

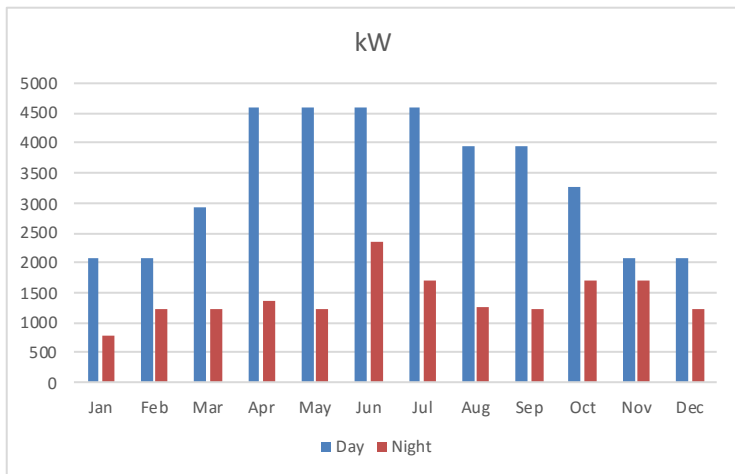
Connected Load : 6490 kW

ASSUMPTIONS				ELECTRICAL								
Zoning	Building Names	Building Areas (m ²)			Electrical Load (kW)							
		Built Up	Carpeted	Roof	Lighting	Power	UPS	Lifts	Plumbing	HVAC	TOTAL	W/m2 (Carpet Area)
RESIDENTIAL	Faculty & Staff	39,122	29,342	32,622	118	1014	0.6	120	0	881	2133	72.7
	Hostel	20,500	15,375	23,145	53	350	0.0	0	0	288	691	44.9
	Dining	3,761	3,307	3,087	6	74	0.6	10	11	100	201	60.8
NON RESIDENTIAL BUILDINGS	Academic	17,031	12,750	23,960	26	152	60.2	109	19	90	456	35.8
	Administration	6,810	5,536	3,010	10	23	20.8	23	12	109	198	35.7
	Communication Center	1,600	1,470	3,010	2	7	33.4	0	0	55	98	66.5
	International Center	5,061	4,171	2,500	23	60	7.8	13	8	42	154	37.0
	Campus Inn	5,677	4,250	2,150	16	67	6.3	15	8	42	154	36.2
	Library	24,000	16,320	5,550	7	68	35.7	19	10	98	237	14.5
AMENITIES	Out Reach	1,380	1,077	800	3	18	5.9	6	5	30	68	63.2
	Student Amenities	8,960	6,720	8,400	11	63	0.0	0	0	87	161	24.0
	Sports Center	3,737	2,803	2,900	3	11	1.6	0	5	45	66	23.6
	Commercial Center	1,460	1,095	2,000	2	9	3.3	10	0	22	46	42.0
	Infirmary & Faculty Club	1,790	1,343	550	3	30	8.8	10	5	27	84	62.7
EXTERNAL INFRASTRUCTURE	School	6,000	4,000	4,968	9	36	27.1	0	0	129	201	50.3
	Pathways & Landscape				75	0	0.0	0	0	0	75	NA
	Pumping HVAC				0	0	0.0	0	150	0	150	NA
TOTAL:		1,46,889	1,09,558	1,18,652	369	1981	212	334	233	3361	6489.6	44.2
					6%	31%	3%	5%	4%	52%	100%	

Demand Load: 4600 kW (70% of Demand Load)

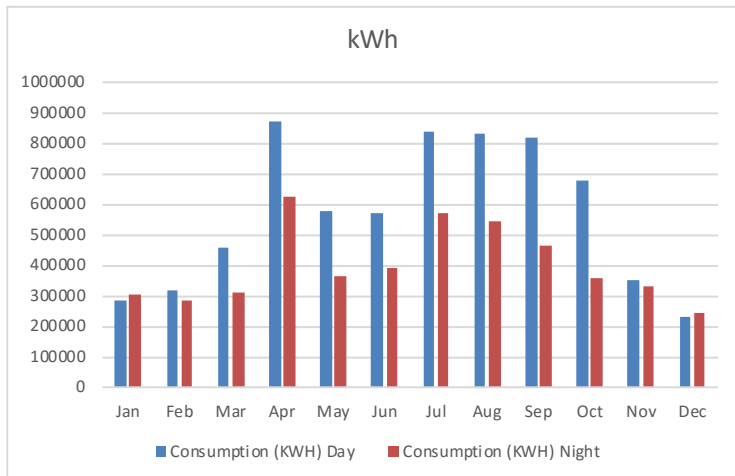
Demand Load (KW)

