CHAPTER 11

ENERGY

The Sustainable Development Goals has been declared as global development agenda declared by the United Nations for sustainable and equitable access to safe water, access to universal and quality health care and education, and promotion of a gender equal world. One of the important goals is SDG -7 is that Government is to ensure access to affordable, reliable, sustainable and modern energy for all.

1.1 The power scenario in Delhi has improved considerably after the power sector reform in July 2002 compared to other states. Now there is a need to continue the 24X 7 uninterrupted power supply and to maintain the power tariff at a stable level and to make electricity affordable for every consumer. In this regard, various steps have been taken, like containing the load-shedding and by subsidizing electricity of the domestic consumers, irrespective of the load:

- Free up to consumption upto 200 units per month of entire bill amount
- Subsidy upto ₹ 800 per month for consumption between 201 to 400 units per month
- Load shedding has dropped to the lowest level in last two decades at 0.03% of the total consumption

1.2 Delhi being the national capital and hub of commercial activities in the Northern Region has very high demand for power. Prosperity of its population generates diversified demand for electricity covering every facet of life. The domestic power tariff in Delhi is the lowest amongst all the metros in the country. The growth in power consumption can also be attributed to large-scale regularization of unauthorized colonies leading to both horizontal and vertical load growth. Better road transport, telecommunication, regular power supply and economic policies have attracted industrial activities and services, thereby raising the demand for power. The priority in the energy sector in Delhi is mainly to maintain uninterrupted power supply and to take care of the increasing power demand. Electricity prices have not been increased in Delhi since 2015. At present, there are about 42 lakh (more than 83% of the total domestic electricity consumers) households in Delhi who are getting electricity subsidy as compared to 2015. The number of electricity consumers in Delhi has grown by 81.74% during the decade (2010-2020).

1.3 Delhi has already achieved 100% electrification. Delhi, being an urban place with high load density, has seen the electricity consumption increasing from 25668 MUs in 2010-11 to 33082 MUs in 2019-20. Delhi has its unique load pattern and peak load problem due to predominant share of domestic consumption and extreme weather conditions. Power sector of Delhi is different compared to other states, while other states have power deficit, Delhi has tied up surplus power in order to cater to the increasing demand and peak load.

1.4 From the month of March-2020, the country has witnessed the outbreak of Covid-19 pandemic and nationwide lockdown was imposed. In order to provide relief to the stakeholders, DERC vide its order dated 07.04.2020, has inter alia, allowed extension in due date for payment of electricity bills during the period March 24, 2020 to June 30, 2020, moratorium for payment of fixed charges to the consumer covered under public utility, Industrial and non-domestic tariff categories, rebate on timely payments, etc.

2. Power Generation

2.1 Indraprastha Power Generation Company Limited (IPGCL) and Pragati Power Corporation Limited (PPCL) are managing following power plants in Delhi having a total installed generation capacity of 1971.2 MW. Two coal based power plants IP Station and Raj Ghat power house have been commercially shut down and are not functional due to environment concern.

2.2 There is 1500 MW Coal Based Indira Gandhi Super Thermal Power Plant set-up in Jhajjar, Haryana by Aravali Power Company Private Limited, which is a joint Venture of NTPC Limited, IPGCL and Haryana Power Generation Corporation Limited with equity participation in the ratio of 50:25:25 respectively. The power generated is being shared equally by Delhi and Haryana. The Commercial Operation of this plant started on 26th April 2013. The Plant, under Stage-I, has 3 units of 500 MW capacity, and all the units have been fully commissioned. There is a future provision of augmenting the capacity by 1320 MW (2 x 660 MW) under Stage-II.

2.3 A new 750 MW Gas Based Combined Cycle Gas Turbine (CCGT) Pragati-II Power Project at Bamnauli is proposed to be set up by Pragati Power Corporation Limited (PPCL). The project has been kept on hold by the Government due to non availability of gas.

Statement 11.1
INSTALLED CAPACITY OF POWER GENERATION IN DELHI

(As on 30th September 2020)

S.No	Companies/Station	Fuel	Units
1.	Indraprastha Power Generation Company Limited (IPGCL)		
	a. Gas Turbine Power Station (GTPS)	Gas	6 x 30 MW (GTs) + 3 x 30 MW (STGs) = 270 MW
2.	Pragati Power Corporation Limited (PPCL)		
	b. Pragati-I Power Station	Gas	2 x 104 MW (GTs) + 1 x 122 MW (STGs) = 330 MW
	c. Pragati-III Power Station, Bawana	Gas	4 x 216 MW (GTs) + 2 x 253.6 MW (STGs) =1371.2 MW
	Total	**--**	**1971.2 MW**

Source: Indraprastha Power Generation Company Limited and Pragati Power Corporation Ltd.

