

First Prize winner : The South Indian Education Society, Nerul, Navi Mumbai “Reduce Electricity Costs”

Team Leader: Mr. C. V. Gopalakrishnan

Team Members:

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Abstract

This case demonstrates effects of passionate leadership and innovative approach towards continuous improvement undertaken to reduce electricity costs. Most of the improvement efforts involve performance of what is called as Small Group Activities (SGA), wherein small groups drawn from related departments are made to work together during a stipulated time through PDCA based improvement methodology. The group made use of various productivity and quality improvement tools & techniques like Theory of constraints, Pareto analysis, GEMBA and PDCA. The group also gets involved in implementation of solutions derived by them. One of such SGA activities has been documented in this case study.

Our efforts have been recognised by National Centre for Quality Management and we have been awarded the First prize in 10th BEST EDUCATIONAL QUALITY ENHANCEMENT (BEQET) PRESIDENT AWARD 2015.

Introduction

The South Indian Education Society (SIES) is one of the oldest educational societies in Mumbai and was pioneered in year 1932. What started with a strength of six students has now become a conglomerate of various institutions with nearly 25000 students under its wing. SIES has established a high school, science & commerce colleges with academic and other institutions of higher learning.

This includes establishments of Centre for Excellence in Management Research & Development (CEMRD), SIES School of Packaging, SIES Indian Institute of Environment Management Graduate School of Technology (an Engineering Institute), SIES Senior's home and SIES Sri Chandrasekarendra Saraswathi Veda Vidya Pitha are the latest ventures initiated by SIES. Education blends with tradition at SIES, which in turn reflects on individual and personal growth. This has achieved through the foresight, wisdom and

dedication of the founders with strong emphasis on high standards of academic, professional and societal performance. Our institutions are located at Sion (East), Sion (West), Matunga and Nerul.



Analysis of problem

Electricity charges is one of the major expenditure for our organisation and for the financial year 2014-15 we had spent Rs 2,85,22,899/ on electricity alone . With a view to control reduce electricity charges a team was constituted to study the existing system and suggest ways & means to improve the same. The values given below are in Rs Lacs.



The team analysed the electricity consumption for the specific month and the report is as detailed below.



In order to achieve maximum impact we decided to study the electric power consumption at Nerul which contributes to nearly 65-70% of total consumption.

On analysing the electricity bills of Nerul it was observed that the power factor was observed to be 0.918 - 0.922 which was very low

and in the month of June 2015, we had paid penalty of Rs 62000/ as the power factor was below 0.90.

In addition to issue of power factor we had issue of meters exceeding the contract demand thereby incurring the penalty for over loads. It was also observed that in some meters the billing demand was much lower compared to the contract demand.

Development of solutions

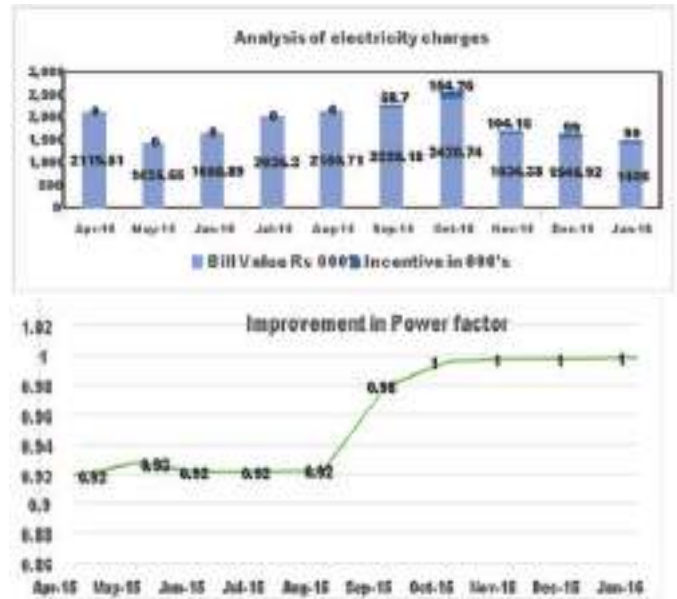
We decided to enlist the services of two consultants to separately evaluate the reason for such low power factor. We had already installed adequate capacitor banks of capacity 300KVAR & 250 KVAR. The contractors were instructed to check each capacitor in the bank and it was observed that in 250 KVAR all the capacitors were defunct and in the 300KVAR the capacitors were okay but the contactors had burnt off. In addition theoretical studies on the design of the capacitors were undertaken with the help of our Engineering College and based on their studies and recommendation optimum capacitor requirement were derived.

