The present water supply service area of Municipal Corporations Chandigarh (MCC) is 114 km^2, which includes MCC area 79.34 km^2 and rural area of 34.69 km^2. The urban area falls in jurisdiction of Municipal Corporation and the water supply system is entrusted to Public Health wing of MCC. The rural area comprises of 13 villages overseen by the Engineering Department. The water supply to the villages is provided with tube wells in and around the villages. Other urban/rural areas have water source of 67 MGD from Bhakra Main Canal which is 27 km away from Chandigarh and 20 MGD from 239 tube wells located in the city. The transmission mains carry raw water from Kajuali to the water treatment plants located at Sector 39. At sector 39, the water is treated, disinfected and transmitted to 7 No. subsidiary water works located in Sectors 12, 26, 32, 37, 52 and Manimajra. The average availability of water in Chandigarh is reasonably high at 332 Litres per Capita per Day (LPCD), stands second in the country after Goa (343 LPCD). Chandigarh gets 14.5 million gallons per day (MGD) water as its share from each phase of Kajauli water supply scheme. Chandimandir cantonment and Haryana is in process of installing its infrastructure for treatment and transmission of water. The net available water will be only 78.0 MGD, if Haryana and Chandimandir Cantonment starts drawing their share of raw water from Chandigarh.

Water Treatment Plant, Sector 39, Chandigarh

Status of Ground Water

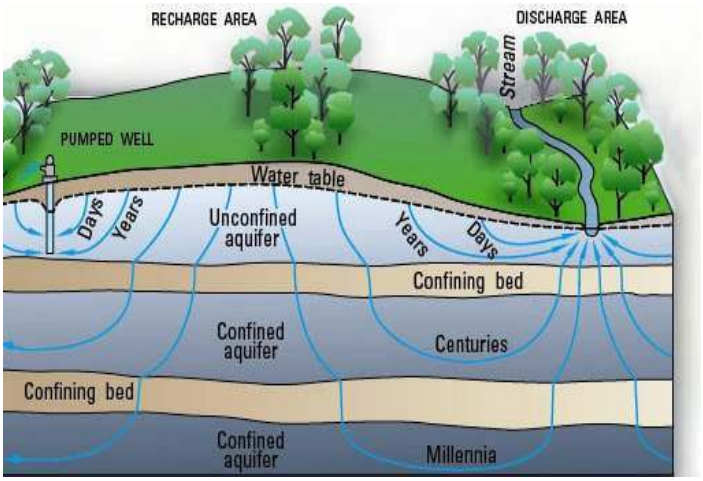
Ground water level of Chandigarh has declined at a fast speed in the last decade. The data collected by the CGWB, Chandigarh shows a gradual decrease in the total replanishable Ground Water Resources (3.636%) and the available ground water resources (3.645%).

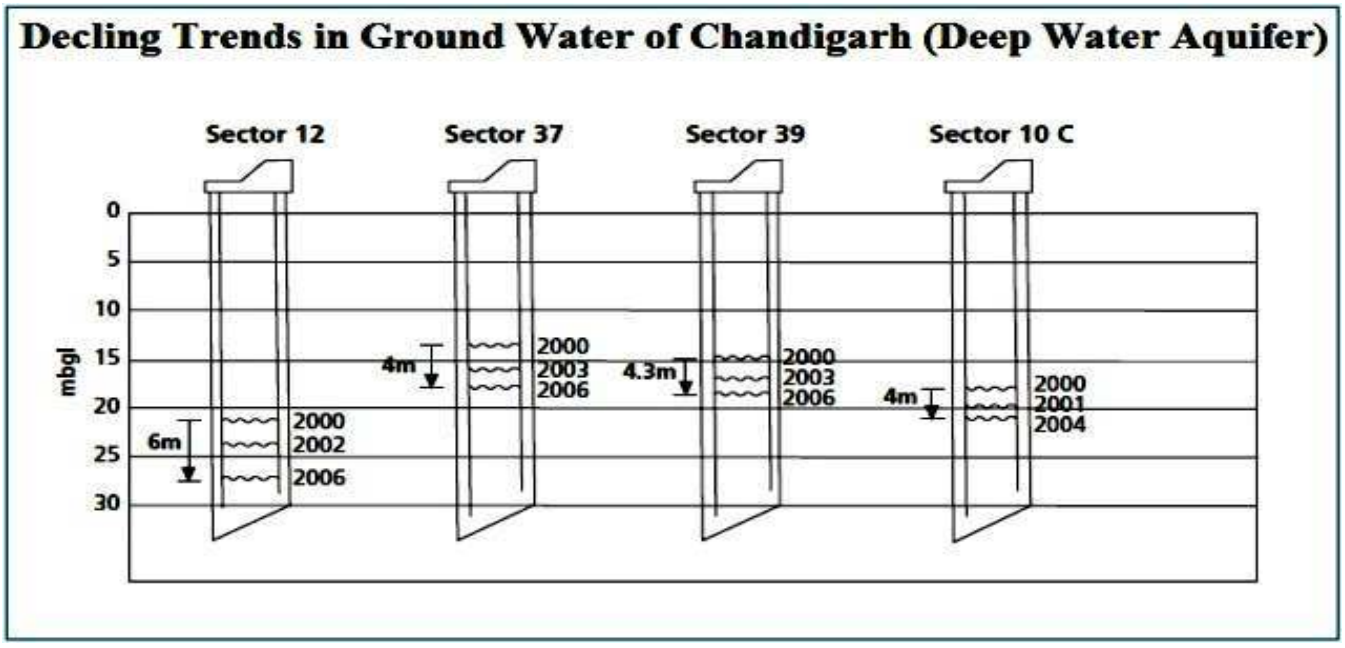
Status of Ground Water	2004	2009	2014
Annual Replenishable Ground Water Resources (MCM)	2255 ham	2173 ham	2156 ham
Available Ground Water Resource	2030 ham	1956 ham	1940 ham
Balance Ground Water	2030 ham	1956 ham	1940 ham
Provision for Industrial/Domestic and other uses & Natural Discharge etc.	225 ham	217 ham	216 ham

Source: Scientist 'D' & TS For Regional Director, Suprintending Hydrogeologist For Reg. Dir. Ground Water B. Chandigarh

Ground Water in Deep Aquifers

Chandigarh is a rapidly growing city and in the last decade (2001-2011), its population growth rate was observed to be about 28%. Being one of the densely populated city (9252/sq km), its demand for water is estimated to grow steeply. It is estimated that by 2026, the water demand will be 523.41 MLD (138.27 MGD) that is about 22.72% higher over the 2011 demand of 426.50 MLD (112.67 MGD). Due to excessive withdrawing and comparatively lesser annual replenishment, the ground water level of deep aquifers in Chandigarh (except southern sectors) has been suppressed on an average of 4m in 6 years at different locations throughout the city.





Source: National data centre, Central Ground Water Board, Faridabad (Haryana)

Chandigarh, experiences heavy rainfall during monsoonal season i.e. July to late September receiving average rainfall of 1059.3 mm, which is calculated to be 60380.1million litres or 13241gallons or 36.28 MGD per annum. As per the study conducted by Ground Water Board, Chandigarh this heavy amount of water seeps down to the aquifers and helps to recharge them remarkably.

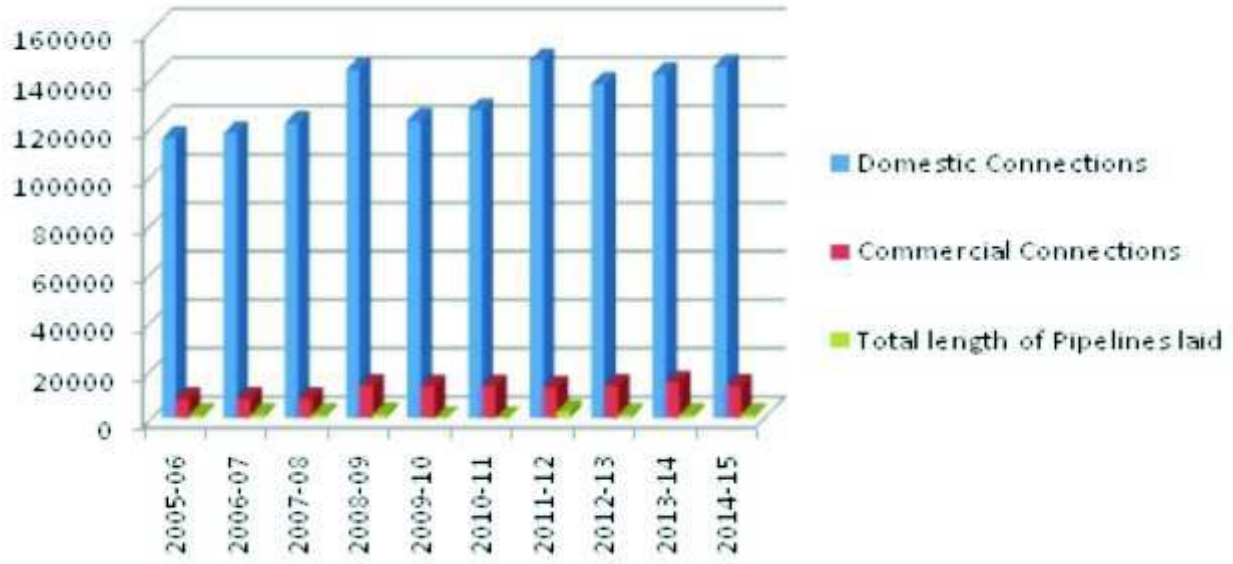
Year	Pre-Monsoon Water Level Range	Post Monsoon Water Level Range	Units
2009	2.84-18.60	2.30-19.96	m bgl
2010	0.58-22.12	1.89-21.97	m bgl
2011	2.27-21.67	2.38-21.68	m bgl
2012	3.12-23.67	2.03-24.15	m bgl
2013	4.62-22.49	2.98-20.50	m bgl
2014	2.05-21.48	2.55-20.50	m bgl
2015	2.92-44.41	1.79-37.88	m bgl

Source: Scientist 'D' & TS For Regional Director, Suprintending Hydrogeologist For Reg. Dir. Ground Water B. Chandigarh