3. Plant Load Factor

3.1 In the electricity industry, plant load factor is a measure of the gross output of a power plant compared to the maximum output it could produce. The performance of the generation stations owned by Delhi Government in terms of Plant Load Factor and Availability Factor is as under:

Statement 11.2
PLANT LOAD FACTOR / AVAILABILITY FACTOR OF POWER PLANTS IN DELHI 2010-2020

(Percentage)

S. No	Year	Rajghat Power House	Gas Turbine Plants	Pragati-I Power Station	Pragati-III Power Station	Average
1.	2011-12	69.01 (68.37)	52.21 (79.41)	88.32 (92.61)	38.36 (68.65)	69.14 (82.31)
2.	2012-13	67.04 (66.94)	55.28 (84.22)	86.77 (90.50)	30.24 (88.04)	54.15 (85.71)
3.	2013-14	32.12 (67.55)	44.01 (85.76)	83.90 (92.62)	9.16 (95.69)	33.71 (91.13)
4.	2014-15	35.82 (56.50)	39.59 (68.80)	63.91 (85.62)	18.60 (92.32)	29.49 (91.52)
5.	2015-16	23.57* (55.88)*	19.69 (74.81)	53.11 (90.25)	15.87 (64.55)	21.77 (72.88)

6.	2016-17	--	29.41 (82.84)	62.46 (90.62)	17.04 (80.70)	26.31 (82.94)
7.	2017-18	--	24.48 (83.07)	67.63 (92.64)	24.60 (74.11)	31.79 (78.25)
8.	2018-19	--	25.35 (81.29)	52.43 (88.36)	30.14 (71.99)	33.22 (76.02)
9.	2019-20	--	21.15 (86.46)	52.76 (96.95)	33.33 (89.26)	34.91 (90.16)
10	2020-21**	--	23.39 (85.91)	58.12 (93.93)	24.16 (85.90)	34.91 (87.25)

Sources: Indraprastha Power Generation Company Limited and Pragati Power Corporation Limited. Figures in parenthesis relates to availability factor.

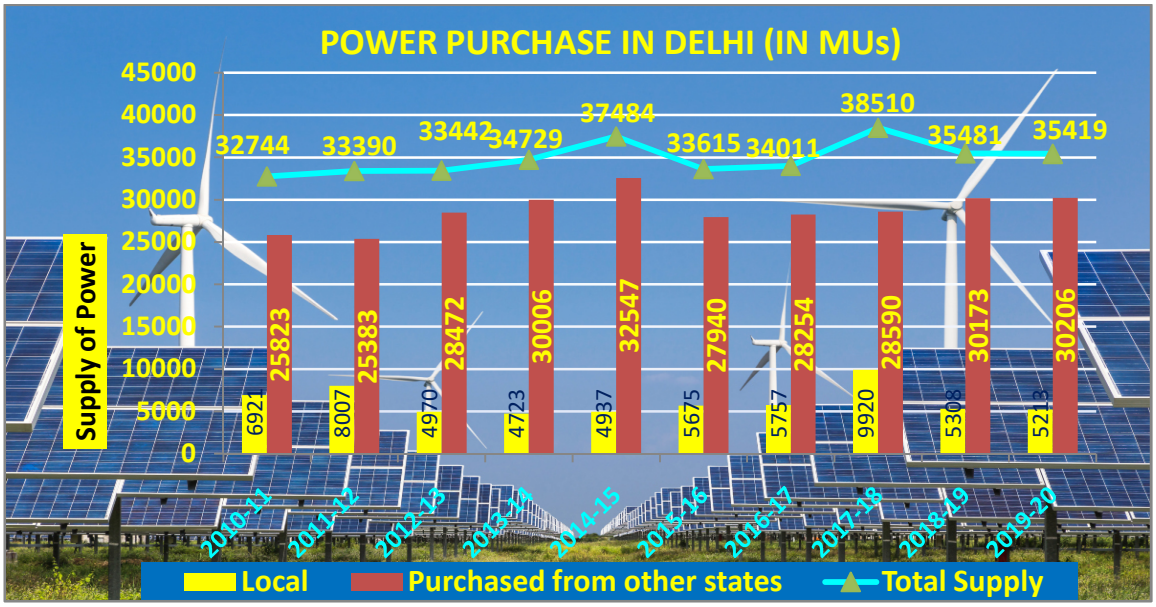
** upto May 2015. ** upto September 2020.*

3.2 It may be inferred from statement 11.2 that the power stations of IPGCL & PPCL have achieved more than 90% average availability during FY 2019-20. Further, IPGCL & PPCL have generated highest ever generation during FY 2019-20. However, the reason for low plant load factor attributed to low scheduled received from System control due to low availability of cheaper domestic gas.

