production is defined as the capture, extraction or manufacture of fuels or energy informs that are ready for general use. 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.

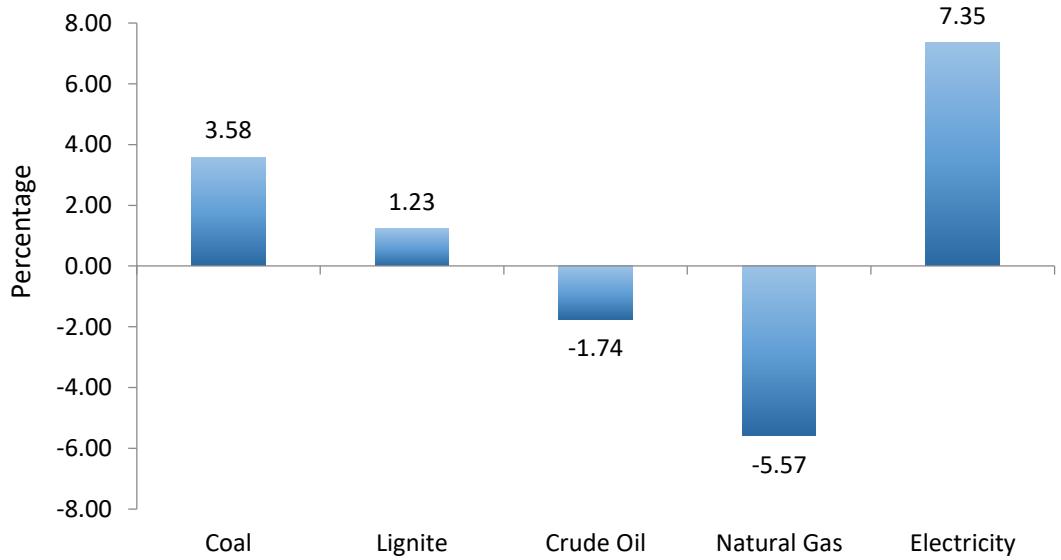
Secondary production is the manufacture of energy products through the process of transformation of other fuels or energy, whether primary or secondary. The quantities of secondary fuels reported as production include quantities lost through venting and flaring during and after production.

This chapter presents the production of different energy resources and electricity.