The issue was elevated to the highest level in Management and permission for investment for capacitors and contactors were obtained in the month of August 2015. Approval were given to us on 21/08/2015 and the consultant was asked to commence the job immediately on an urgent basis and the same was completed within a period of 15-20 days' time. In the month of September 2015 we were able to improve the power factor to 0.98 resulting in incentive of Rs 58697/. Even after installing new capacitors and change of contactors we were not reaching the desired power factor of unity and the values were reaching only 0.98. Further technical discussions were held with the consultants and it was decided to install additional KVAR to compensate the reactive load of the transformers. We had two transformers of capacity 1000KVA & 625 KVA. We had to take a shut down for both the transformers and additional capacitors of 25KVAR rating were serially connected to the transformers. Eventually in the month of October 2015 we were able to obtain the power factor of unity and incentive of Rs 154264/.

Currently we are still getting the power factor of unity with manual intervention of capacitor banks due to reduced load in the evening and automation is still pending The reactive load of transformers are still to be optimised and we have to undertake the load using power analyser. This we propose to carry out when there is maximum load on transformers and is scheduled in the month of March 2016 after the vacations are over. Subsequent to the study the optimum capacity of capacitors required for the transformers will be calculated and same will be serially connected to the transformers. We have spent a total of Rs 183339/ in this initiative.

We are scaling up the initiative of saving the electricity on the demand side by reducing the utilisation during peak hours, resetting the temperature of air conditioners to 25Deg C and other proven measures. We are planning to hold a conference on

conservation of energy in the month of December 2016 to sell the message of conservation of electricity across the institution and get the support of all in the institutions and achieved the objective of reduced electricity charges.



1. Improvement Power Factor

Improvement in power factor			
Consumer No	parameter	Oct-15	Nov-15
202-030-153	Power factor	0.969	0.985
	Incentive	2028.39	5493
202-000-206	Power factor	0.969	0.99
	Incentive	485.84	750.81
202-020-083	Power factor	0.952	0.961
	Incentive	0	996.98

Installation of solar power

As a longer term measure to reduce power cost we have decided to install a 100KWp solar power plant. We started the project in the month of November 2015 and the installation was inaugurated on 12/01/2016 and currently generating 400 units daily. We will be saving around Rs 16 Lacs annually on electricity charges with this installation.



Photograph of solar plant installed at SIES Nerul

Weekly report of electricity generated through solar power

Date	Irradiation [kWh/m ²]		Energy [kWh]			
	Solar Card (1)	Total system	Row No.1 - 34.2kWp (41)	Row No.2 - 34.2kWp (41)	Row No.3 - 33.2kWp (42)	Row No.4 - 32.4kWp (42)
15.12.2015	4.4991	426.5424	141.9910	150.8119	124.4915	
16.12.2015	4.1316	402.6483	146.9321	141.5258	124.6824	
17.12.2015	4.1278	398.7321	141.5401	146.5478	126.6418	
18.12.2015	4.7194	428.2793	146.3306	151.8962	127.8483	
19.12.2015	4.4827	406.7486	142.9318	144.8484	124.6672	
20.12.2015	4.6246	425.5363	134.8812	128.4678	102.1877	
21.12.2015	4.1842	397.4404	147.5111	143.2188	104.1042	
		2,157,940.2	1,001,437.0	1,007,403.8	841,898.8	

Balancing of loads

In addition to issue of power factor and we had issue of meters exceeding the contract demand thereby incurring the penalty for over load. We have to study the existing loading pattern and availability of capacity in other meters and increase capacity of fuses, contactors etc. Currently we have balanced the loads in all meters and we hope to realise the benefits effective December which will reflect in the Feb 2016 bill.



Photograph of load changed one meter to another one

Conclusions

Tangible benefits for the year 2015-16

Action	Investment in Rs	Payback period	Savings in Rs
Improvement in power factor	174723	2 months	750,000
Balancing of loads	12616	1 month	88,000
Installation of solar power	6,600,000	6 years	280000
Total			1,118,000

Intangible Benefits

Reduction in power Consumption - Improved energy efficiency

- Extra KVA available from existing supply
- Reduction in voltage drop in long enables
- Reduced heating of cables & electrical components

Sustainability

Continued benefits will be reaped from implementation of the solutions across all the Campuses

Continuously monitored by the Central Improvement team

Cleaning of PV modules carried for improved efficiency

Automate loading of capacitor banks

Annual Maintenance Contract given for inspection of all the control panels and maintenance carried out once in 6 months

Savings to be utilized for further expansions.

Better environment by using solar energy

Bench Marking

We had made a study of management of electricity by other educational institutions within Mumbai and our report is as follows.