Status of Drinking Water in Chandigarh

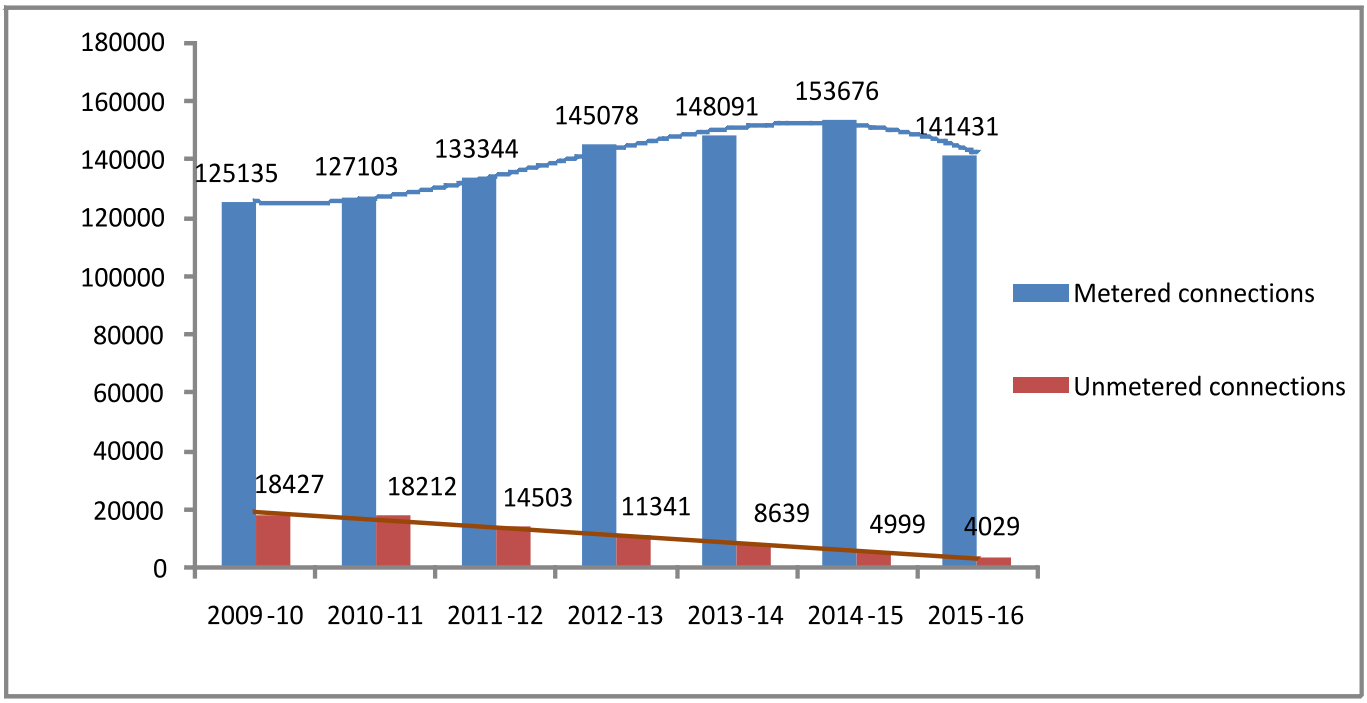
The City has been divided into 7 zones for the purpose of distribution of drinking water, including town of Manimajra. The total installed capacity of drinking water from the four phases of surface source is about 67 MGD. Apart from the piped supply, about 20 MGD is also abstracted through deep bore wells with power pumps. Out of the total water connections, more than 96% connections are metered and flat rate connections are given to rehabilitated colonies. Besides there are 800 stand posts in the city 332 LPCD water is 10-12 hours.

Water Connections



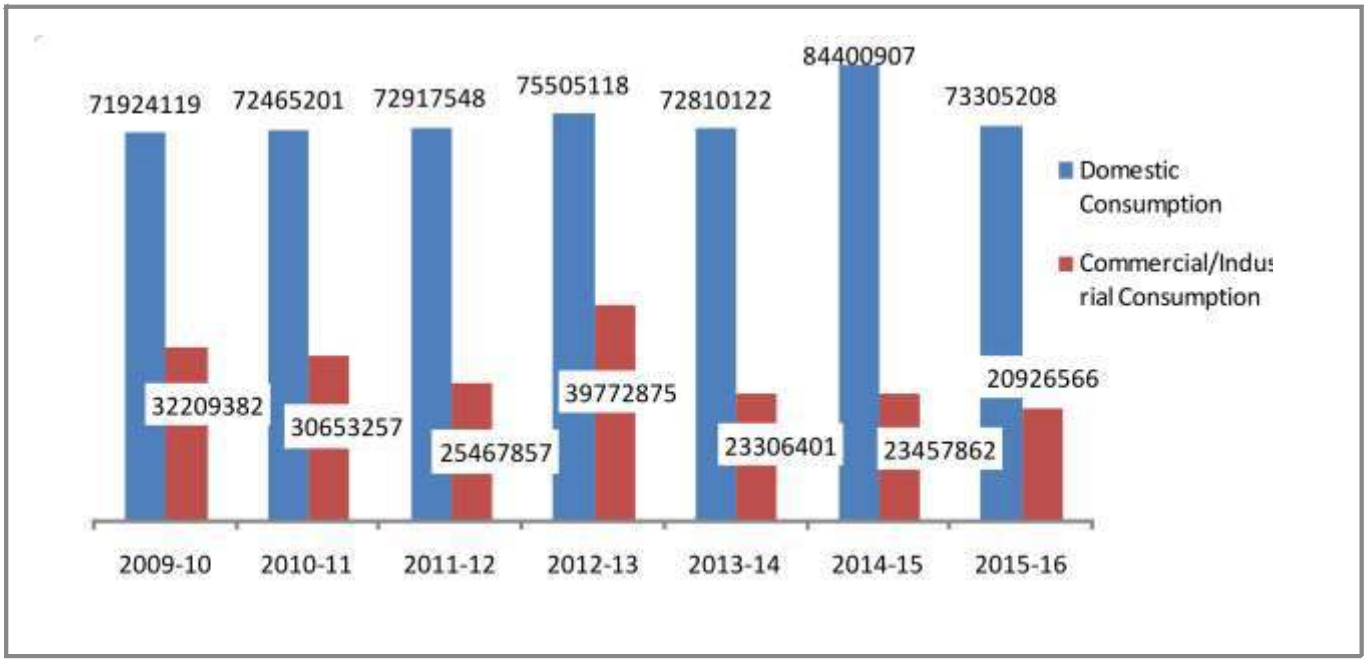
The steep growth in the population had also increase the demand of water for the daily purposes. Water supply in Chandigarh is regulated by the municipal corporation of the city and it was calculated that the total water connections have been increased from 1,36,094 in 2009-10 to 1,58,363 in the year 2014-15. Regularization of the unmetered connections is also moving at a faster r ate in the city. The graph below represents the total domestic and commercial connections along with the total length of water supply pipeline laid in the city till 2015 which is1404 Km's

Metered/ Unmetered Connections



From year 2009-10 to year 2015-16 graph of metered connections has been increased from 1.25 lakh to 1.41 lack with the increase in population of the city and so, the demand of fresh water. However, with the continuous efforts of the municipal corporation, Chandigarh, the connections to be taken under meter coverage, are reducing steeply.

Water Consumption



As per the graph above, in Chandigarh the water consumption in Domestic Sector is more than the Industrial and Commercial Sector. Also, the domestic load has been increasing day by day as the population load on the city is increasing, which is more then 78% of the total consumption.

Water Supply and demand Scenario

Water Requirement

Year	Population in Lacs	Domestic Requirement @150 LPCD In MLD	Industrial Commercial @ 4000 gallon/ Acres/Day Area in Acres	Industrial Commercial Requirement in MLD	Community Institutional @ 4000 gallon/Acres/ Day Area in Acres	Community Institutional Requirement in MLD	Requirement For Stand Post Lav Blocks MLD	Wastage Water Leakage %	Total Leakage MLD	Total Requirement	Horticulture Requirement @ 5400 Gallon /Acres /Day Area in Acres	Horticulture Requirement in MLD	Gross Requirement MLD
2011	10.55	158.25	1921.63	29.09	3048.5	46.15	20.07	15	38.04	291.60	6600	134.90	426.50
2016	12.79	191.85	1998.50	30.26	3170.44	48.00	24.43	8	44.18	338.72	6600	134.90	473.62
2021	13.71	205.65	2078.44	31.47	3297.25	49.92	29.77	8	47.52	364.33	6600	134.90	499.23
2026	14.46	216.90	2161.60	32.73	3429.15	51.92	36.29	8	50.68	388.51	6600	134.90	523.41
2031	15.59	233.85	2248	34.03	3566.32	53.99	44.19	8	54.91	420.98	6600	134.90	555.88
2036	16.95	254.25	2338	35.40	3709	56.15	53.86	8	59.95	459.61	6600	134.90	594.51

Source: Climate Action Plan, U.T., Chandigarh

The Table, given on the left, gives the detailed description of the water scenario in the UT of Chandigarh. The table also gives a comparisons between the demands of drinking water which are expected to grow in future. The future projection shows that their might be an increase of more than 60% in population of the city from 2011 to 2036 and the similar way the demand of residents for the fresh water may also rise upto 30% as compared to the present situation. To meet the rising demand, the administration need to get prepared for the management of additional resources of fresh water supply to the city beautiful.

One of the best way to tackle the futuristic situation of rising water demand will be the use of tertiary treated water supply to all sectors of the city, preferable not for the drinking purposes but to be used for other household purposes for cleaning, washing, gardening and several other uses.

Fresh Water Treatment

Household water supply

Waste Water Generation and Treatment

Water Conservation Practices in Chandigarh

Water conservation means protecting our water resources from pollution and being wasted. It is important because plants, humans and animals all need water to survive. Without water, the earth would have no life. Due to consistent water resources, but increasing population and demand of water; the city beautiful has also been practicing water conservation by following different conservation strategies.

1.Artificial Recharge and Rain Water Harvesting

With the exponentially increasing demand of water resources due to escalating population, the city beautiful "Chandigarh", has also implicated the scheme at the remarkable speed in a very short span of time. The rainwater harvesting potential of Chandigarh, with an area of 114 sq km and the average annual rainfall of 1059.3, is calculated to be 60380.1million liters or 13241gallons or 36.28 MGD. Thus, the potential is more than the water pumped out of aquifers and therefore, efficient harvesting of rain water and proper recharging of ground water will go a long way in contributing towards sustainability of water supply.

One interesting feature is that the aquifers in the southern parts of the city are restricted in aerial extent due to lithological boundaries as studied by CGWB. Therefore, this part of the city has very high water level and does not require any water recharge facility.

Details about the installed capacity of artificial recharge schemes implemented in Chandigarh:

No. Of Units	Type of scheme	Total annual Capacity (Lakh Cubic meter)
6	Roof Top Rain Water Harvesting	0.144-0.13
1	Roof Top & Pavement catchments Rain Water Harvesting	34.50
1	Recharge Trenches	9.50

Source: Executive Engineering Project Public Health Division No. 1 & 7, Chandigarh

Construction of storm water harvesting and ground water recharge structures is also at full swing throughout the city to cover the roads (15.89 sq. km), rooftops of residential areas, (30.19 sq.km) shopping areas (3.97 sq. km), public and institutional buildings (7.94 sq. km).