3.3 Power Purchase

The total power purchase in Delhi has grown by 21.37% during the last ten years (from 2009-10 to 2019-20). The power purchased in Delhi has increased from 32744 MU in 2010-11 to 35419 MU in 2019-20. While 14.72% of total power purchase is sourced from own generation by Delhi Govt. Power Plants, 85.28% is purchased from Central Govt. and other sources. The information regarding power purchase in Delhi in last 10 years is presented in Chart 11.1.

Chart 11.1



Source: - Delhi Statistical Handbook, and Power Department, GNCTD

3.4 Power Distribution

The distribution of electricity in Delhi to various categories of consumers increased from 19758 million units in 2010-11 to 30266 million units in 2019-20. Category wise consumption of electricity in Delhi during 2010-11 to 2019-20 is presented in Chart 11.2.

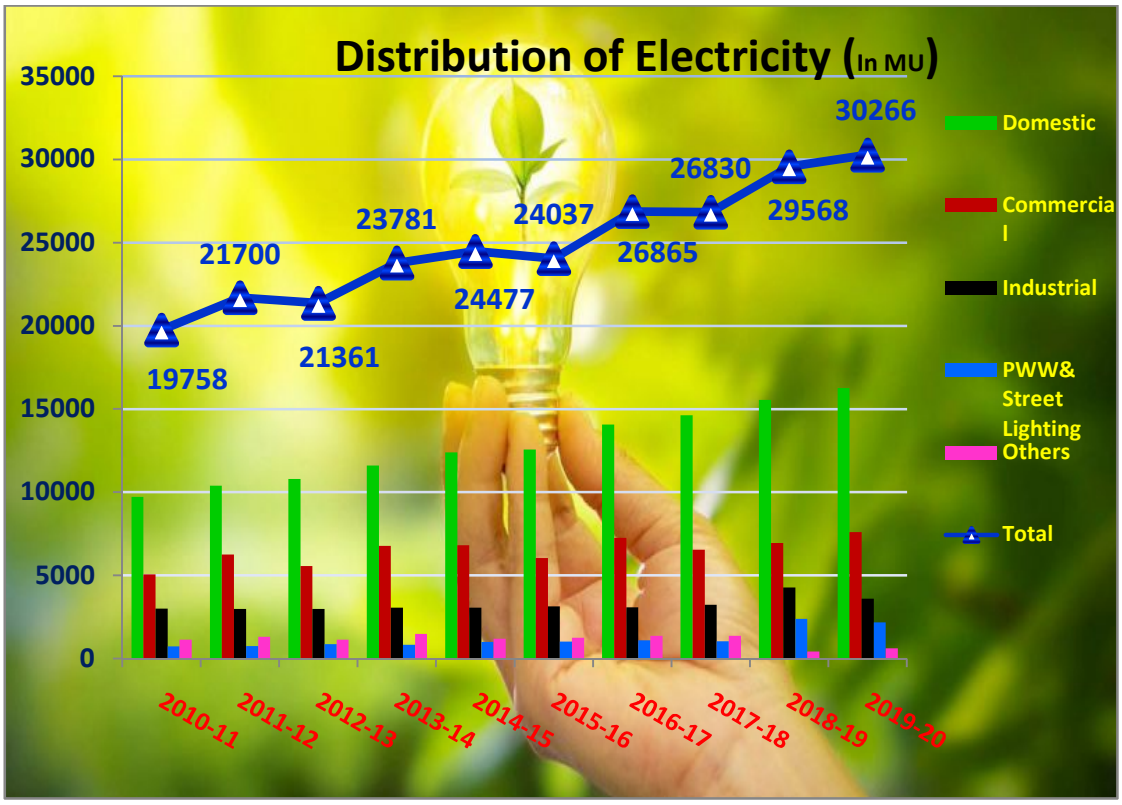
Statement 11.3

DISTRIBUTION OF ELECTRICITY IN DELHI

	Pattern of Electricity Distribution in Delhi (In Million Unit)									
Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Domestic	9723	10396	10796	11609	12386	12560	14060	14627	15541	16253
Commercial	5074	6253	5569	6786	6814	6053	7257	6550	6942	7606
Industrial	3008	2989	2979	3064	3068	3135	3088	3243	4271	3597
PWW& Street Lighting	734	748	870	838	1007	1027	1098	1042	2389	2185
Others	1219	1314	1147	1484	1202	1262	1362	1368	425	625
Total	**19758**	**21700**	**21361**	**23781**	**24477**	**24037**	**26865**	**26830**	**29568**	**30266**