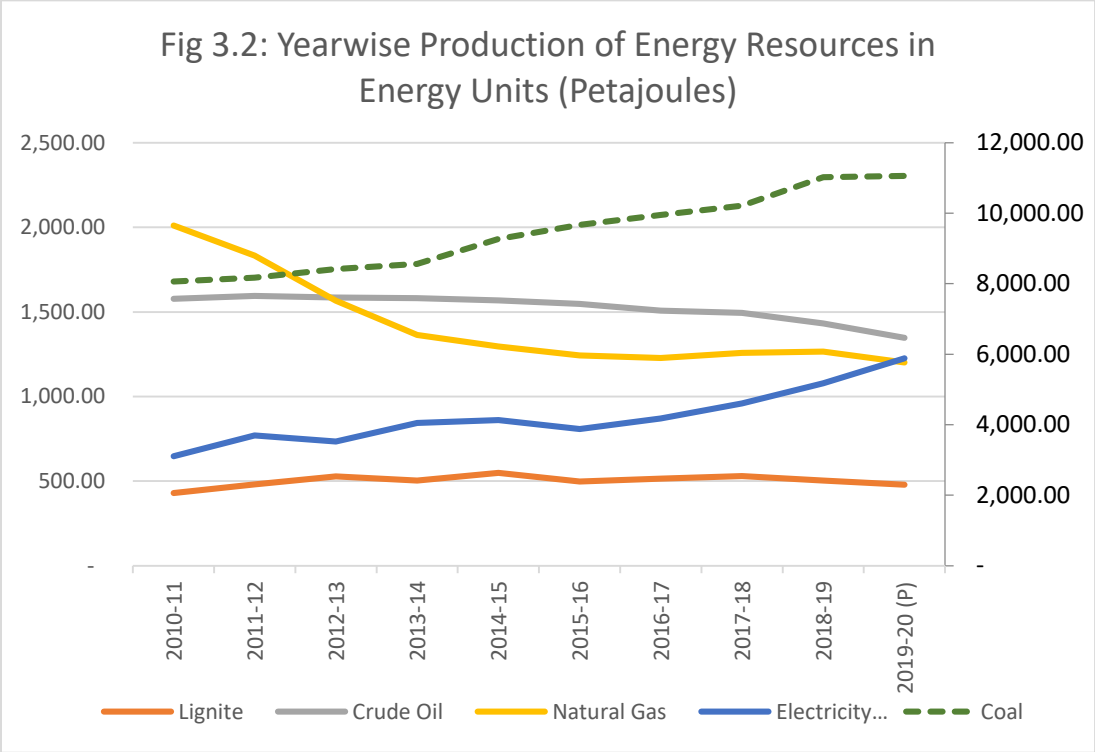
Highlights

- Coal production in the country during the year 2019-20(P) was 730.87 million tonne as compared to 728.72 million tonnes during 2018-19, growing at the rate of 0.30%. The overall trend of production in the last ten years i.e. 2010-11 to 2019-20 has shown a steady increase with a CAGR of 3.58%(Table 3.1).
- The Lignite production during 2019-20 (P) reduced to 42.10 million tonnes from the figure of 44.28 million tonnes in 2018-19 which is 4.92% lower than the production in 2018-19. However, the CAGR of Lignite was about 1.23% with production increasing from 37.73 million tonnes in 2010-11 to 42.10 million tonnes in 2019-20 (P).
- Similarly, Production of crude oil for 2019-20 (P) was 32.17 MT as compared to 34.2 MT in the previous year which is a fall of 5.95%.
- The CAGRs for natural gas and electricity were (-) 5.57% and 7.35% respectively for the period 2010-11 to 2019-20 (P) with Electricity showing the highest CAGR among all the resources of energy during this period.

Fig 3.1: Compound Annual Growth Rate of Production of Energy Resources from 2010-11 to 2019-20 (P)

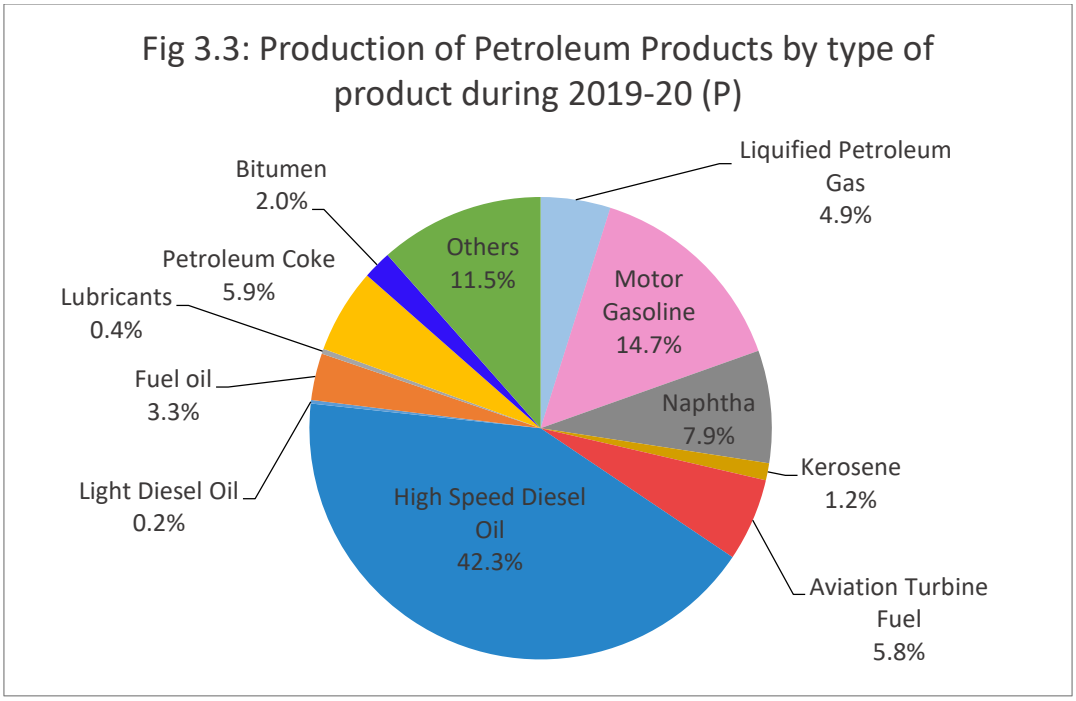


- To allow comparison among and aggregation of production by different sources of energy, production has been converted in terms of energy units, Petajoules. It may be seen that the total production of energy resources increased from 15305.45 petajoules during 2018-19 to 15311 petajoules during 2019-20(P), showing an increase of 0.04%(Table 3.2).
- Coal was the major source of energy, accounting for about 72.22% of the total production during 2019-20 (P). However, although Crude Oil was the second major resource but only 8.79% of the total production of energy was contributed by Crude Oil.