Area wise Rain Water availability:

Chandigarh has a total rain water harvesting capacity of more than 70% of the total land area. The total capacity of water that would be available for recharge annually is:

58 sq km (area) x 1059.3 (rainfall) x 0.5 (rainfall coefficient) = 30,720 million litre

To reduce dependence on ground water a short term legal frame work has been laid by the Administration to make provisions for rain water harvesting mandatory while granting the additional covered area to all plots above 500 m sq (1 Kanal) area (Order/Notification dated 16.10.2008)

Storm Water Harvesting Sources	Area Covered
From Roads	15.89 sq. km
From the Rooftop of Residential area	30.19 sq. km
From Public and Institutional Buildings	7.94 sq. km
From Shopping area	3.97 sq. km

2. Recycle and Reuse of treated waste water Water:

Chandigarh is fully covered with sewerage facility and provided with the 100% sewerage treatment facility. Out of 87 MGD water being supplied to the residents of the city, 57 MGD sewage effluent is being generated per day. Out of which, average 53.85 MGD waste water is treated everyday.

Municipal Population	**10.54 Lacs**
Volume of Domestic & Industrial Waste Water Generated	**57 MGD (Approx.)**
Treated waste water	**53.85 MGD**
No. of STPs	5
Capacity of Each STP	16 MGD – 3 BRD
	5 MGD – Raipur Kalan
	30 MGD – Diggian
	1.25 MGD – Raipur Khurd
	1.6 MGD – Dhanas
	Total : 53.85 MGD
Proposed STPs	1.7 MGD at Khuda-ali-sher.
	15 MGD is under renovation at
	Diggian, Mohali.
	Total: 16.7 MGD
Mode of Disposal	Natural Choe for all except Diggian. Diggian STP effluent goes to Irrigation Channel

Source: CPCC, Chandigarh

Recognizing the importance of water, Chandigarh had, earlier in 1991, initiated tertiary treatment of waste water at Diggian STP (10 MGD) and later supplied it for the non-potable uses such as irrigation of gardens, green belts & lawns, washing cars etc, to different sectors. Presently, the installed capacity for tertiary treatment is 20 MGD at Diggian STP which is treating 10 MGD water (avg.), however, the present demand of tertiary treated water is 6 MGD. As per new bylaws the use of tertiary treated water has been made mandatory for all houses having area of 1 kanal or more. At present, tertiary treated water is available for use in sector 1, 4, 5, 6, 7, 9, 12, 15, 16, 18, 19, 20, 21 & 61; whereas sectors 2, 3, 8, 10, 11, 14, 17, 23, 25, 33, 34, 37, 41 and 42 are provided with the partial availability of the same. The work for the supply of tertiary treated water throughout the city is at full pace and soon all the sectors can have access for the tertiary treated water to be used for the daily house hold practices.

Water Quality of the City:

CGW Toxic Elements in Ground Water							
Year	Field	Pb	Cd	Mn	Fe	Cr	As
2015	Water Samples of Tap Water	0.009-0.015 mg/l	0.006-0.007 mg/l	0.000-0.030 mg/l	0.130-1.390 mg/l	-	-
2015	Water Samples of Hand Pump	0.000-0.110 mg/l	0.004-0.006 mg/l	0.001-0.800 mg/l	0.100-3.430 mg/l	-	-
2015	Water Samples of Tube well	0.000-0.022 mg/l	0.004-0.007 mg/l	0.003-0.360 mg/l	0.000-2.89 mg/l	-	<0.01

Source-: Central Ground Water Board, North Western Region, Chandigarh.

Every house of the city has access to the clean drinking water supplied by the municipal corporation during the regular periods of time every day. Due to small agricultural fields, the use of harmful chemicals such as pesticides is also very controlled in the city. Thus the water quality of the Chandigarh lies within the limits as prescribed by the BIS standards of drinking water. Water analysis conducted by the Central Ground Board of the shallow and deep aquifers of the city shows the absence of any impurity including heavy metals.

Water Quality Analysis of STPs:

STP RAIPUR KALAN OUTLET - 2016															
Sr.No.	Parameters	Unit	Permissible Limit	Jan.	Feb.	March.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	pH	-	5.5 to 9.0	7.7	7.4	7.3	7.4	7.3	7.1	7.2	7.2	7.1	7.6	7.4	7.2
2	DO	mg/l	-	<1	<1	<1	<1	<1	-	-	-	-	<1	Absent	<1
3	COD	mg/l	250	160	74	315	349	400	145	99	70	83	92	145	97
4	BOD	mg/l	30	65	23	98	142	36	36	24	17	21	24	54	27
5	TSS	mg/l	100	100	30	61	67	24	32	34	-	21	32	13	37
6	Total Nitrogen	mg/l		-	-	-	-	-	9.20	13.80	1.16	13.10	12.50	2.31	12.90
7	NO3-N	mg/l	10	1.60	1.80	2.50	7.60	20.00	-	-	-	-	-	-	-
8	NH3-N	mg/l	50	7.50	3.00	13.80	14.80	11.40	7.60	9.60	0.92	8.90	6.70	1.01	6.90
9	PO4-P	mg/l	5.0	3.30	3.00	3.20	18.80	10.90	5.10	4.38	1.44	3.91	1.17	2.52	3.12
10	FAECAL COLIFORM	MPN/100ml	-	-	-	-	-	-	2.7×106	4.0×107	1.1×107	9.3*105	1.1*107	0.92*105	6.9*104

Note: The above mentioned Standards/Permissible Limit are meant for discharge in Inland Surface Water. Finally treated water mixes with river ghaggar hence, same norms will be applicable.

Source: CPCC, Chandigarh

STP DIGGIAN TERTIARY TREATMENT OUTLET - 2016													
Sr.No.	Parameters	Unit	Jan.	Feb.	March.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	pH	-	7.5	7.7	7.2	7.2	7.3	7.3	7.4	7.6	7.7	7.6	7.5	7.3
2	DO	mg/l	<1	<1	2.3	<1	<1	-	-	-	<1	<1	Absent	<1
3	COD	mg/l	110	100	89	89	88	28	36	173	71	71	69	69
4	BOD	mg/l	32	36	22	26	25	7	14	49	21	21	11	20
5	TSS	mg/l	50	60	36	44	34	18	46	15	21	45	7	51
6	Total Nitrogen	mg/l		-	-	-	-	10.30	6.80	13.20	8.40	10.20	1.00	10.70
7	NO3-N	mg/l	2.10	1.6	1.1	3.30	3.60	-	-	-	-	-	-	
8	NH3-N	mg/l	4.50	4.50	5.30	9.50	8.60	7.10	3.80	0.78	5.20	6.10	1.08	5.80
9	PO4-P	mg/l	2.30	3.54	2.10	9.80	3.90	1.60	3.79	5.90	2.50	1.89	3.60	1.71
10	FAECAL COLIFORM	MPN/100ml	-	-	-	-	-	3.8×106	4.5×105	2.0×106	1.1*105	3.2*109	1.05*109	6.9*10^5

Source: CPCC, Chandigarh

STP DHANAS OUTLET - 2016														
Sr.No.	Parameters	Unit	Permissible Limit	Feb.	March	April	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	pH	-	5.5 to 9.0	7.6	7.2	7.8	7.6	7.0	7.4	7.7	7.9	8.0	7.5	7.5
2	DO	mg/l	-	3.8	<1	5.3	<1	-	-	-	4.2	3.4	2.2	5.7
3	COD	mg/l	250	56	65	58	64	85	89	69	60	65	69	85
4	BOD	mg/l	30	16	18	15	19	21	21	18	18	18	30	25
5	TSS	mg/l	100	46	64	22	18	75	11	8	13	11	21	15
6	Total Nitrogen	mg/l	-	-	-	-	-	8.70	11.60	8.20	9.20	9.40	1.00	9.90
7	NO3-N	mg/l	10	6.40	7.10	3.30	3.60	-	-	-	-	4.3	-	-
8	NH3-N	mg/l	50	1.20	2.80	9.20	8.60	6.90	7.60	<0.3	5.90	1.01	0.30	4.50
9	PO4-P	mg/l	5.0	BDL	1.10	2.40	33.10	2.09	2.20	<0.5	2.77	9.4	3.00	1.23
10	FAECAL COLIFORM	MPN/100ml	-	-	-	-	-	7.6×106	7.6×107	1.4×106	2.7*105	3.2*106	1.01x105	4.0*10^6

Source: CPCC, Chandigarh

SUKHNA LAKE -2016														
Sr.No.	Parameters	Unit	Jan.	Feb.	March.	April	May	June	July	Aug.	Sept.	0ct	Nov.	Dec.
1	pH	-	8.5	8.4	8.3	8.2	8.2	8.8	7.9	9.4	7.9	9.1	9.3	9.0
2	Conductivity	µs/cm	320	350	360	320	251	251	195	132	122	132	154	1665
3	DO	mg/l	6.2	3.2	6.7	8.0	4.8	5.8	2.3	4.8	1.4	8.0	8.7	8.2
4	COD	mg/l	19	30	36	39	6	17	114	18	79	88	10	93
5	BOD	mg/l	5	7	7	8	<2	4	29	<2	25	28	2	27
6	NO_3-N	mg/l	BDL	1.50	1.80	3.40	<1	2.50	6.20	<1	4.80	4.20	0.56	4.90
7	NH_3-N	mg/l	1.20	1.00	1.40	7.40	4.20	1.90	4.20	<1	3.90	3.40	1.01	3.90
8	Phosphate	mg/l	BDL	2.80	1.10	<0.5	<0.5	1.20	<0.5	0.61	<0.5	<0.5	1.03	<1
9	Total Suspended Solid	mg/l	15	30	16	32	15	10	124	<5	20	25	37	29
10	TDS	mg/l	210	230	240	210	160	150	120	85	99	86	96	102
11	TFS	mg/l	160	180	146	90	60	90	140	60	60	50	52	54
12	Turbidity	NTU	12	39	29	88	32	12	48	<1	5	9	86	60
13	TH as $CaCO_3$	mg/l	107	110	121	90	79	54	49	37	39	36	45	34
14	Ca as $CaCO_3$	mg/l	83	82	103	63	67	32	35	25	25	22	14	20
15	Mg as $CaCO_3$	mg/l	24	27	18	27	12	22	14	12	14	14	2	14
16	Sulphate	mg/l	20.58	12.30	18.90	6.00	22.00	31.00	19.00	28.00	18.00	16.00	11.50	13.00
17	Chloride	mg/l	10	5	7	6	4	5	9	10	7	4	12	4
18	P-Alkalinity	mg/l	--	--	--	--	--	16	<1	10	4	8	5	6
19	Total alkalinity as $CaCO_3$	mg/l	155	171	148	181	107	84	65	60	44	55	55	58
20	Fluoride	mg/l	0.40	0.26	0.60	0.28	0.33	<0.1	0.44	0.42	0.48	0.39	ND	0.34
21	Boron(B)	mg/l	--	--	--	--	--	0.12	0.20	<0.1	0.10	<1	ND	<0.1
22	TKN	mg/l	--	--	--	--	--	2.50	9.60	<1	8.20	4.60	2.71	4.9
23	Potassium	mg/l	--	--	--	--	--	11	10	12	9	3	29	16
24	Sodium	mg/l	--	--	--	--	--	26	21	25	18	12	75	5
25	colour	Hazen	<5	10	<5	7	<5	10	14	<5	<5	5	35	5
26	FAECAL COLIFORM	MPN/100	--	--	--	4.0×10^3	$7.6*10^5$	$9.4*10^6$	4.0×10^4	1.4×10^3	$2.2*10^4$	1.2×10^3	6.1×10^2	$2.7*10^5$
27	TOTAL COLIFORM	MPN/100	--	--	--	$1.8*10^4$	$7.6*10^6$	$7.6*10^7$	5.4×10^5	9.3×10^3	$3.2*10^4$	1.5×10^3	8.6×10^2	$3.2*10^5$