Source: - Delhi Statistical Handbook, DERC letter dt 20.10.2020

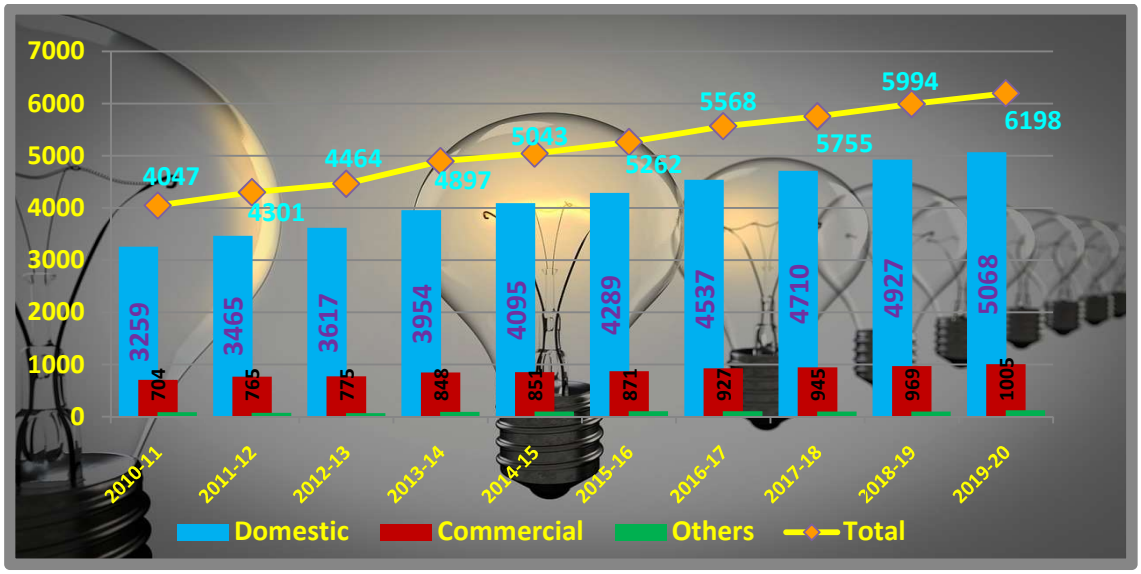
Chart 11.2



3.5 During the period 2010-11 to 2019-20, the number of consumers of electricity in Delhi increased from 40.47 lakh to 61.68 lakh. The information regarding growth of electricity consumers in Delhi in last 10 years is presented in Chart 11.3.

Chart 11.3

GROWTH OF ELECTRICITY CONSUMERS IN DELHI (in '000)

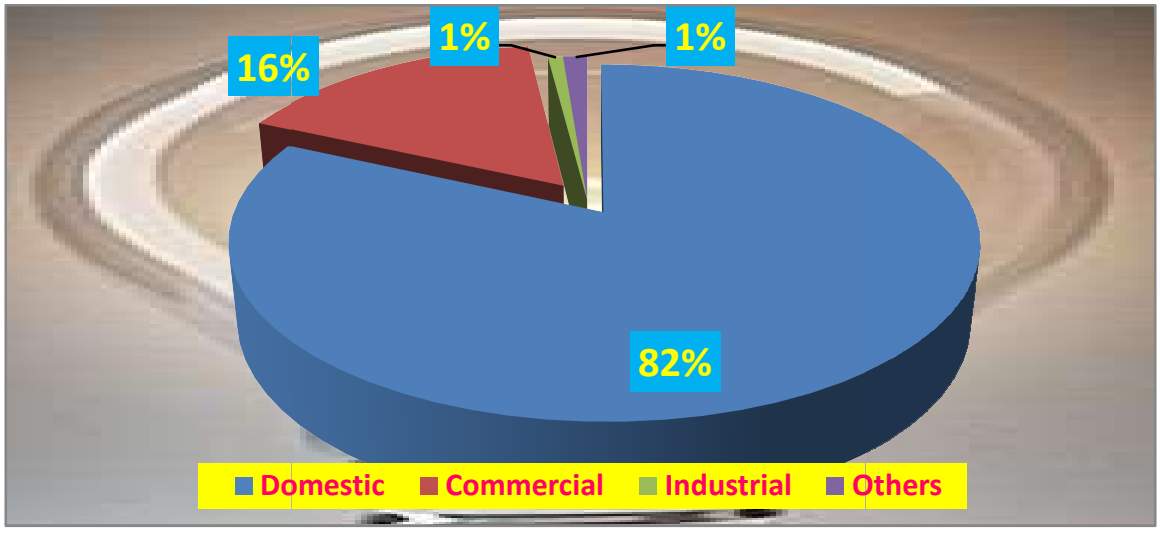


Source: - Delhi Statistical Handbook

3.6 During the period 2010-11 to 2019-20, the number of consumers of electricity in Delhi increased from 40.47 lakh to 61.68 lakh. The electricity consumers has increased 21.21 lakh consumers from 2010-11 to 2019-20. Number of consumers in domestic increased every year in the period covered under the study. While all other consumers mentioned in the chart showed an up and down situation in the period covered. The information regarding number of consumers of electricity in Delhi during 2019-20 is depicted in Chart 11.4