Month	Day	Night
Jan	2083	772
Feb	2083	1225
Mar	2923	1225
Apr	4602	1354
May	4602	1225
Jun	4602	2362
Jul	4602	1690
Aug	3931	1243
Sep	3931	1225
Oct	3259	1690
Nov	2083	1690
Dec	2083	1225



Consumption (KWH)

Month	Day	Night
Jan	286989	307221
Feb	319798	284105
Mar	458915	311743
Apr	868967	625113
May	578430	365326
Jun	571801	390861
Jul	838236	569750
Aug	830208	544291
Sep	815771	462286
Oct	679607	356262
Nov	349786	331040
Dec	230071	242578



Demand kW

	Day Time	Night Time
Connected Load	6489	3375
Diversity	71%	70%
Maximum Demand	4600	2362

Source

Solar P.V.	2200
CHP	1700

Size of Grid kW

Maximum Demand	4600
Less CHP Generation	1700
Balance	2900

GRID Size 3000 kW

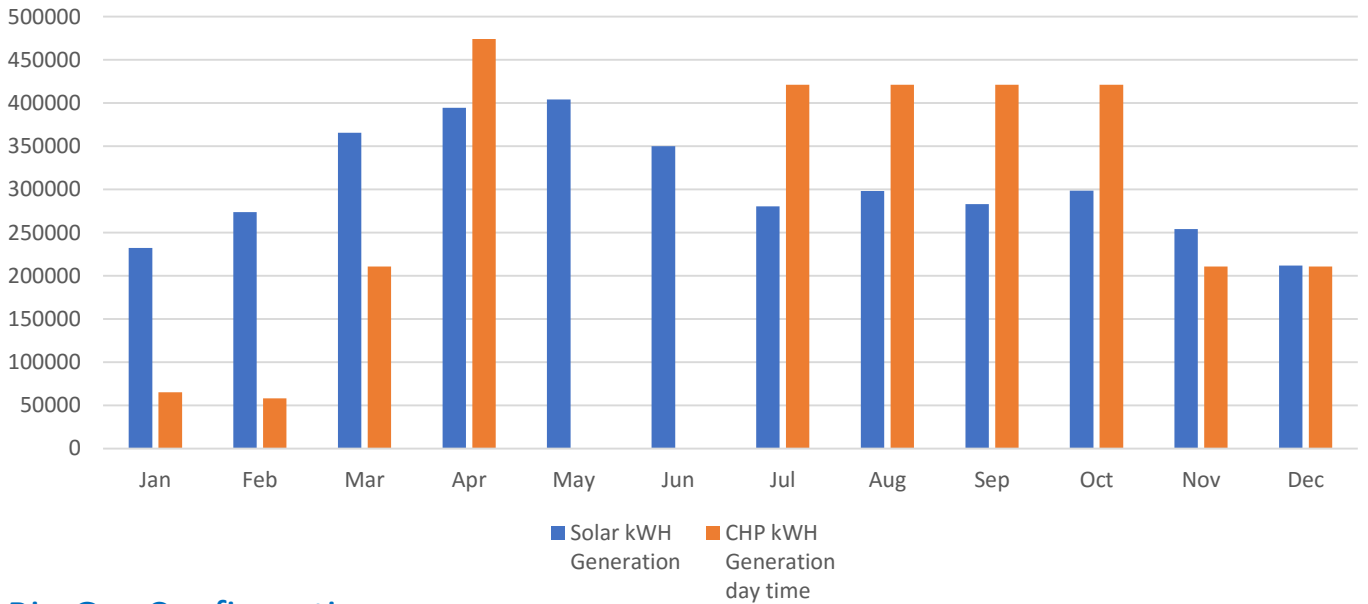
Electricity Sanctioned demand is calculated based on Maximum Demand Load less assured capacity generation on site i.e. 4600-1700 = 2900.