Source: CPCC, Chandigarh

Dhanas Lake(2016)

Sr.No.	Parameters	Unit	Jan		Feb.		March		April		May		June	
			Location D1	Location D3	Location D1	Location D3	Location D1	Location D3	Location D1	Location D3	Location D1	Location D3	Location D1	Location D3
1	pH	-	7.8	8.1	7.8	7.7	7.7	9.8	8.2	9.4	7.8	9.6	7.8	8.4
2	Conductivity	µs/cm	430	320	450	340	440	330	--	--	--	--	--	--
3	DO	mg/l	3.2	9.2	2.6	2.5	5.2	5.6	8.4	7.6	<1	5.6	<1	5.3
4	COD	mg/l	61	61	72	16	65	28	89	47	83	49	92	63
5	BOD	mg/l	18	11	21	5	18	8	26	14	23	13	23	16
6	NO_3-N	mg/l	3.20	3.00	3.90	3.80	2.70	4.10	3.80	3.30	1.70	3.70	1.70	2.10
7	NH_3-N	mg/l	2.20	1.30	1.90	1.60	1.10	1.10	11.20	7.80	6.70	7.20	8.30	8.50
8	Phosphate	mg/l	1.30	BDL	1.26	BDL	1.10	<0.5	2.60	5.30	2.00	0.60	0.70	<0.5
9	Total Suspended Solid	mg/l	40	40	52	22	43	32	45	24	12	44	48	37
10	TDS	mg/l	290	200	290	220	280	210	--	--	--	--	--	--
11	TFS	mg/l	180	140	80	60	80	60	--	--	--	--	--	--
12	Turbidity	NTU	21	35	20	7	31	11	--	--	--	--	--	--
13	TH as $CaCO_3$	mg/l	126	111	139	135	149	141	--	--	--	--	--	--
14	Ca as $CaCO_3$	mg/l	115	103	108	76	89	103	--	--	--	--	--	--
15	Mg as $CaCO_3$	mg/l	12	8	31	59	59	38	--	--	--	--	--	--
16	Sulphate	mg/l	49.00	12.00	57.60	16.50	80.00	15.70	--	--	--	--	--	--
17	Chloride	mg/l	20	19	22	24	18	24	--	--	--	--	--	--
18	Total alkalinity as $CaCO_3$	mg/l	247	121	198	139	214	154	--	--	--	--	--	--
19	Fluoride	mg/l	0.60	BDL	BDL	0.20	<0.2	<0.2	--	--	--	--	--	--
20	Colour	-	5	5	10	<5	12	<5	--	--	--	--	--	--

Source: CPCC, Chandigarh

Artificial Lake, at Village Dhanas, Chandigarh (UT)

It is one of the two main centre of tourist attraction in Village Dhanas, Chandigarh.

In a unique initiative in the region, Chandigarh Renewal Energy and Science & Technology Promotion Society (CREST) has installed a 10 kW peak (kWp) floating Solar Photovoltaic (SPV) power plant at Dhanas lake.

The plant has been set up as a pilot project at a cost of Rs 12 lakh

The floating plant has a total of 34 photovoltaic of 300 watts each. The plant has been set up on a platform that includes a large outer ring that floats on water, and grid supporting 34 panels which are arranged on 7 rows in a hexagonal pattern.

Dhanas Lake(2016)

Sr.No.	Parameters	Unit	July		August		Sept		Oct.		Nov.		Dec.	
			Location D1	Location D3	Location D1	Location D3	Location D1	Location D3	Location D1	Location D3	Location D1	Location D3	Location D1	Location D3
1	pH	-	7.7	8.6	7.7	8.3	7.9	8.7	7.3	8.3	7.5	8.7	7.2	8.6
2	Conductivity	µs/cm	-	-	-	-	-	-	-	-	-	-	-	-
3	DO	mg/l	4.6	4.8	<1	2.3	4.8	6.2	3.3	8.7	2.1	6	2	7.9
4	COD	mg/l	89	62	42	88	38	71	42	77	20	71	40	85
5	BOD	mg/l	25	16	12	24	11	21	12	23	2	21	13	25
6	NO_3-N	mg/l	6.20	5.60	1.60	2.60	2.00	3.10	1.90	2.90	0	3	3.3	3
7	NH_3-N	mg/l	7.90	8.10	<0.3	0.75	<1	0.82	<1	<1	1.67	0.82	<1	<1
8	Phosphate	mg/l	4.30	2.70	0.68	<0.5	<0.5	<0.5	<0.5	<0.5	0.21	<0.5	<0.5	<0.5
9	Total Suspended Solid	mg/l	38	32	5	16	8	22	11	25	9	22	16	29
10	TDS	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
11	TFS	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
12	Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-
13	TH as $CaCO_3$	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
14	Ca as $CaCO_3$	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
15	Mg as $CaCO_3$	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
16	Sulphate	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
17	Chloride	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
18	Total alkalinity as $CaCO_3$	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
19	Fluoride	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
20	Colour	--	-	-	-	-	-	-	-	-	-	-	-	-

Source: CPCC, Chandigarh

Lake Sec 42 2016

Sr.No.	Parameters	Unit	Jan.	March.	April	May	June	July	Aug.	Sept.	Oct.	NOV.	Dec.
1	pH	-	7.4	8.3	7.9	8.3	7.6	8.0	--	--	8.2	8.0	7.9
2	Conductivity	µs/cm	630	530	--	--	--	--	--	--	--	--	--
3	DO	mg/l	5.1	5.8	4.3	5.6	4.9	3.2	--	--	8.9	9.7	8.8
4	BOD	mg/l	<3	<3	6	<2	<3	3	--	--	9	1	24
5	COD	mg/l	11	12	23	<5	13	12	--	--	27	20	8
6	NO_3-N	mg/l	BDL	<1	6.40	6.50	3.40	4.20	--	--	3.60	0.70	3.90
7	NH_3-N	mg/l	BDL	<.04	2.10	8.20	<0.3	4.40	--	--	2.30	1.80	1.90
8	Phosphate	mg/l	BDL	<.05	<.05	<.05	<0.5	1.10	--	--	<0.5	0.21	<0.5
9	Total Suspended Solid	mg/l	20	15	12	8	24	<5	--	--	20	3	25
10	TDS	mg/l	400	340	--	--	--	--	--	--	--	--	--
11	TFS	mg/l	300	220	--	--	--	--	--	--	--	--	--
12	Turbidity	NTU	3	10	--	--	--	--	--	--	--	--	--
13	TH as $CaCO_3$	mg/l	186	198	--	--	--	--	--	--	--	--	--
14	Ca as $CaCO_3$	mg/l	127	121	--	--	--	--	--	--	--	--	--
15	Mg as $CaCO_3$	mg/l	59	77	--	--	--	--	--	--	--	--	--
16	Sulphate	mg/l	33	41	--	--	--	--	--	--	--	--	--
17	Chloride	mg/l	40	45	--	--	--	--	--	--	--	--	--
18	Total alkalinity as $CaCO_3$	mg/l	236	253	--	--	--	--	--	--	--	--	--
19	Fluoride	mg/l	0	1	--	--	--	--	--	--	--	--	--
20	colour	Hazen	<5	<5	--	--	--	--	--	--	--	--	--

note- In the month of Feb monitoring was not done due to dry lake.

note- In the month of Aug. monitoring was not done due to dry lake.

note- In the month of Sept. monitoring was not done due to dry lake.

Source: CPCC, Chandigarh

Water Quality of the Drains in Chandigarh

Water quality analysis of all the drains and sewage treatment plants established in the U.T. region are carried out regularly (monthly basis) to keep a sharp eye on the quality of water flowing through the city. Except the open drains (Sukhna Choe, Patiala Ki Rao, North Choe) passing through the city, the treated water of STP's lies near the permissible limits. As per the new guidelines upgradation of all STP's is proposed to take the BOD of treated water below the figure of 10 mg/L.

Like the adjoining states of the city, no ground water from shallow tube wells in Chandigarh is prescribed as drinkable. MC discourages use of handpumps for drinking water. Hand pumps in markets serve other purposes of the use of water. These Handpumps are painted red to indicate the same. MC has given potable water supply to various sections of market/commercial places which is for hours in a day.

Water Quality

Every house of the city has access to the clean drinking water supplied by the municipal corporation during the regular periods of time everyday. Due to small agricultural fields, the use of harmful chemicals such as pesticides is also very controlled in the city. Thus the water quality of the Chandigarh lies with in the limits as prescribed by the BIS standards of drinking water. Water analysis conducted by the Central Ground Board of the shallow and deep aquifers of the city shows the absence of any impurity including heavy metals.

Year	Field	Pb	Cd	Mn	Fe	Cr	As	Units
2013	Water Samples of Tubewell	0.000-0.022	0.004-0.007	0.003-0.360	0.000-2.89	-	<0.01	mg/l
2013	Water Samples of Hand Pump	0.000-0.110	0.004-0.006	0.001-0.800	0.100-3.430	-	-	mg/l
2013	Water Samples of Tap Water	0.009-0.015	0.006-0.007	0.000-0.030	0.130-1.390			mg/l

Source-: Central Ground Water Board, North Western Region, Chandigarh.

No ground water from shallow tubewells in Chandigarh is prescribed as drinkable. MC discourages use of handpumps for drinking water. Hand pumps in markets serve other purposes of the use of water. These Handpumps are painted red to indicate the same. MC has given potable water supply to various sections of market/commercial places which is for hours in a day.