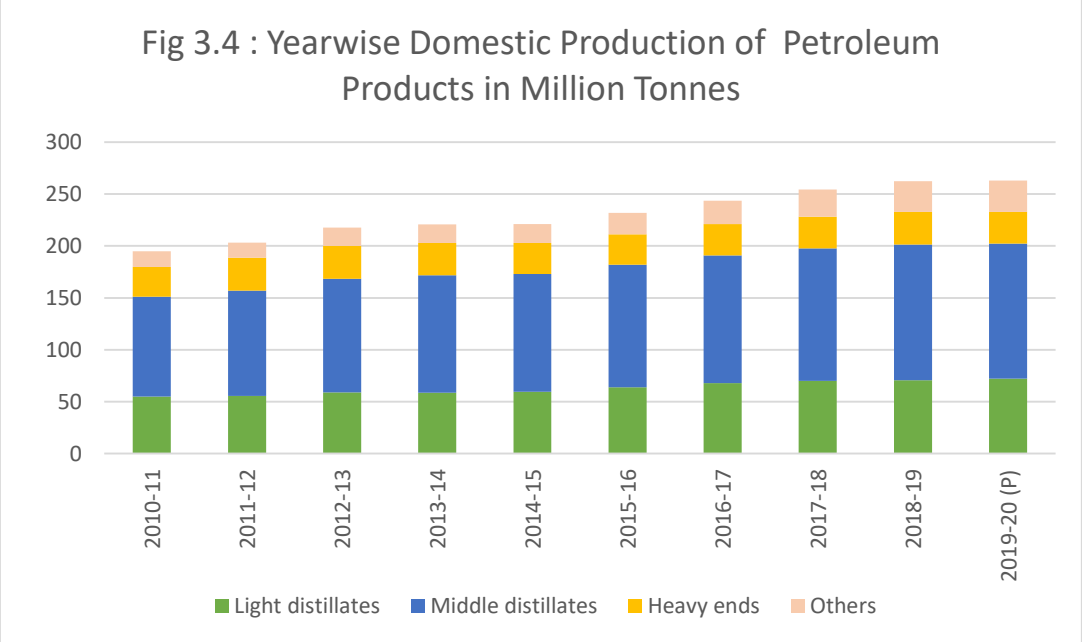


**Coal is plotted on the secondary axis on the right side

- In the year 2018-19, the production of Petroleum Products in the country was 262.36 MT as against 262.94 MT during 2019-20(P), an increase of 0.22%. In the total production of Petroleum Products during 2019-20(P), High Speed Diesel Oil accounted for the maximum share (42.13%), followed by Motor Gasoline (14.70%). (Table 3.4).



- The year-wise growth of domestic production of Petroleum Products for different categories of distillates has seen an increasing trend over the years 2010-11 to 2019-20(P) with middle and light distillates moving more rapidly than heavy ends over the same period.



- Net production of Natural Gas for consumption decreased from to 32.05 Billion Cubic Meters(BCM) in 2018-19 to 30.26 BCM in 2019-20(P) registering a shrinkage of 5.61% (Table 3.5).
- The gross electricity generation from utilities grew at a CAGR of 5.63% in the last ten years from 2010-11 to 2019-20(P).
- Also, in terms of year on year growth, from 2018-19 to 2019-20(P), gross generation of electricity from Hydro, Nuclear and other Renewable Resources from Utilities grew at 15.48%, 22.90% and 9.13% respectively whereas a decline in growth rate of 2.75% is seen from Thermal resources. Thus depicting the shift and focus on using more renewable and clean sources of energy in this year to meet the growing energy demands of the country. (Table 3.6).