Chart 11.4

NUMBER OF CONSUMERS OF ELECTRICITY IN DELHI: 2019-20



4. Aggregate Technical and Commercial Losses (AT&C)

After reforms in power sector, the AT&C losses in Delhi has reduced significantly from 52% in the pre-reform era in 2002 (before July 2002) to 8.37% in 2019-20. Aggregate Technical and Commercial Losses (AT&C) is the difference between energy units put into the system and the units for which the payment is collected. Transmission and distribution loss do not capture losses on account of non-realization of payments. AT&C loss is the actual measure of overall efficiency of the distribution business as it measures both technical as well as commercial losses. The scenario of reduction of AT&C losses is depicted in Statement 11.4.

Statement 11.4

AT&C LOSSES IN DELHI – POST POWER SECTOR REFORMS PERIOD

(Percentage)

S. No.	Year	BYPL	BRPL	TPDDL
1.	2010-11			
	a. Target	22.00	17.00	17.00
	b. Achievement	21.95	18.82	14.15
2.	2011-12			
	a. Target	18.00	15.00	15.33
	b. Achievement	22.07	18.11	11.49
3.	2012-13			
	a. Target	16.82	14.16	12.50
	b. Achievement	22.14	17.74	10.73
4.	2013-14			
	a. Target	15.66	13.33	12.00
	b. Achievement	22.19	16.93	10.35
5.	2014-15			
	a. Target	14.50	12.50	11.50
	b. Achievement	18.93	13.65	NA
6.	2015-16			
	a. Target	13.33	11.67	9.80
	b. Achievement	15.66	12.08	8.88
7.	2016-17			
	a. Target	--	--	10.50
	b. Achievement	12.70	10.69	8.59
8.	2017-18			
	a. Target	13.00	10.93	8.38
	b. Achievement	10.67	9.43	8.18
9.	2018-19			
	a. Target	12.13	8.00	8.65
	b. Achievement	8.98	8.07	7.92
10.	2019-20			
	a. Target	--	--	--
	b. Achievement	8.66	8.60	7.87

Sources:- DERC, Discoms and websites.

5. Capital Investment made by DISCOMs on infrastructure

As the demand for power increases, the demand for improved infrastructure for power also increases. For improving the power conditions in Delhi, all the three companies are augmenting infrastructure like power transformers, EHV cables, installation and 11 KV feeders, shunt capacitors, etc. The capital investment made by the three distribution companies since FY 2010-11 is presented in Statement 11.5.

Statement 11.5

INFRASTRUCTURE CREATED BY POWER COMPANIES IN DELHI

(₹ in crore)

S.No.	Year	BYPL	BRPL	TPDDL	Total
1.	2010-11	178.78	283.00	465.53	**927.31**
2.	2011-12	99.96	119.00	365.89	**584.85**
3.	2012-13	133.23	301.00	292.97	**727.20**
4.	2013-14	172.75	287.55	326.46	**786.76**
5.	2014-15	184.87	308.00	264.22	**757.09**
6.	2015-16	231.68	346.00	350.49	**928.17**
7.	2016-17	247.03	371.00	455.10	**1073.13**
8.	2017-18	343.86	564.83	479.00	**1387.69**
9.	2018-19	338.28	499.55	569.53	**1407.36**
10.	2019-20	247.20	635.60	567.64	**1450.44**
	Total	**2177.64**	**3715.53**	**4136.83**	**10030.00**

Sources: - DERC, Discoms.

6. Power Transmission

6.1 Delhi Transco Limited is the State Transmission Utility of the National Capital Territory of Delhi. It is responsible for transmission of power at 220KV and 400KV level, besides up gradation operation and maintenance of EHV Network as per system requirements. After the enactment of Electricity Act 2003, a new department: State Load Despatch Centre (SLDC) under Delhi Transco Limited was created, as an Apex body to ensure integrated operation of the power system in Delhi. Earlier the SLDC was part of O&M Department of Delhi Transco Ltd / Delhi Vidyut Board. SLDC Delhi started its function on the 1st of January 2004. SLDC is responsible for the real time Load Despatch function, SCADA System and Energy Accounting. It's mission is to facilitate intra and inter state transfer of power in coordination with NRLDC (Northern Regional Load Despatch Centre) with Reliability, Security and Economy on sound commercial principles.