CPCC, Chandigarh taking water samples for testing

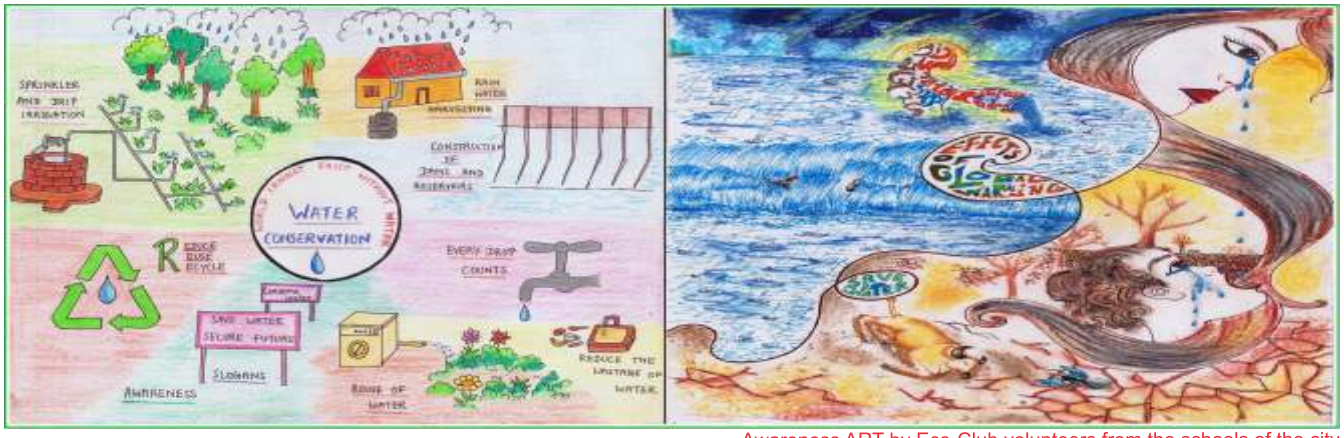
Conservation of Water:

Water conservation means protecting our water resources from pollution and being wasted. It is important because plants, humans and animals all need water to survive. Without water, the earth would have no life. Due to consistent water resources, but increasing population and demand of water; the city beautiful has also been practicing water conservation by following different conservation strategist.

Action Plan for Water Conservation: U.T. Chandigarh

- As per new guidelines by the CPCB, the BOD of treated waste water should be below 10 mg/L, thus the upgradation of all STP's in the city is under process.
- Supply of tertiary treated water is planned to increase from 10 MLD to 30 MLD for the use in sectorial garden, parks, household lawns etc.
- All the large developments, housing and institutional campuses etc. with a total site area >30 acres must adhere to Zero storm water runoff from the site.
- Use of recycled water will be compulsory for all non-potable uses for all large buildings with an area of more than 2000 m2 in all new developments.
- All apartments with more than 20 tenements or area of more than 2000 m2 should make plumbing and infrastructure provision for enabling localized sewage treatment, use of recycled water for flushing, washing and for watering gardens.

Sr. No.	Category of interventions	Proposed activities	Remarks
1	Reduce Water consumption on	Water efficient fixtures are being fitted in all new	All new buildings are being fitted with water efficient fixtures and water less urinals, resulting into reduction of 15% of the water consumption.
		Leakage Control Management	An gency is being decided from the Empanelled agency of MoUD to study the non revenue water, however strict monitoring results in leakage control in the tune of 5%.
		Replacement of malfunctioning water meters	It has been notified in the Chandigarh Water Supply Bye Laws that all the malfunctioning water meters shall be replaced by the consumers from their own otherwise the penal rate will be charged from water chares which is being strictly followed resulting 80% of the malfunctioning water meters replaced.
2	Landscape water conservation	Use partially treated water for irrigation	Tertiary Treated water network has been provided and it has been mandatory for all the residential houses above 1 kanal to have T.T connection for irrigation purpose all the green belts/parks are being irrigated with T.T. water and the work is in progress to cover the entire city within next 3 months.
3	Water Audit		EESL has been engaged for the water audit and survey work is in progress.



Awareness ART by Eco-Club volunteers from the schools of the city

The increasing population, upgrading economic status, and increasing demand of rapid transportation, leads to the exponential increase in the number of vehicles all over the world, and the similar trend is being witnessed in city beautiful Chandigarh also, Accomplishment of the required demand of the above sector resulting in the drastic augmentation in the consumption of conventional sources of energy mainly coal and petroleum based fuels such as petrol, diesel, kerosene, aviation turbine fuel (ATF), compressed natural gas (CNG) and liquefied petroleum gas (LPG) etc. As the category itself indicates that these sources are conventional in usage i.e. their exploitation has been continued since the beginning of machine age. Most of our daily energy needs from cooking, heating, industrial processing and transportation are fulfilled by the conventional sources of energy.

The geographical location of U.T. Chandigarh blessed the city with the undisputed supply of almost all energy resources through railways, road transport and airways from the adjoining states of Haryana, Punjab & Himachal, and the other parts of country. Due to high per capita income, the consumption of electricity, LPG and other petroleum products is also notably high in the city. The city has the highest per capita vehicle ownership in the country, very high vehicle density and the multiple modes of public transport for the daily commuters mostly from the cities of neighboring states However the well maintained road network, tree covered pathways, cleaning with the latest techniques, strict traffic rules and traffic management by the attentive officers makes the system very easy going. The stats of conventional energy resources and their consumption trend the city are discussed further.

Electricity Consumption

Union Territory of Chandigarh came into existence with effect from 01/11/1966 after re-organization of erstwhile state of Punjab. The Local Distribution of electricity in Chandigarh was taken over by the Chandigarh Administration from the PSEB on 2nd May, 1967 and is responsible for Transmission and Distribution of power supply up to consumers door-step for making quality and continuous power supply available to each and every resident. The Electricity Operation Circle is headed by Superintending Engineer along with four Executive Engineers with the employee's strength of 1246 approx.
The peak demand of UT Electricity Department has touched 323 MW on dated 24.05.2010 which was met from different Central/State Generating stations. UT Chandigarh has no generating capacity of its own because the generating projects are found to be techno-economically not viable. At present, the City is receiving 51% of its power through Mohali (PSEB), about 9 % through Dhulkote (BBMB) and remaining 40 % through Nalagarh. The city has a transmission network which comprises of one No.220 KV Sub Station at Kishangarh Manimajra, 13 Nos. 66 KV Sub Stations and 5 Nos. 33 KV Sub Stations. At present, the city has 197931 consumers as on 31.03.2011 which includes 1,69,288 domestic consumers, 24,619 commercial consumers and about 2644 industrial consumers. The average power requirement is around 43. lac units per day. UT has an allocation of 187-263 MW of power from different Central/State Generating Stations during different hours of the day. Per capita consumption is 1468 units per person per annum. Besides this, Chandigarh Administration is maintaining 19437 numbers overhead tube type of street light points within sectors (i.e. V-6) roads.

Source: http://chandigarh.gov.in/engg_web/pages/about_us.html

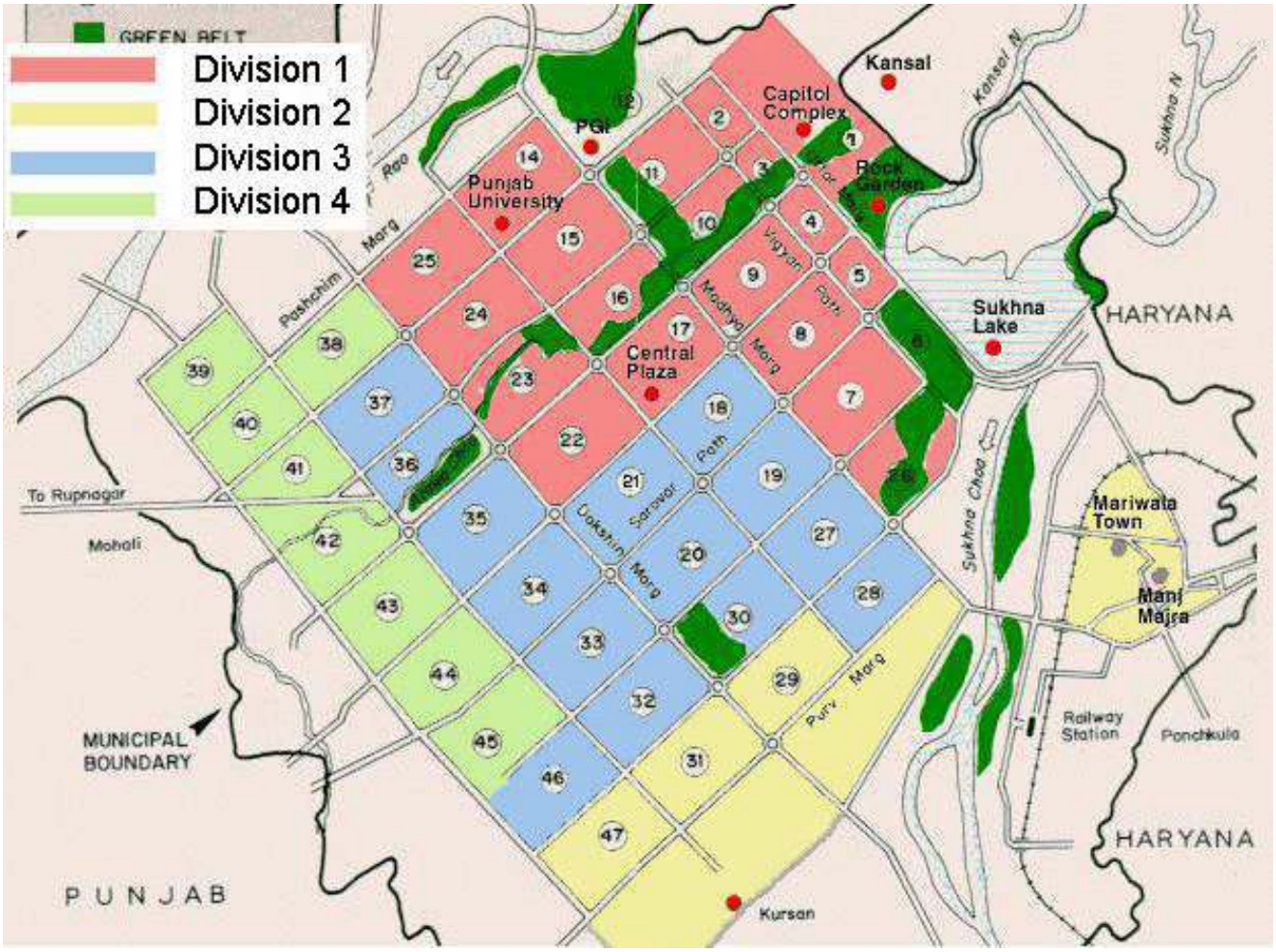
Supdt. Er. Electy.OP Circle,U.T.Chandigarh

The increase in population along with the ever-increasing per capita consumption of electricity is making it difficult for the city to meet the demand. This in turn leads to power cuts and discontinuous supply of power to both residential and non-residential areas including the industrial area; as a consequence of the productivity is being affected. Chandigarh draws power from the central grid and has no power generation of its own. But yet electricity consumption of Chandigarh is increasing by 52 million units every year. Therefore it is imperative that the union territory adapts itself to reduce dependence on the grid electricity and build its own captive generation or switch to renewable power that helps to generate its own power. Aiming to the energy efficient city, Chandigarh is moving strongly to adopt Solar City plan to reduce dependence on Conventional Energy resources.

