

Koyana Education Society, Patan

**BALASAHEB DESAI COLLEGE,
PATAN**

Energy Audit Report

By

BEE Approved Energy Auditor

16/01/2021

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BY

BEE Approved Energy Auditor

Energy Auditor no. EA-8981

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ACKNOWLEDGEMENT

Express hereby my sincere gratitude to Dr Pawar Sir, Hon.Principal of Balasaheb Desai College,Patan for awarding us the assignment of carrying out detailed Energy Audit of their Institute at Patan

We are thankful to:

1. Shri.Fulchandji Tapase Saheb and Hemlata Kate Madam.
2. All the staff members of BDS college,Patan.

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Connection Inventory

Sr No	Consumer No	Location	Meter Make	Meter Sr No	1ph/3ph	Reading	Date	Meter Status	Distributed Load	
1	198720107133	In front of Library	Kaifa	60184086	3-ph	57639	16.01.2021		Area of Library and office	Admin Bldg
3	198720010016	Biology Department	GENUS	8423344	1-ph	3900	16.01.2021		Biology department	Admin Bldg
4	198720039197	Chemistry	GENUS	4286511	1-ph	37330	16.01.2021		Chemistry department	Admin Bldg
5	198720009827	Physics	GENUS	2429545	1-ph		16.01.2021		Physics department	Admin Bldg
7	198720010016	Competative Exam Center	GENUS	8423345	1-ph	529	16.01.2021		Competative Exam Center	Bld-2
8	198720010083	Printing Press	L&T	92063239	1-ph	660	16.01.2021		Press	Bld-3
9	198720038191	Furniture workshop	HPL	11364939	1-ph	1135	16.01.2021		Workshop	Bld-4
10	198720009913	Koyana Education Institute Office	HPL	11364941	1-ph	20208	16.01.2021		Sanstha Office	BLD-5
11	198723021078	Jimkhana	Kaifa	60161447	3-ph	2772	16.01.2021		Jimkhana	Bld-6
12	198720009956	Class-IV Quarters	HE	13674208	1-ph	614	16.01.2021		Quarter	Bld-7
2	198720030122	Building No.1 Phase1	ISKRA	31588400	1-ph	27137	16.01.2021		BLD No 1	Phase-1
6	198720010024	BCA	GENUS	8549852	1-ph	2488	16.01.2021		BCA	Phase-1
13	198720010474	Canteen	Flash	2562419	1-ph	No display	16.01.2021	Faulty	Canteen	Bld-8
14	198720028081	Jr College Passage near Toilet block	GENUS	Not Visible	1-ph	NV	16.01.2021		Passage	Bld-9
15	198720037747	Jr College second floor	L&T	7177824	3-ph		16.01.2021		Jr college second floor	Bld-9
16	198720024319	Ladies Hostel	HPL	360271	3-ph	No display	16.01.2021	Faulty	Ladies Hostel	Bld-10
17	198720014445	Ladies Hostel	Palmohan	181165	1-ph	21999	16.01.2021		Ladies Hostel	Bld-10
18	198720015204	Ladies Hostel	Siemens	6032583	1-ph	13251	16.01.2021		Ladies Hostel	Bld-11
19	Solar Street Light	Admin Bld Entrance								
20	Solar Street Light	Sr college Entrance								

Sr College Campus

Jr College Campus

Ladies Hostel Campus

Connection Consumption History

Sr No	Consumer No	Area	1ph/3ph	Billing Status	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Avg Consumption
1	198720107133	Admin Bldg	3-ph	Normal	877	760	670	769	769	1980	655	630	795	815	753	762	725
3	198720010016	Admin Bldg	1-ph	Normal	70	31	31	44	44	31	4	6	74	21	13	27	24
4	198720039197	Admin Bldg	1-ph	Faulty	391	391	391	391	391	391	391	391	391	391	391	391	391
5	198720009827	Admin Bldg	1-ph	Faulty	70	70	70	70	70	70	70	70	70	70	70	70	70
7	198720010016	Bld-2	1-ph	Normal	70	31	31	44	44	31	4	6	74	21	13	27	24
8	198720010083	Bld-3	1-ph	Normal	25	139	58	65	65	123	41	41	41	188	47	95	56
9	198720038191	Bld-4	1-ph	Normal	0	0	0	2	2	11	0	3	1	1	0	0	3
10	198720009913	BLD-5	1-ph	Normal	121	115	89	88	88	240	80	80	80	250	73	77	80
11	198723021078	Bld-6	3-ph	Normal	26	29	27	27	27	112	36	25	17	24	17	62	29
12	198720009956	Bld-7	1-ph	Normal	122	133	121	125	125	535	93	113	120	123	115	135	134
2	198720030122	Phase-1	1-ph	Normal	123	99	97	106	106	266	102	59	90	119	97	79	94
6	198720010024	Phase-1	1-ph	Normal	198	256	123	192	192	390	96	66	97	186	73	67	129
13	198720010474	Bld-8	1-ph	Faulty	0	0	0	81	81	0	0	74	74	74	74	74	74
14	198720028081	Bld-9	1-ph							No data Available							
15	198720037747	Bld-9	3-ph	Normal	159	135	113	136	136	136	328	213	126	283	165	234	146
16	198720024319	Bld-10	3-ph	Faulty	229	231	190	217	217	217	217	217	217	217	217	217	217
17	198720014445	Bld-10	1-ph	Normal	162	177	116	152	152	603	201	201	201	832	19	29	162
18	198720015204	Bld-11	1-ph	Normal	0	0	0	119	119	0	119	119	119	0	0	0	119