Unit Generation from P.V. & CHP

Month	DAY TIME				NIGHT TIME			OVER ALL			
	Day Demand kWh	Solar P.V. kWh	CHP kWh	Grid kWh	Night Demand kWh	CHP kWh	Grid kWh	Total Demand kWh	Solar P.V. kWh	CHP kWh	Grid kWh
Jan	286989	232089	65174	-10274	307221	308016	-795	594210	232089	373190	-11069
Feb	319798	273919	58032	-12153	284105	284256	-151	603903	273919	342288	-12304
Mar	458915	365526	210701	-117312	311743	314712	-2969	770658	365526	525413	-120281
Apr	868967	394650	474077	240	625113	625320	-207	1494080	394650	1099397	32
May	357048	404238	0	-47189	247278	247752	-474	604327	404238	247752	-47663
Jun	331541	349937	0	-18396	310829	311040	-211	642369	349937	311040	-18608
Jul	838236	280433	421402	136401	569750	572508	-2758	1407986	280433	993910	133643
Aug	830208	298094	421402	110712	544291	545724	-1433	1374499	298094	967126	109280
Sep	815771	282954	421402	111416	462286	463320	-1034	1278057	282954	884722	110382
Oct	679607	298451	421402	-40245	356262	358236	-1974	1035869	298451	779638	-42219
Nov	349786	253950	210701	-114866	331040	333720	-2680	680826	253950	544421	-117546
Dec	230071	211752	210701	-192382	242578	244404	-1826	472648	211752	455105	-194209
Total	6366936	3645994	2914992	-194049	4592496	4609008		10959433	3645994	7524000	-210561

	Load KW	Solar KW	Stirling KW	Grid KW
Daytime	6366936	3645994	2914992	-194049
Night	4592496		4609008	0
	10959433	3645994	7524000	-210561

Unit Generation from P.V. & CHP



Bio Gas Configuration

- Methane Content - 55%
- RH Value – 80
- Pressure – 6 Bar
- Calorific Value – 22-24 MJ/m3

Technical Data for CHP (For Reference only, capacity of engine may vary)

Technical data

Configuration	In line	Dimensions l x w x h (mm)	
Bore (mm)	135	Generator set	4,900 x 1,700 x 2,000
Stroke (mm)	145	Cogeneration system	4,900 x 1,700 x 2,000
Displacement / cylinder (lit)	2.08	Container 20-foot (generator set)	6,100 x 2,500 x 2,600
Speed (rpm)	1,500 (50 Hz) 1,800 (60 Hz)	Container 40-foot (cogeneration)	12,200 x 2,500 x 2,600
Mean piston speed (m/s)	7.3 (1,500 rmp) 8.7 (1,800 rmp)	Weights empty (kg)	
Scope of supply	Generator set, cogeneration system, generator set / cogeneration in container	Generator set	6,000
Applicable gas types	Natural gas, flare gas, propane, biogas, landfill gas, sewage gas	Cogeneration system	6,700
Engine type	J208		
No. of cylinders	8		
Total displacement (lit)	16.6		

Outputs and efficiencies

Natural gas		1,500 rpm 50 Hz					1,800 rpm 60 Hz				
		Type	Pel (kW) ¹	η_{el} (%) ¹	Pth (kW) ²	η_{th} (%) ²	η_{tot} (%)	Pel (kW) ¹	η_{el} (%) ¹	Pth (kW) ²	η_{th} (%) ²
500 mg/m ³ _N	J208	300	38.3	409	52.0	90.3	335	37.2	424	47.1	84.3
	J208	330	38.8	371	43.6	82.4					
250 mg/m ³ _N	J208	294	37.6	410	52.4	90.0	335	35.9	423	45.3	81.2

Biogas		1,500 rpm 50 Hz					1,800 rpm 60 Hz				
		Type	Pel (kW) ¹	η_{el} (%) ¹	Pth (kW) ²	η_{th} (%) ²	η_{tot} (%)	Pel (kW) ¹	η_{el} (%) ¹	Pth (kW) ²	η_{th} (%) ²
500 mg/m ³ _N	J208	330	38.8	413	48.5	87.3	335	36.3	410	44.4	80.6
	J208	249	39.1	275	43.2	82.2					
250 mg/m ³ _N	J208	330	37.8	357	40.9	78.6					

Predicted Solar P.V Output: (2300 SM Solar P.V Cell Area)

Sr. No.	Month	Solar Radiation (MJ /m2 /day)	Solar Radiation (kwh/m2 /day)	15% efficiency of solar panel	Month wise output in kWH
	F				
1	JAN	13.01	3.62	0.65	232088.77
2	FEB	17.00	4.73	0.85	273918.96
3	MAR	20.49	5.70	1.03	365526.44
4	APR	22.86	6.36	1.14	394650.47
5	MAY	22.66	6.30	1.13	404237.63
6	JUN	20.27	5.64	1.01	349937.23
7	JUL	15.72	4.37	0.79	280433.17
8	AUG	16.71	4.65	0.84	298094.03
9	SEP	16.39	4.56	0.82	282953.68
10	OCT	16.73	4.65	0.84	298450.82
11	NOV	14.71	4.09	0.74	253950.50
12	DEC	11.87	3.30	0.59	211752.02
Total kWH Generated by 2000 kW Solar					3645993.71