Ministry of Natural & Renewable Energy (MNRE) Government of India (GOI), New Delhi has selected Chandigarh to develop as Model Solar City through Chandigarh Renewal Energy, Science and Technology Promotion Society (CREST). Master Plan for Model solar City was prepared by, "The Energy and Resource Institute" (TERI) and approved by MNRE, GOI in Jan 2012. The Solar City plan is aimed to reduce the dependence on conventional electricity consumption by 10 % in next five years (2017).

This Master Plan for Solar City is a dynamic document meant to change with time, experience, and need. The development of master plan has benefitted from the collaborative participation of CREST, Public Works Department, Municipal Corporation UT, Chandigarh Administration, Municipal Water Supply Department, Forest Department, power utilities, electricity department of Chandigarh Administration; and other agencies with energy-related responsibilities. Development of a solar city requires an integrated urban planning approach, which simultaneously involves reducing reliance on fossil fuels by the application of energy conservation & efficiency measures and by replacing the conventional energy generation with the renewable energy. The key steps of the Model Solar City concept comprised:

- Base line determination
- Energy planning Energy use projections
- Energy efficiency measures and audit
- Utilization of available renewable energy sources

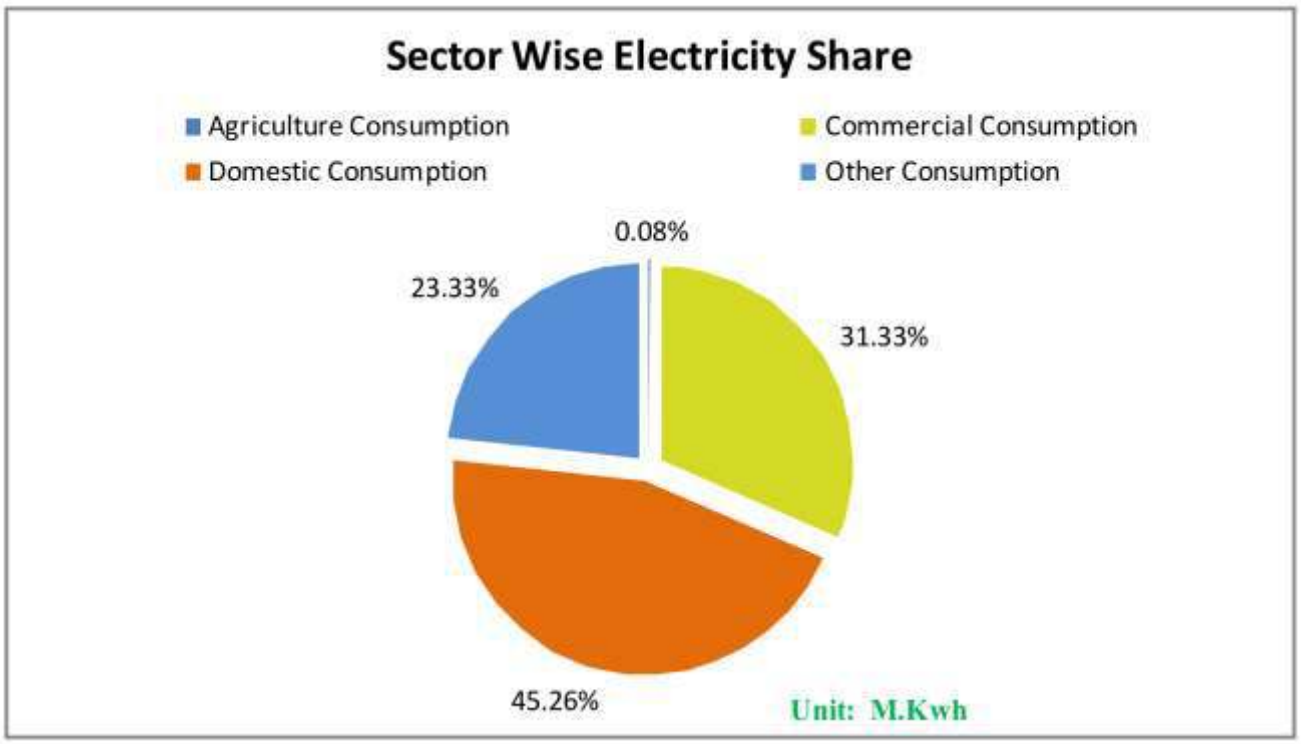


Electricity Division wise map of Chandigarh

With the gradual increase in the population of the city the demand for electricity has also been increased at a faster rate. In 2009-10 the electricity demand was 1237.58 Million Kilowatt Hour (M.kWh) and in 2016-17 it was 1496.08 M.KWh, compared to the total electricity demand in 2009-10, nearly 351.42 Million Kilowatt Hour (M.kWh) electricity consumption has been increased till 2015-16 in just six years as shown in the table.

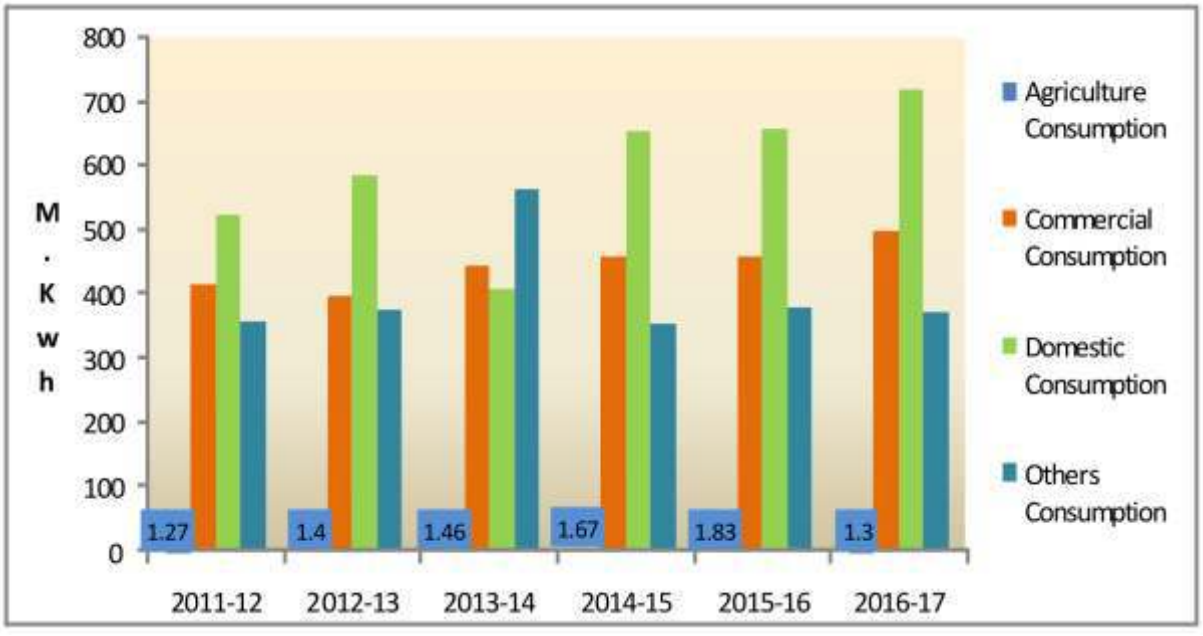
Year	Total Consumption (M.KWH)
2009-10	1237.58
2010-11	1284.45
2011-12	1301.47
2012-13	1362.73
2013-14	1419.27
2014-15	1471.66
2015-16	1496.98
2016-17	1589

Source: *Supdt. Er. Electy, 'OP' Circle U.T Chandigarh.*



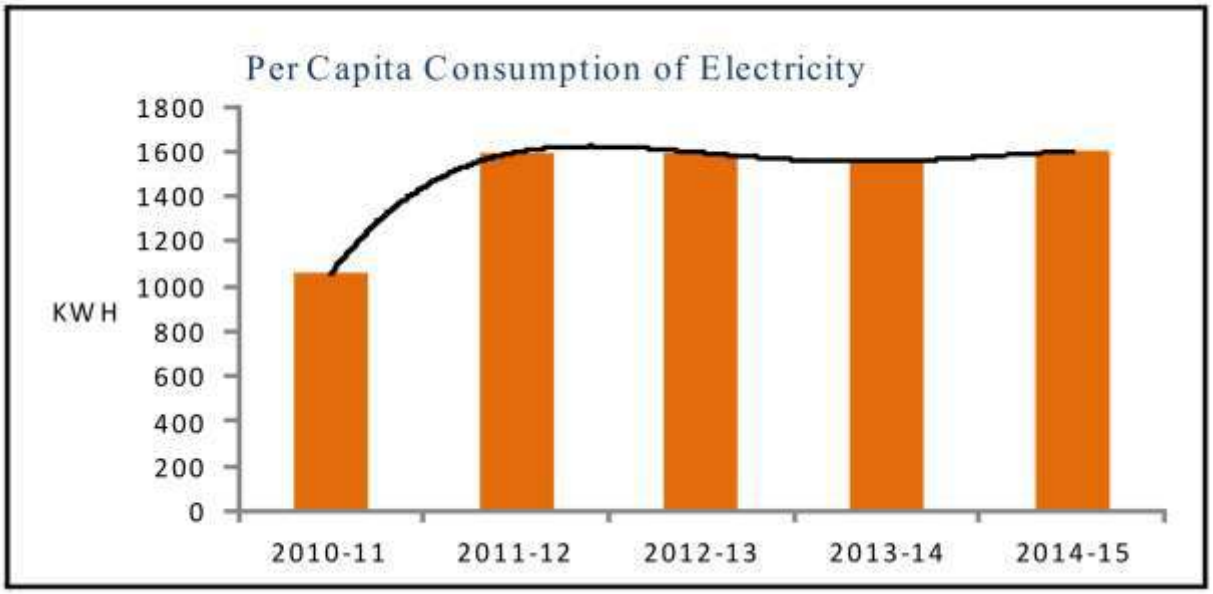
Source: *Supdt. Er. Electy, 'OP' Circle U.T Chandigarh.*

As per census 2011 report, Chandigarh lies amongst the highly populous cities of India with the remarkable per capita income. Due to high living standard the domestic consumption of electricity was observed to be the highest compared to the other sectors. Agricultural sector of Chandigarh is shrinking day by day due to rapid growth and expansion of the city. With ,merely 600 Hectare crop area, the agriculture sector of the city has the lowest electricity consumption of just .08% of total. The major portion of the supplied electricity has been occupied by the commercial, domestic and other sectors such as Industries, Public Lighting , Educational & medical Institutions, Govt. Buildings & offices etc. Sector wise annual consumption of electricity is given by the graph below.