Amalgamation of separate connections in to one connection wherever possible.

Sr No	Consumer No	Area	1ph/3ph	Billing Status	Avg Consumption	Monthly Energy bill for Avg consumption			Instead of separate 1-ph connections combined 3-ph for entire building				per month Saving in Rs
						Fixed Charges	All other charges	Total Amt	Revised Avg cons.	Fixed Charges	All other charges	Total Amt	
1	198720107133	Admin Bldg	3-ph	Normal	725	362	5741	6103					
3	198720010016	Admin Bldg	1-ph	Normal	24	362	263	625		362		9894	1674
4	198720039197	Admin Bldg	1-ph	Faulty	391	362	3131	3493	1210		9532		
5	198720009827	Admin Bldg	1-ph	Faulty	70	362	623	985					
7	198720010016	Bld-2	1-ph	Normal	24	362	263	625	24	362	263	625	
8	198720010083	Bld-3	1-ph	Normal	56	362	513	875	56	362	513	875	
9	198720038191	Bld-4	1-ph	Normal	3	362	99	461	3	362	99	461	
10	198720009913	BLD-5	1-ph	Normal	80	362	701	1063	80	362	701	1063	
11	198723021078	Bld-6	3-ph	Normal	29	362	302	664	29	362	302	664	
12	198720009956	Bld-7	1-ph	Normal	134	362	1123	1485	134	362	1123	1485	
2	198720030122	Phase-1	1-ph	Normal	94	362	810	1172					
6	198720010024	Phase-1	1-ph	Normal	129	362	1084	1446	224	362	1826	2188	430
13	198720010474	Bld-8	1-ph	Faulty	74	362	654	1016	74	362	654	1016	
14	198720028081	Bld-9	1-ph			362				362			
15	198720037747	Bld-9	3-ph	Normal	146	362	1217	1579	146	362	1217	1579	
16	198720024319	Bld-10	3-ph	Faulty	217	362	1771	2133					
17	198720014445	Bld-10	1-ph	Normal	162	362	1342	1704	379	362	3037	3399	438
18	198720015204	Bld-11	1-ph	Normal	119	362	1006	1368	119	362	1006	1368	
Total						6516	20643	26797	2479	4706	20273	24617	2542

Average Unit cost

Sr No	Consumer No	Area	1ph/3ph	Billing Status	Avg Consumption	Monthly Energy bill for Avg consumption			Avg Unit cost		
						Fixed Charges	All other charges	Total Amt	Slab rate	Wheeling charges	Total
1	198720107133	Admin Bldg	3-ph	Normal	725	362	5741	6103	4.85	1.45	6.3
3	198720010016	Admin Bldg	1-ph	Normal	24	362	263	625	4.85	1.45	6.3
4	198720039197	Admin Bldg	1-ph	Faulty	391	362	3131	3493	4.85	1.45	6.3
5	198720009827	Admin Bldg	1-ph	Faulty	70	362	623	985	4.85	1.45	6.3
7	198720010016	Bld-2	1-ph	Normal	24	362	263	625	4.85	1.45	6.3
8	198720010083	Bld-3	1-ph	Normal	56	362	513	875	4.85	1.45	6.3
9	198720038191	Bld-4	1-ph	Normal	3	362	99	461	4.85	1.45	6.3
10	198720009913	BLD-5	1-ph	Normal	80	362	701	1063	4.85	1.45	6.3
11	198723021078	Bld-6	3-ph	Normal	29	362	302	664	4.85	1.45	6.3
12	198720009956	Bld-7	1-ph	Normal	134	362	1123	1485	4.85	1.45	6.3
2	198720030122	Phase-1	1-ph	Normal	94	362	810	1172	4.85	1.45	6.3
6	198720010024	Phase-1	1-ph	Normal	129	362	1084	1446	4.85	1.45	6.3
13	198720010474	Bld-8	1-ph	Faulty	74	362	654	1016	4.85	1.45	6.3
14	198720028081	Bld-9	1-ph			362					
15	198720037747	Bld-9	3-ph	Normal	146	362	1217	1579	4.85	1.45	6.3
16	198720024319	Bld-10	3-ph	Faulty	217	362	1771	2133	4.85	1.45	6.3
17	198720014445	Bld-10	1-ph	Normal	162	362	1342	1704	4.85	1.45	6.3
18	198720015204	Bld-11	1-ph	Normal	119	362	1006	1368	4.85	1.45	6.3
Total					2479	6516	20643	26797	4.85	1.45	6.3

