Energy Auditing

Preliminary Energy Audit

For

Sandip Foundation

Sandip Institute of Technology & Research Centre

Nashik

Prepared by

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1. Analysis of monthly electricitybill

In a corporate electricity bill three factors contribute significantly to the total amount. They are:

- *Active energy consumption.* The total active or useful energy consumed by all loads connected to thefeeders.
- *Power factor consumption.* The total reactive power energy consumed by inductive or capacitiveloads.
- *Maximum power demand.* The peak power or the cumulative power rating of allconnectedloadsataparticularpointoftime.

Though traditionally energy audit targets the active energy consumption and power factor improvement, this project gives special emphasis to reduction of maximum power demand.

Walk through Audit

- For power factor correction we already installed APFC Panel and we maintained PF at 0.994 to 0.997. So according to that we get incentives in each months around 70000/- to 85000/- Indian Rupees.
- For managing the maximum demand we installed building wise metering to continues monitoring of critical and Non-critical load.
- For hostels (6 No.) we already installed **Solar Water Heater** Having Capacity of each is 5000 lits. 5000*6= 30000 lits of solar water heater. According to that we save 100 unit per day, 3000unit per month & 3000*12 = **36000 unit per year**
- For street light we almost replaced halogen lamp by LED Street light.
- And finally we found that we need to concentration on MD report given below.

2) Analysis of maximum demand & Power factor & Incentives in the electricity bill. The months wise electricity bill is analyzed to obtain table.

Table 1: Monthly analysis maximum demand and its cost. F.Y. 2016-17

Month	Contact Demand (kVA)	Bill Demand (KVA)	Demand Charges /kVA	Demand Charges (Rs)	Billed pf	Sanction Load (Kw)	Penalty/ Incentive due to PF in (RS))
April-2016	450	535	220	117700	0.996	840	-106588.67
May- 2016	450	422	220	97240	0.995	840	-99999.84
June- 2016	450	410	220	90200	0.993	840	-58690.36
July- 2016	450	401	220	88220	0.997	840	-79144.35
Aug- 2016	450	434	220	95480	0.997	840	-86727.13
Sept-2016	450	459	220	100980	0.997	840	-97749.83
Oct- 2016	450	461	220	101420	0.997	840	-93214.80
Nov- 2016	450	401	235	94235	0.997	840	-93209.75
Dec-2016	450	401	235	94235	1.00	840	-98260.65
Jan- 2017	450	418	235	98230	0.996	840	-101624.43
Feb-2017	450	462	235	108570	0.996	840	-101660.22
Mar-2017	450	575	235	135125	0.995	840	-118357.90
Average Bill Demand		**448.25**			**Total Incentive to SF=**		**-1135227.93**

Table 2: Monthly analysis maximum demand and its cost. F. Y. 2015-16

Month	Contact Demand (kVA)	Bill Demand (KVA)	Demand Charges /kVA	Demand Charges(Rs)	Billed PF	Sanction Load (Kw)	Penalty/ Incentive due to PF in (RS)
April-2015	450	433	190	82270	0.986	840	-56235.47
May- 2015	450	350	190	66500	0.994	840	-51891.81
June- 2015	450	373	220	82060	0.998	840	-64977.99
July- 2015	450	412	220	90640	0.994	840	-56445.95
Aug- 2015	450	441	220	97020	0.995	840	-82451.70
Sept-2015	450	489	220	107580	0.992	840	-65066.98
Oct- 2015	450	506	220	111320	0.992	840	-78575.29
Nov- 2015	450	380	220	83600	1.00	840	-81083.57
Dec-2015	450	380	220	83600	0.997	840	-86894.10
Jan- 2016	450	380	220	83600	0.996	840	-88920.47
Feb-2016	450	383	220	84260	0.996	840	-87692.58
Mar-2016	450	470	220	103400	0.995	840	-101022.90
Average Bill Demand		**416**			**Total Incentive to SF=**		**-901258.81/-**

Table 3: Monthly analysis maximum demand and its cost. F. Y . 2014-15

Month	Contact Demand (kVA)	Bill Demand (KVA)	Demand Charges /kVA	Demand Charges(Rs)	Billed pf	Sanction Load (Kw)	Penalty/ Incentive due to PF in (RS)
April-2014	450	403	190	76570	997	840	-84189
May- 2014	450	437	190	63270	996	840	-71820
June2014	450	444	190	84360	993	840	-50638
July- 2014	450	386	190	73340	995	840	-83021
Aug- 2014	450	423	190	80370	994	840	9627
Sept-2014	450	408	190	77520	994	840	-56069
Oct- 2014	450	378	190	71820	998	840	-72175.29
Nov- 2014	450	333	190	63270	995	840	-79012.07
Dec-2014	450	333	190	63270	995	840	-53022.55
Jan- 2015	450	361	190	68590	990	840	-60137.20
Feb-2015	450	378	190	71820	993	840	-51555.82
Mar-2015	450	445	190	84550	989	840	-59317.46
Average Bill Demand		**394**			**Total Incentive to SF=**		**-711330.39**

Yearly Unit Consumption of SITRC Nashik

Year	Name of Institute	Unit consumption in Month (Kwh)	Unit Consumption in Year (Kwh)	Remark
2014-15	SITRC Nashik	35612	35612*12= 427344	Nearly 35-40 % of total consumption of SF
2015-16	SITRC Nashik	39937	39937*12= 479244	
2016-17	SITRC Nashik	48884	48884*12= 586608 **Total Power Requirement**	
Energy Save by Solar Water Heater	SITRC Nashik	3000	3000*12 = 36000 **power requirement by Renewable Energy Source**	6.14% power used by Renewable

Lighting Load Survey

Particulars	Tube-lights	CFLs	CFL at Ground floor operating when there is function	CFL at Corridor and First Floor	LED Street Lights	Total Lighting load excluding Tube Lights	Total Load of LED lights	Total Lighting load including Tube Lights	% contribution of LED in Lighting	% contribution of LED with all type of lighting loads
Number of Lights	561	309	204	450	45	124	38.88	174	**31.35%**	22.36 %18
wattage	29.6	18	18	18	72					
Hours	3	3	1	8	12					
Daily Annual average kWh Load	49.816	16.68	3.672	64.8	38.88					
Annual kWh Load	**18183**	**6090**	**1340**	**23652**	**14191**	**45274**	**14191**	**63457**		

It may be noted that the maximum power demand which occurs at some point of the month constitutes nearly 25000/-in some months. If this can be reduced there will certainly be considerable reduction in electricity bill. The annual maximum demand curve as shown.

2. Maximum Demand Control

2.1 Critical load analysis

Based on the data obtained, a study for determining the most critical load at any point of the day was done (In Zone B & C). Based on this report, during peak load when the maximum demand exceeds the preset value the the non-critical loads at that point of time can be switched off thereby reducing the maximum demand or that load is shifted in (In Zone A & D) Off peak hours.

3. Final Conclusion:-

Total Extra charges/Incentives Paid towards MSEDCL in Year 2016-17 = **-1135227.93**/-Rs.
Total Extra charges/Incentives Paid towards MSEDCL in Year 2015-16 = **-901258.81**/-Rs.
Total Extra charges/Incentives Paid towards MSEDCL in Year 2014-15 = **-711330.39**/-Rs.
Day by day Average maximum demand is increase = more than 450 kVA
Also the penalties due to excess maximum demand can be saved by continuous monitoring of maximum demand in Energy meter during Zone (B & C), also we need sanctioning of D.G. set having capacity 250KVA in our Bill.

Prepared by **Signature**

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STREET LED LIGHT