6.2 Delhi Transco Limited has established power transmission network consisting of four numbers of 400 KV and forty one 220 KV substations and associated with transmission lines. The existing network consists of 400 KV ring around the

periphery of Delhi interlinked with the 220 KV network spread all over Delhi. The network of Delhi Transmission Utility upto the year 2019-20 is presented in Statement 11.6.

Statement 11.6

NETWORK OF DELHI TRANSMISSION UTILITY: 2019-20

S.No.	Details	400 KV Level	220 KV Level
1.	Number of Sub Stations	4	41
2.	Transformation Capacity (in MVA)	5410	14060
3.	Transmission Lines (Length in Ckt. Km.)	249.118	852.17

Source: Delhi Transco Limited / SLDC.

6.3 The performance of the transmission utility during the last ten years, system has improved mainly in system availability, reduction in transmission losses, significant reduction of load shedding etc. The performance of Delhi Transco Limited is presented in Statement 11.7.

Statement 11.7

PERFORMANCE OF DELHI TRANSCO LIMITED 2010-2020

S. No	Details	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
1.	Peak Demand met (in MW)	4720	5028	5642	5653	5925	5846	6261	6526	7016	7409
2.	Load Growth (in %)	7.10	6.50	12.21	0.19	4.81	-1.33	7.10	4.06	7.51	5.60
3.	Energy Consumption (in MUs)	25581	25593	27235	28021	29035	29416	30797	31874	31909	33082
4.	Shedding (in MUs)	74	83	138	77	117	42	32	19	15	10.85
5.	Shedding as % of Energy Consumption	0.29	0.32	0.51	0.27	0.40	0.14	0.10	0.06	0.05	0.033
6.	Transmission Losses (in %)	1.28	1.20	1.17	0.95	0.69	0.85	0.98	0.79	0.92	0.90
7.	System Availability (in %)	98.58	98.38	97.17	97.43	98.60	99.03	98.01	99.37	98.50	98.95

Source: Delhi Transco Limited / SLDC, DERC.

6.4 It may be observed from Statement 11.7 that the peak demand increased from 4720 MW in 2010-11 to 7409 in 2019-20. Energy consumption recorded an average annual growth of approx. 2.93%, System availability is always 97% or more during last ten years. The information regarding peak demand met in MW

and energy consumption in MUs are depicted in Charts 11.5 and 11.6 respectively.