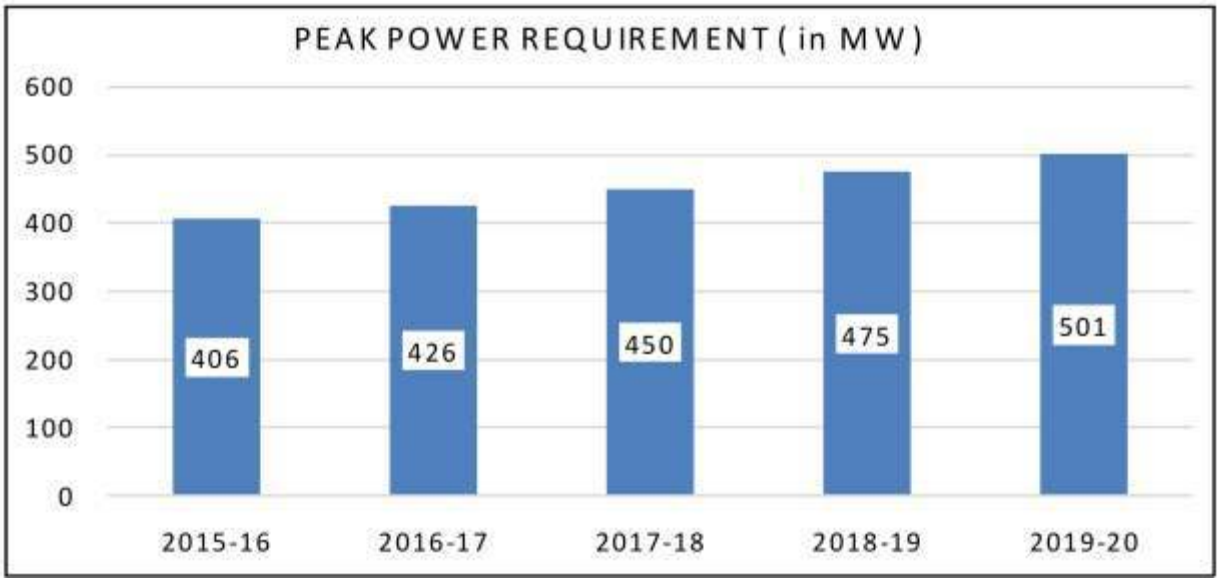


Source: *Supdt. Er. Electy, 'OP' Circle U.T Chandigarh.*

Chandigarh has Per capita power consumption of 1,601 units per year against National average of 1,010 units per year



Source: Supdt. Er. Electy, 'OP' Circle U.T Chandigarh.
Http://chandigarh.gov.in/engg_web/pages/about_us.html



Source: Chandigarh Electricity Department

POWER SUPPLY SOURCES

Generating Companies	Installed capacity (in MW)	Total Allocation inc. unallocated quota (in MW)
NTPC (13)	11942	75
NPCIL (3)	1320	28
NHPC (11)	3885	37
THDC (2)	1400	12
BBMB (3)	2356	127
SJVNL (2)	1843	14
TOTAL (34)	**22746**	**293**

Power Shortage/Surplus (-/+)

Sr. No	Months	Availability of Power (in MW)
1	APRIL - SEPTEMBER	220-260 MW
2	OCTOBER - NOVEMBER	150-210 MW
3	DECEMBER- MARCH	130-190 MW
THE AVAILABILITY OF POWER HAS BEEN DETERMINED KEEPING IN VIEW THE OUTAGES (FORCED /PLANNED) AND THE INFLOW OF WATER TO VARIOUS HYDRO GENERATING PLANTS.		

HOW THE SHORTAGES BEING MANAGED?	
BANKING ARRANGEMENT WITH J & K	30 MW
SHORT TERM POWER PURCHASE	40-80 MW
POWER EXCHANGE PLATFORM	Need Based

Energy Consumption Petroleum Products

Products	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Unit
Petrol Incl. ULP	118855	128519	124671	116921	82147	85161	kl
High Speed Diesel	90564	92757	88175	91267	70651	82636	kl
Kerosene	9033	9155	7491	3941	3037	2035	kl
Light Diesel Oil	451	682	444	573	479573	447	kl
Furnace Oil	8541	34117	31118	19827	29359	39975	MT
Low Sulphur heavy Stock	6800	9024	4065	643	0	0	MT
L.P.G Connections	3,40,961	3,15,011	3,24,400	3,23,685	343538	408289	Nos.(Cum.)

Source:Statistical Abstract Chandigarh-2003,2006,2007,2008,2009,2010,2011,2012,2013,2014,2015

Among the petroleum products, Petrol as a fuel has the highest consumption in the city due to petrol based automobiles. Though the consumption of petrol has been reduced to 85,161 kl in 2014-15 compared to 1,24,671 kl of 2011-12 possibly due to advanced diesel vehicles and high prices of petrol. The product wise consumption of petroleum products during last 5 yr is given by the table above.

Number of LPG Connections:

Indian Oil Corporation

Year	No of Connections Released	Customer Population(Lacs)	DBC Population(Lacs)
2012-13	15603	3.91	2.28
2013-14	17735	2.07	1.14
2014-15	8075	1.8	1.64
2015-16	12104	2.73	1.86
2016-17	10614	2.81	1.99

Source: Manager-SLC,UTC,HPCL,Chandigarh
DBC (Double Bottle Connection)

Hindustan Petroleum Corporation

Year	No of Connections Released	Customer Population(Lacs)	DBC Population(Lacs)
2012-13	2779	0.55	0.41
2013-14	1764	0.82	0.58
2014-15	1817	0.84	0.59
2015-16	2055	0.84	0.6
2016-17	1908	0.86	0.61

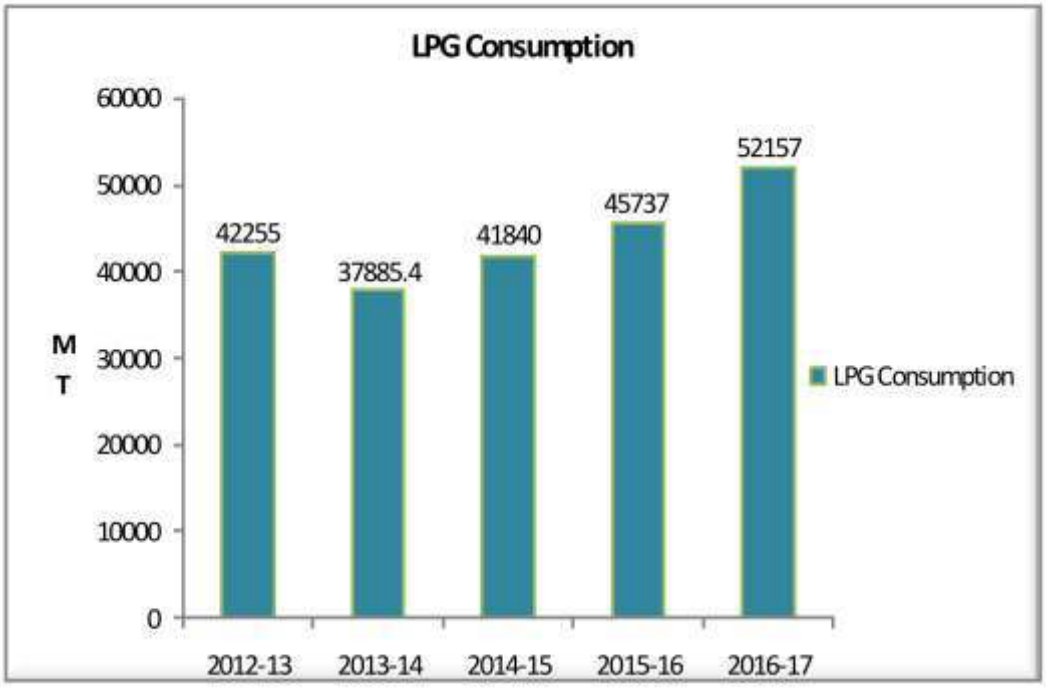
Source: Manager-SLC,UTC,HPCL,Chandigarh
DBC (Double Bottle Connection)

Bharat Petroleum Corporation

Year	No of Connections Released	Customer Population(Lacs)	DBC Population(Lacs)
2012-13	1654	0.51	0.38
2013-14	4011	0.54	0.35
2014-15	2401	0.55	0.35
2015-16	2664	0.58	0.42
2016-17	1329	0.59	0.4

Source: Manager-SLC,UTC,HPCL,Chandigarh
DBC (Double Bottle Connection)

Liquified Petroleum Gas (LPG) is the major source to fulfill energy requirements related to cooking food and food products in households and commercial eateries of Chandigarh. LPG supply to almost all houses of Chandigarh has been done by three major LPG suppliers named Indian Oil Corporation (IOC), Hindustan Petroleum Corporation (HPC) and Bharat Petroleum Corporation (BPC). Chandigarh administration has promoted the use of LPG in the territorial villages, instead of traditional fuel sources to control the air pollution caused by their combustion, greenhouse gas emission and to preserve the natural resources like Forests of the area. With the increase in population, nuclear family trend and development of commercial sector, the LPG connections are also increasing day by day. The trend of LPG consumption in Chandigarh is given below by graph respectively, and it shows the usage of LPG in Chandigarh is increasing each and every year.



Source: Manager-SLC,UTC,HPCL,Chandigarh

Non Conventional Energy

Non-conventional energy refers to the energy generated by using the natural resources such as wind, tides, solar, geothermal heat and biomass including farm-animal waste as well as human excreta, is known as non-conventional energy. All these sources are renewable or inexhaustible in the long run of time and do not cause environmental pollution. Moreover they also do not require heavy expenditure and after initial sources start delivering energy at negligible maintenance cost.

Chandigarh has a well defined boundary of 114 sq. Km and almost all the area is covered under different land use patterns. Due to shortage of vacant spaces Chandigarh do not have any option for the installation of wind mills or wind turbines. Also, due to the absence of yearly river/stream; the hydro power generation can't be done in the city. Chandigarh also do not have any geothermal energy source or radioactive material site, therefore the only way out left for the city to get non-conventional energy is Solar light. The climate of Chandigarh is subtropical humid, thus high intensity solar light (more than 300 sunny days) is available during most of the period throughout the year. Therefore, taking account of the benefits of a cleaner energy, Chandigarh has adopted a well structured plan to move forward in the field of generating solar energy, using solar water heaters, solar lights, blinkers, solar cookers and electricity generation by solar panels etc.

As per guidelines issued by MNRE, Govt. Of India, 3 % of the total energy consumption is to be obtained from the RE (Renewable Energy) sources under RPO (Renewable Purchase Obligation) for UT. Chandigarh. Out of this 0.85% is to be met from solar energy. Thus, about 12.3 million units are to be produced/ obtained from the solar energy. In order to meet its RPO, UT Chandigarh has conceived Rooftop based SPV Power Projects only; as the use of other renewable sources such as wind power, Hydel Power etc. is minimal in the UT.