Table 3.1 : Yearwise Production of Energy Resources in Physical Units

Year	Coal (million tonnes)	Lignite (million tonnes)	Crude Oil (million tonnes)	Natural Gas (Billion Cubic Metres)	Electricity (Hydro, Nuclear and RES) (GWh)
1	2	3	4	5	6
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	612.44	48.27	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	675.40	46.64	35.68	32.65	2,66,308.30
2018-19	728.72	44.28	34.20	32.87	2,99,465.00
2019-20 (P)	730.87	42.10	32.17	31.18	3,40,578.57
Growth rate of 2019-20 over 2018-19 (%)	**0.30**	**-4.92**	**-5.95**	**-5.14**	**13.73**
CAGR 2010-11 to 2019-20 (%)	**3.58**	**1.23**	**-1.74**	**-5.57**	**7.35**

(P): provisional

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

#For Natural Gas Gross Production is reported

Sources:

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

Table 3.2 : Yearwise Production of Energy Resources in Energy Units

(in Petajoules) @

Year	Coal	Lignite	Crude Oil	Natural Gas	Electricity (Hydro, Nuclear and RES)	Total
1	2	3	4	5	6	7= 2 to 6
2010-11	8,059.66	429.02	1,577.66	2,011.51	647.74	12,725.60
2011-12	8,169.44	481.31	1,594.83	1,832.01	770.49	12,848.08
2012-13	8,418.36	528.17	1,585.20	1,566.99	734.53	12,833.25
2013-14	8,560.02	503.36	1,582.20	1,363.87	844.54	12,854.00
2014-15	9,266.22	548.83	1,568.49	1,296.48	860.07	13,540.09
2015-16	9,671.55	498.48	1,546.75	1,242.24	808.46	13,767.48
2016-17	9,953.54	514.27	1,507.69	1,228.66	870.63	14,074.79
2017-18	10,218.80	530.34	1,494.10	1,257.65	958.71	14,459.61
2018-19	11,025.50	503.50	1,432.09	1,266.28	1,078.07	15,305.45
2019-20 (P)	11,058.11	478.71	1,346.93	1,201.22	1,226.08	15,311.05
Growth rate of 2019-20 over 2018-19 (%)	**0.30**	**-4.92**	**-5.95**	**-5.14**	**13.73**	**0.04**
CAGR 2010-11 to 2019-20 (%)	**3.58**	**1.23**	**-1.74**	**-5.57**	**7.35**	**2.08**

(P): provisional

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

@ 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*

Table 3.3 : Yearwise Production of Coal - Typewise and Sectorwise

(Million Tonnes)

Year	Coking	Non-coking	Total	Public	Private	Total
1	2	3	4=(2)+(3)	5	6	7=(5)+(6)
2010-11	49.55	483.15	532.69	485.06	47.63	532.69
2011-12	51.66	488.29	539.95	503.84	36.11	539.95
2012-13	51.58	504.82	556.40	521.68	34.73	556.40
2013-14	56.82	508.95	565.77	528.08	37.69	565.77
2014-15	57.45	551.73	609.18	567.03	42.15	609.18
2015-16	60.89	578.34	639.23	606.68	32.55	639.23
2016-17	61.66	596.21	657.87	625.20	32.67	657.87
2017-18	40.15	635.25	675.40	641.77	33.63	675.40
2018-19	41.13	687.59	728.72	694.98	33.74	728.72
2019-20(P)	52.94	677.94	730.87	695.56	35.31	730.87
Growth rate of 2019-20 over 2018-19 (%)	**28.71**	**-1.40**	**0.30**	**0.08**	**4.67**	**0.30**
CAGR 2010-11 to 2019-20 (%)	**0.74**	**3.84**	**3.58**	**4.09**	**-3.27**	**3.58**

(P): Provisional

Source : Office of Coal Controller of India

Table 3.4: Yearwise Domestic Production of Petroleum Products

(Million Tonnes)

Year	Light distillates			Middle distillates			
	LPG	MG	Naphtha	Kerosene	ATF	HSD	LDO
1	2	3	4	5	6	7	8
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	12.38	37.78	20.01	4.41	14.59	107.90	0.56
2018-19	12.79	38.04	19.79	4.07	15.48	110.53	0.70
2019-20 (P)	12.82	38.62	20.68	3.14	15.24	111.20	0.64
Growth rate of 2019-20 over 2018-19(%)	**0.29**	**1.52**	**4.51**	**-22.84**	**-1.56**	**0.60**	**-8.31**
CAGR 2010-11 to 2019-20 (%)	**3.14**	**4.43**	**0.83**	**-9.62**	**5.28**	**4.01**	**0.96**

(p) : Provisional LPG=Liquified Petroleum Gas, MG= Motor Gasoline, ATF= Aviation Turbine Fuel
HSD= High Speed Diesel Oil, LDO= Light Diesel Oil

Source : Ministry of Petroleum & Natural Gas.