Chart 11.5

PEAK DEMAND MET (MW) IN DELHI

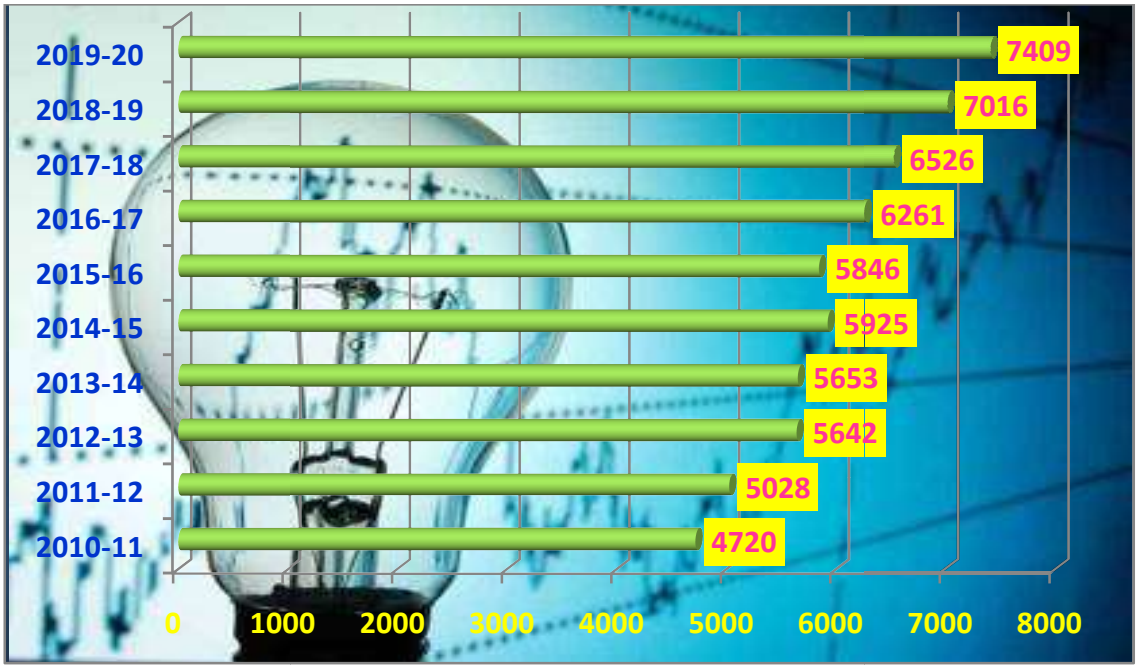
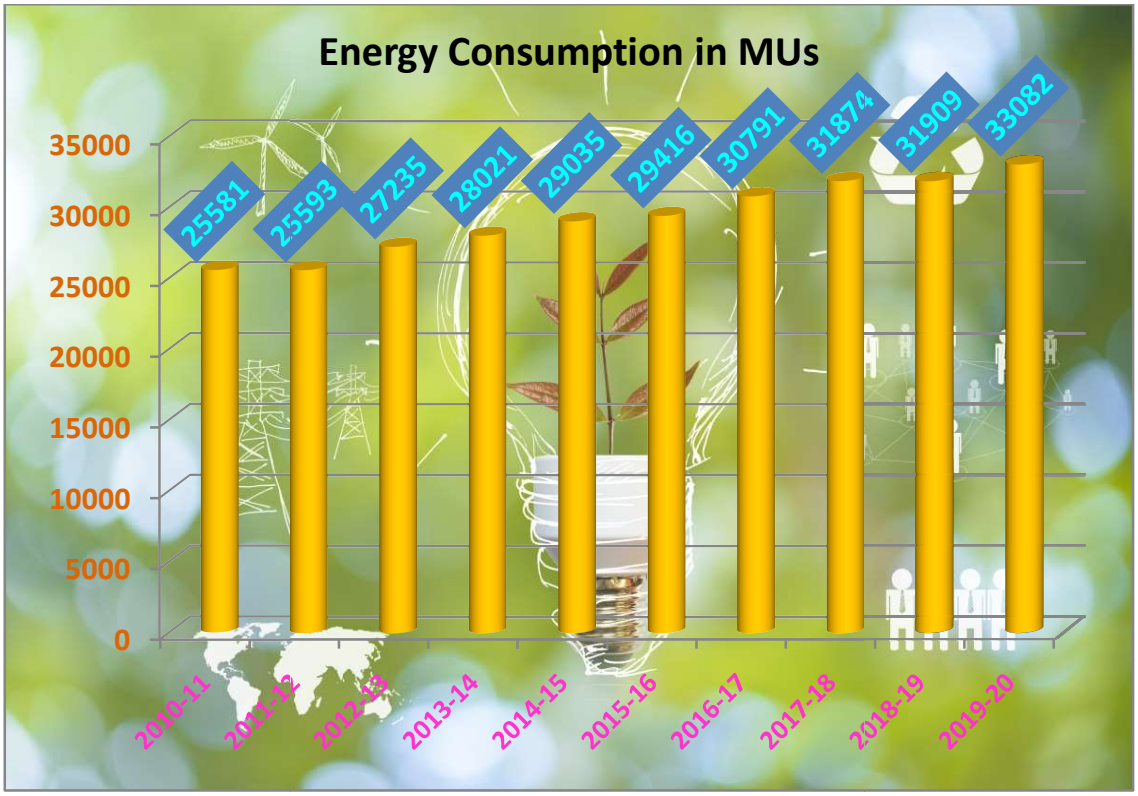


Chart 11.6

ENERGY CONSUMPTION IN DELHI- 2010-2020 (IN MUS)



6.5 Volume III of 19th Electric Power Survey (EPS) of India Report covers the demand forecast of National Capital Region (NCR). Central Electricity Authority, Ministry of Energy, Government of India, in the report of 19th Electric Power Survey has projected maximum demand of electricity in Delhi to be 6997 MW by the end of March-2020 but it actually recorded 7409 MW. The forecast of energy requirement made in the report indicates that the total demand may go-up to 7471 MW by 2021-22 but considering the present scenario it may go to 8200 MW by 2021-22.

Energy Requirement and Peak Load Forecast for NCR- 19th EPS

	2019-20 (Actual)	2021-22
Energy Requirement (MU)	33082	36884
Peak Load (MW)	7409	7471

7. Major Transmission Projects

To facilitate constant access to real-time data of the entire network, Supervisory Control and Data Acquisition (SCADA) system has been implemented. In order to meet the future requirement of power in Delhi in reliable and efficient manner, various new and augmentation transmission network projects (400/200kV) costing approx. ₹ 4452 crore for adding 6460 MVA transformation capacity at 220kV level and 5500MVA at 400kV level in the net work are envisaged in Business Plan for the period up to 2022-23 for improving of power supply in Delhi.