50kWp Solar Power Plant at Govt. College of Commerce & Business Administration Sector-42, Chandigarh

210kWP Solar Power Plant at Govt. Post Graduate College Sector-46, Chandigarh

200kWp Solar Power Plant at Govt. Post Graduate College for Girls Sector-42, Chandigarh

150kWp Solar Power Plant at Chandigarh College of Engineering & Technology Degree Wing, Sector-26, Chandigarh

Status Report : Renewable Power Obligation (SOLAR POWER)

Sr. No	Financial Year	Max Demand (MW)	Units Billed (MU)	Solar Obligation to be met		Actual Solar Obligation Met (MUs)			%age RPO met in that year	Cumulative RPO met in %age	Remarks
				%	MUs	By purchasing RECs (MUs)	By Purchasing Solar Power (MUs) from M/S CREST	Total Obligation Met (MUs)			
1	2010-11	323	1285	0.25	3	-	-	-	-		JERC Regulation came into force w.e.f 30.11.2010 and copy of the regulation received from Hon'ble JERC on 6.1.2011.
2	2011-12	315	1301	0.3	4	-	-	-	-		
3	2012-13	363	1365	0.4	5	2	-	2	43%	16.66%	
4	2013-14	353	1420	0.4	6	16	-	16	275%	88.88%	Backlog of 2010-11 to 2012-13 achieved.
5	2014-15	395	1423	0.6	9	7	2	9	110%	100%	
6	2015-16		1510	0.85	12.72			13.022	102.37%		

Solar Renewable Power Obligation (RPO): Future Targets

Financial Year	Energy Consumption (MU) as per 18th Electric Power Survey Forecast.	Energy Consumption excluding Hydel Power (MU) (35% 0f toal Consumption)	Solar RPO (%) As Per JERC	RPO (Solar Requirement) (MU)	SPV Capacity (MW)
2015-16	1739	608.65	0.85	5.17	3.98
2016-17	1841	644.35	1.65	10.63	8.18
2017-18	1948	681.8	2.5	17.05	13.11
2018-19	2062	721.7	3.6	25.98	19.99
2019-20	2182	763.7	4.7	35.89	27.61
2020-21	2309	808.15	6.1	49.3	37.92
2021-22	2444	855.4	8	68.43	52.64

Chandigarh: The model Solar City

70kWp Solar Power Plant at Govt. Multi Speciality Hospital Sector-16, Chandigarh

35kWp Solar Power Plant at Security & Traffic Lines Sector-29, Chandigarh

100kWp Solar Power Plant at Govt. Medical College & Hospital Sector-32, Chandigarh

50kWp Solar Power Plant at National Institute of Technical Teachers Training & Research Sector-26, Chandigarh

- MNRE has identified 60 cities in the country to be developed as solar city by 2012 as part of the National Mission of Solar Energy with Chandigarh being one of them in the northern region.
- Chandigarh is among one of the 4 Model Solar Cities chosen by MNRE, GoI.
- Chandigarh Renewable Energy and Science and Technology Promotion Society (CREST) under the aegis of Department of Science & Technology and Renewable Energy, Chandigarh Administration, has been appointed as the executing agency for MNRE (GoI) schemes & Renewable Energy projects in Chandigarh.
- Master Plan for 10 years for Model Solar City was prepared by " The Energy and Resource Institute (TERI)", New Delhi.
- Approved Master plan of 'Chandigarh Solar' City envisaged mid term target of 5 MWp Rooftop Solar (by 2017) and long term target of 10 MWp rooftop solar plants installation by 2022 to be achieved.
- However, in view of enhanced target of 100 GW to be achieved by 2022 as recently announced by MNRE (GoI), Government of India, has set 50 MW as SPV target for Chandigarh Administration to be achieved by 2022.

This concept will prove to be extremely beneficial for Chandigarh, which is located in the sunny belt of the country and receives a good amount of solar radiation over the year. The Chandigarh Administration has got a DPR (Master plan for implementation of solar city program) prepared from TERI. The underlying philosophy of the concept of the Solar City is to ensure that the energy demand in will be met in affordable, technologically advanced, and environmentally friendly manner. It means that after cost effective efficiency and demand response, the city relies on renewable sources of power and distributed generation, to

It is proposed that Chandigarh will generate its own power by harnessing solar energy for which the following targets has been anticipated:

- 10 MW solar PV based roof top power plant
- 5 MW solar PV based power plants in landfill site of the city (this has of late has been ruled out due to capping of site.

Journey So far to Achieve Solar Targets:

Chandigarh is leading towards a complete solar city and the administration has installed solar panels over the roofs of houses, commercial buildings, schools, colleges, universities, hospitals and government offices etc. Solar lights has been installed at various places including parks, street lights at road sides and blinkers on the roads interconnecting different sectors of the city. The total number of various solar appliances installed throughout the city is given in the Table below:

Year	Solar Water Heating	Solar Cookers	Solar Street Light	Blinkers	Battery Operated Vehicles	Solar Green House
	Cumulative value in LPD	Cumulative value in No.	Cumulative value in No.	Cumulative value in No.	Cumulative value in No.	Cumulative value in No.
2016-17	2,45,330	105	894	14	562	37

495kWp Solar Power Plant at Govt. College for Girls Sector-11, Chandigarh

100kWp Solar Power Plant at District Court, Sector-43, Chandigarh

50kWp Solar Power Plant at Paryavaran Bhawan Sector-19, Chandigarh

1000kWp Solar Power Plant at PEC, Sector-12, Chandigarh

- Chandigarh has already installed & commissioned **10.5 MWp** Solar PV Plants as on 31st Mar, 2017.
- Chandigarh is in the process of installation of another 9.5 MWp Solar plants By March, 2018 thereby meeting all its Solar RPO Obligation by end of FY 2016-17 through production of solar energy in its own territory.

- CREST has commissioned **159 rooftop solar plant** with overall installed capacity of **8.15 MWp** as on **31st Mar, 2017.**
- These **145** solar plants include followings:
- Installation& commissioning of Rooftop solar plants in ***64 Govt schools of UT Chandigarh of overall capacity of 2510*** **kWp**.
- Installation& commissioning of Rooftop solar plants on ***11 Govt colleges in Chandigarh leading to overall capacity of 2770 kWp.***
- One of the largest rooftop Solar PV Plant of ***1 MW capacity installed & commissioned at Punjab Engineering college, Sec 12, Chandigarh***
- Installation of rooftop Solar plants on ***28 Govt residential Houses for Demonstration purposes***
- *Installation & Commissioning of **10 kWp floating off Grid SPV Power Plant with fountain at Dhanas Lake,** Chandigarh for water aeration, as innovation project*

Climate Change Initiative

- As on 31st Mar, 2017, Chandigarh has already generated 18.81 MU of solar energy (in last 3.3 years) which is equivalent to reduction of 13,040 metric ton of CO_2 and in turn equivalent to planting of 14.07 lakh trees which is remarkable initiative under Climate Action Plan..
- Chandigarh plants about 2 Lakh saplings every year as part of Greening Chandigarh Action plan and hence above efforts in Solar City is equivalent to planting another 3.5 Lakh saplings every Year.

Future Strategies:

1. Covering all rooftop of UT government office as well as residential buildings
2. Encouraging & facilitating other Govt. Offices like Central Govt. offices, Punjab Govt. offices & Haryana Govt. offices to go for solar installation
3. Encouraging Private/third party solar installation mode on buildings

S. No	Agency	Target
1	UT Administration's intervention	35 MW
2	Private Sector/ Industries/Institutions/ Residential Houses/ RESCO Mode	15 MW

Promotion of Solar Energy in Residential/Industria /Commercial sector

- **Joint Electricity Regulatory Commission for Goa & UTs (JERC) has notified the Solar Tariff & Net metering Regulation which is offering a very attractive rate which shall definitely lead to installation of Solar Plants on private houses/Industrial/commercial establishments**

Solar Traiff Notifiedby JERC For U.T. Chandigarh For FY 2016-17 & 2017-18					
Capacity (in kwp)	Subsidy	Tariff (in Rs.)			
		FY 2016-17		FY 2017-18	
		Without AD*	With AD*	Without AD*	With AD*
1_10	0%	9.19	8.71	8.57	8.13
	30%	6.89	6.55	6.46	6.15
11_100	0%	9.08	8.6	8.47	8.04
	30%	6.81	6.48	6.39	6.09
101_500	0%	8.86	8.4	8.27	7.85
	30%	6.66	6.34	6.25	5.95
>501	0%	8.72	8.26	8.14	7.73
	30%	6.56	6.24	6.16	5.87

As per the Regulation, any electricity consumer/resident can opt for 'Gross Metering' billing arrangement or for 'Net Metering'.

Gross Metering:

Total aggregate capacity of 600 kWp Solar Power Plants installed on 32 Nos. private sector in Chandigarh.

Grand Total = 1829 kWp

Net Metering:

Total 1229 kWp Solar Power Plants installed on 57 Nos. private sector in Chandigarh on 31st March,2017.

Initiatives taken to promote Solar Power in Private Sector:

- CREST has empanelled large no of EPC Contractors for installation of rooftop Plants and 30% subsidy as provided by GOI shall be released to the consumer if they get it installed through any on of the. However, the subsidy is limited to L-1 rate arrived or as per rate notified by MNRE Whichever is less.

- CREST has launched an online portal: www.solarchandigarh.com wherein any regulatory clearances including subsidy can be obtained online by any consumer as part of Ease of Business.

- UT Chandigarh has recently notified amended Building By- laws to make Solar PV Installation mandatory on all buildings in U.T., Chandigarh above 500 Sq yard Plot size to promote the

AWARDS/RECOGNITION:

Year 2015:

Awards from the MNRE, GOI on the First Foundation day of Association of Renewable Energy Agencies of State (AREAS) on 27th August, 2015 at Bengaluru for its excellent performance in the field of Renewable Energy.

1. Second highest grid connected solar rooftop power capacity addition in the country in 2014-15.

2. Second highest cumulative grid connected renewable power capacity addition amongst the 1st in the country in 2014-15.

3. Ranked Second Prize for installation of renewable power applications in its office building at Chandigarh

Year 2016:

CREST received following from the MNRE, GOI on 7th June, 2016 at Vigyan Bhawan, New Delhi for its excellent performance in the field of Solar Energy.

1. National Excellence Award 2016 for Rooftop Solar Projects as number one Solar City of the Country.

2. National Excellence Award 2016 to CREST as top performing State Nodal agencies for Renewable Energy among UTs & special category states.

10 kWp SPV Power Plant at Dhanas Lake, Chandigarh

200kWp SPV Power Plant at ISBT, Sector, 43, Chandigarh