Table 3.4 (Contd.): Yearwise Domestic Production of Petroleum Products

(Million Tonnes)

Year	Heavy ends				Others*	Total
	Fuel oil	Lubes	Pet. Coke	Bitumen		
1	9	10	11	12	13	14 = Sum (2-13)
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	9.49	1.04	14.75	5.28	26.21	254.40
2018-19	10.03	0.95	14.68	5.80	29.50	262.36
2019-20 (P)	8.61	0.93	15.53	5.24	30.29	262.94
Growth rate of 2019-20 over 2018-19(%)	**-14.18**	**-1.81**	**5.80**	**-9.63**	**2.67**	**0.22**
CAGR 2010-11 to 2019-20 (%)	**-9.20**	**0.59**	**21.40**	**1.77**	**8.01**	**3.39**

(P): Provisional Lubes= Lubricant, Pet.Coke= Petroleum Coke

$: Includes other Light distillates from 2006-07

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

Source : Ministry of Petroleum & Natural Gas.

Table 3.5 : Yearwise 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
2010-11	52.22	5.21	0.97	**	46.04	51.25
2011-12	47.56	5.28	0.97	0.03	41.28	46.56
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	32.65	5.81	0.82	0.09	25.92	31.73
2018-19	32.87	6.02	0.73	0.09	26.04	32.05
2019-20 (P)	31.18	6.05	0.86	0.07	24.20	30.26
Growth rate of 2019-20 over 2018-19(%)	**-5.14**	**0.60**	**18.44**	**-27.53**	**-7.04**	**-5.61**
CAGR 2010-11 to 2019-20 (%)	**-5.57**	**1.68**	**-1.32**	**-**	**-6.89**	**-5.69**

P : Provisional **:Included in Internal consumption

Total may not tally due to rounding off.

Source : Ministry of Petroleum & Natural Gas.

Table 3.6 (A): Yearwise Gross Generation of Electricity from Utilities

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

Year	Utilities							
	Thermal				Hydro	Nuclear	RES*	Total
	Steam	Diesel	Gas	Total				
1	2	3	4	5	6	7	8	9
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	9,86,591	348	50,208	10,37,146	1,26,123	38,346	1,01,839	13,03,455
2018-19	10,22,265	215	49,834	10,72,314	1,34,894	37,813	1,26,759	13,71,779
2019-20 (P)	9,94,197	199	48,443	10,42,838	1,55,769	46,472	1,38,337	13,83,417
Growth rate of 2019-20 over 2018-19(%)	**-2.75**	**-7.70**	**-2.79**	**-2.75**	**15.48**	**22.90**	**9.13**	**0.85**
CAGR 2010-11 to 2019-20(%)	**6.56**	**-26.53**	**-7.77**	**5.13**	**3.49**	**6.54**	**15.03**	**5.63**

(P)-Provisional * RES: Renewable Energy Sources excluding hydro

Source : Central Electricity Authority.

Table 3.6 (B) : Yearwise Gross Generation of Electricity from Non-Utilities

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

Year	Non-Utilities							Grand Total
	Thermal				Hydro	RES*	Total	
	Steam	Diesel	Gas	Total				
1	10	11	12	13	14	15	16	17
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	1,43,868	8,107	25,362	1,77,337	112	2,328	1,79,777	14,83,232
2018-19	1,84,250	5,334	19,545	2,09,130	270	3,674	2,13,074	15,84,853
2019-20 (P)	1,86,578	4,819	19,473	2,10,869	280	3,851	2,15,000	15,98,417
Growth rate of 2019-20 over 2018-19(%)	**1.26**	**-9.66**	**-0.37**	**0.83**	**3.73**	**4.81**	**0.90**	**0.86**
CAGR 2010-11 to 2019-20(%)	**7.58**	**-4.64**	**2.35**	**5.81**	**6.53**	**15.36**	**5.92**	**5.17**

(P)-Provisional * RES: Renewable Energy Sources excluding hydro

Source : Central Electricity Authority.