8. Renewable Energy

8.1 To promote use of green power through solar in Delhi, Government of NCT of Delhi approved "Delhi Solar Policy-2016" on 27.09.2016 with the aim to install 2000 MW Solar installation by 2025. The policy has provision of mandatory solar installation on all Govt. buildings having rooftop size of 500 sqm or above. To adopt solar on mass scale in Residential Sector, Generation Based Incentive (GBI) was offered for a period of 3 years. Also Virtual and Group Net Metering guidelines were notified by DERC on 31st May, 2019. At present Solar systems installed of capacity 193 MW at 4664 locations have been installed out of which 21557.525 KW at 2134 locations is in Residential Sector.

8.2 Energy Efficiency and Renewable Energy Management Centre (EE&REMC) to work as 'State Designated Agency (SDA)' in association with Bureau of Energy Efficiency (BEE), MiP, GoI carryout various Energy Efficiency and Energy Conservation activities in Delhi, some of them are as under:

- Created Energy Clubs in 92 Delhi Government Schools and process of establishment of 81 nos. more schools is in progress.

- Energy Conservation Building Code for Commercial Buildings: BEE, GoI has prepared ECBC code for commercial buildings of India in the year 2017. This ECBC code is in process of implementation. Provision of solar installation in all buildings having plot area of 105 meter or above is mandatory as per Building Byelaws of Delhi.

8.3 EE&REM Centre as State Agency (SNA), has to implement new and renewable energy projects in the city of Delhi in association with Ministry of New & Renewable Energy (MNRE), Govt. of India. Presently 30 MW Rooftop Solar capacity in Residential Sector under CFA scheme of MNRE, GoI Phase-II is being implemented through Delhi DISCOMs.

8.4 Preparation of Tender documents for installation of Solar plants on agriculture land without hampering farming activities linking Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) Scheme for which 10 MW capacity has been allocated to Delhi Discoms in the year 2019-20 and request to allocate 62 MW for FY 2020-21 has been sent to MNRE, GoI and "Mukhyamantri Kisaan Aay Badhotary Solar Yojna" together is in process and shall be floated after receipt of capacity allocation for FY 2020-21 from MNRE, GoI.

8.5 Disposal of Municipal Solid Waste is very challenging issue. In order to overcome this problem 'Waste-to-Energy' Plants are being set-up at various locations in Delhi to generate electricity. In this line, setting up of 'Waste-to-Energy' plants at Tehkhand (25 MW) is under progress, 15 MW WTE plant at Bhalswa is proposed and 8 MW expansion of existing WTE plant at Ghazipur has also been planned.

Till 31.01.2021

	Installed Capacity of Renewable Energy	
Solar Generation	193 MW	4664 solar plants installed.
Waste to Energy	56 MW	WtE Plants at:- Timarpur-Okhla (20 MW) Ghazipur (12 MW) Narela-Bawana (24 MW)
TOTAL	**249 MW**	

9. Public investment in Energy Sector

9.1 Investment in energy sector by the Government of Delhi is for augmentation of transmission and transformation capacity and power generation and also in making electricity tariff affordable to the consumers. Investment by the government in this sector during the last five year showed an up and downward trend. The share of investment in energy sector in Delhi from 2011-12 to 2020-21 is presented in Statement 11.8.

Statement 11.8

GOVT. EXPENDITURE IN ENERGY SECTOR

(₹ in crore)

S.No	Years	Expenditure on Schemes & Projects		
		Total Expenditure	Energy Sector	% of Energy Expr. to Total Plan Expr.
1.	2011-12	13642.54	1833.26	13.44
2.	2012-13	13237.51	1271.61	9.61
3.	2013-14	13964.28	326.00	2.33
4.	2014-15	13979.68	581.26	4.16
5.	2015-16	14960.54	235.52	1.57
6.	2016-17	14355.03	187.77	1.31
7.	2017-18	14401.00	221.85	1.54
8.	2018-19	15672.03	413.18	2.64
9.	2019-20	20307.02	52.86	0.26
10.	2020-21 (RE)	23270.00	70.00	0.31

9.2 Besides the above, Government is also spending for subsidizing electricity tariff for domestic consumers. The expenditure on power subsidy during last 06 years was as under:

(₹ in crore)

Year	Amount
2015-16	1442.76
2016-17	1577.94
2017-18	1676.70
2018-19	1699.29
2019-20	2405.59
2020-21 (upto Sept. 2020)	1253.91