Estimated Unit generation from Renewable energy sources(Solar Energy)

Daily consumption pattern (Day time consumption and Night time consumption)												
Sr No	Consumer No	Area	1ph/3ph	Billing Status	Avg Consumption	% day time use	Day time units consumption	Combined unit consumption for daytime (580+19+235+56)/30	Proposed solar roof top capacity in KW	Estimated Average solar generation per day (4 unit per day per Kwh)	Estimated surplus electricity units supplied to grid Per Day	Remark
1	198720107133	Admin Bldg	3-ph	Normal	725	80	580					
3	198720010016	Admin Bldg	1-ph	Normal	24	80	19	30	10	40	10	Proposed solar roof top for combined 3-ph connection of cap 10KW
4	198720039197	Admin Bldg	1-ph	Faulty	391	60	235					
5	198720009827	Admin Bldg	1-ph	Faulty	70	80	56					
2	198720030122	Phase-1	1-ph	Normal	94	80	75	5	3	12	7	Proposed solar roof top for combined 3-ph connection of cap 3KW
6	198720010024	Phase-1	1-ph	Normal	129	60	78					
16	198720024319	Bld-10	3-ph	Faulty	217	30	65	5	2	8	3	Proposed solar roof top for combined 3-ph connection of cap 2KW
17	198720014445	Bld-10	1-ph	Normal	162	60	97		15	60	20	
	Total				1812		0	40				

***Average Solar radiation in MAHARASHTRA state is 1266.52 w/sqm

1KWp solar rooftop plant will generate on an average over the year 5 units of electricity per day(considering 5.5 sunshine hours)

For Patan taluka it falls under heavy rain category, average 4 units per day is considered.

Pay Back Period Calculations

Details	15 KW				Investment	Savings/Income
Size of solar plant	15 KW					
Cost of plant	MINRE current benchmark cost					
	Rs 55000/KW(with subsidy)				825000	
Total electricity Generation						
(in Units)	Annual	60x30x12	21600			
	Life time	21600x25	540000			
Financial Savings						
Monthly self utilization	Units	40x30	1200			
***Tariff of Rs 6.30/Kwh						
***No increase assumed over 25 years						
Annually self utilization	Units	1200x12	14400			
Life time	Units	14400x25	360000			
tariff Rs 6.30	14400x6.3					90720
Financial Gain						
Surplus units exported to grid per day		20				
Annual units export	Units	20x30x12	7200			
Life time export	Units	7200x25	180000			
***Tariff of Rs 6.30/Kwh		7200x6.3				45360
Interest payable for capital investment						
interest @ 7% per annum						
for term of 10 years					577500	
Total					1402500	136080
Pay back period in years						10.31

Even if investment done by borrowing loan at interest rate 7% for term of 10 years payback period is 10.31 years matching the loan term

Strong recommendation for installation of solar set.

Recommendations:

					Estimated Annual Saving in Rs
1	Amalgamation of separate connections in to one				
	4 no of separate 1-ph connections in to one 3-phase in administrative building	1674x12			20088
	2 no of separate 1-ph connections in to one 3-phase in phase-I building	430x12			5160
	2 no of separate 1-ph connections in to one 3-phase in Ladies hostel	438x12			5256
2	Installation of Solar plant of minimum capacity 15 kW				136080
		Total			166584

Above recommendations will result in to

1	Mitigate carbon dioxide emissions				584 tonnes
2	Equivalent to plantting				935 Teak trees
					(over the span of 25 years)

Signed By


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Based on Annual Basis

Estimated Power Requirement met by Renewable Energy sources in Units	Total power requirement in Units	Renewable energy Sources	Estimated Renewable energy generated and used in Units	Energy supplied to the grid in Units
14400	29748	On Grid roof top Solar	21600	7200

*** Since the proposal to install 18 KW Solar roof top is under consideration, Henceforth estimated unit generation and associated use and export evaluated.

*** Self utilisation of total units generated is calculated for Day period hence $29748 - 14400 = 15348$ units is consumption at night hours.

Total Lighting Requirements	% Lighting through LED bulbs	% Lighting through Other sources
1200 Units Per Month	80%	20%

Administrative Building has healthy population of fluroscent tubes which needs to be replaced by LED.


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