Factors	SIES	College 1	College 2
Month	Jan-16	Jan-16	Dec-15
Power factor	0.999	1	99.4
Units	125901	7448	153984

Awards and recognition

Our efforts have been recognised by National Centre for Quality Management and we have been awarded the First prize in 10th BEST EDUCATIONAL QUALITY ENHANCEMENT (BEQET) PRESIDENT AWARD 2015. The management of our institution have appreciated our efforts and issued us an appreciation letter.



BEQET 1st Prize Winner Team with NCQM dignitaries

Second Prize winner :
Dr. B. M. N. College of Home Science,
Matunga, Mumbai

SRISHTEE (Social Responsible Indians Saving Hazardous Technological Effects on Environment):
Erase E-Waste

Team Leader: Mr. Nitin Pawar

Team Members:

Dr. Shilpa Charankar	Ms. Milina Pareira
Mr. Shahajahan Khan	Mrs. Sharada Sirsilla
Mrs. Usha Kumar	Ms. Shilpa Surulkar
Mr. Abdul Rahman	Ms. Neetu Singhi

The mission of Dr. B.M.N. College of Home Science is 'To impart quality education to women and enable them to become independent and competent, thereby benefiting our society and country at large. Keeping this goal in mind the Department of Bachelor of Computer Applications has initiated a number of steps.

In spite of the introduction of the EVS (Environmental Science) course by S.N.D.T. Women's University, the Students' academic presentations revealed the following points:-

- Astounding data on environmental hazards in Air, Soil and Water
- Callous attitude among students regarding environmental concerns
- Harmful Effects on health due to lack of awareness and social negligence
- Effects on Bio-diversity
- Alarming data on the role of Electronic waste and its effects on the Environment.

This paper includes the report of the project '**SRISHTEE: Erase E-Waste**' which was carried out on 305 students (FYBCA, SYCBCA and TYBCA) from the Department of Computer Application from November 2014 – January 2016. This project report shows how the Department of Computer Application (B.C.A.) started with an aim of making students aware of their role and responsibility towards the society. With the intention of instilling a moral responsibility, the Department implemented the project titled as **SRISHTEE (Socially Responsible Indians Saving Hazardous Technological Effects on Environment)**. A deeper interest was created which in turn brought in a great sense of social accountability. Different strategies were used

like an e-Questionnaire survey was conducted to find out students' awareness, knowledge and concern regarding E-Waste Management (3R's:- Reduce, Reuse, Recycle). The data from the feedback displayed both a lack of knowledge and even worse a lack of concern towards E-Waste Management. Based on these findings, strategic activities revolving around spreading awareness was planned and scheduled throughout the project period. These were carefully monitored and analyzed. The results were extremely satisfactory as showing a rise:

- Awareness-87.54%
- Reduce-69.18%
- Reuse-45.90%
- Recycle-79.67%
- E-waste collection Drive (155Kg. to 630 Kg.)-406.45%
- Participation in E-Waste Drive-89.93%.



BEQET 2nd Prize winner Team receiving trophy & certificate from Mr. K. Khambata, CEO of D. L. Shah Trust



BEQET 2nd Prize winner Team at the time of competition Presentation day January 30, 2016

Third Prize winner :
Shri M D Shah Mahila College of Arts & Commerce, Malad, Mumbai

ASTITVA – A journey towards self-actualization

Team Leader: Dr. Deepa Sharm

Team Members:

Ms. Geeta Patil Ms. Shubha Acharya
Dr. Ranjana Mishra Ms. Vidyalexmi Desai

The degree of confidence, called self-confidence, is the trust or faith that one has in oneself and his/her abilities. Self-esteem is the opinion one has of self and this has a profound effect on one's life. Self-confidence allows a person to have positive yet realistic views of the self and the situations in which he/she is involved. If he/she has self-confidence, typically the person does not fear challenges, is able to stand up for what he/she believes, and has the courage to admit one's limitations. Shri M D Shah Mahila College of Arts & Commerce working in the area of building competent and confident students to become a significant part of mainstream society noticed a drastic decline in the academic performance of students. With an aim to support students towards overall development keeping the primary focus as improvement in academics, a team of teachers formed a Quality Circle to look for means to eradicate this decline in academic performance.

The QC team used NGT to collect information on areas impacting low academic performance. Following the NGT scores, the team located the key area to be tapped to boost overall performance of students. Most of these students were first generation learners with illiterate parents. They possessed some common drawbacks, some of which were -

- Irregularity in attendance
- Poor academic performance
- Conservative thought process
- Lack of opportunities

With this background information, the team identified 100 students who were interviewed and then enrolled into the program. Thus was born “ASTITVA”, a project to lead students towards self-actualization. Parent consent sessions were organized at the start of the project, as the sessions were planned for Sundays and public holidays. Parents were intimated in regular intervals about their child's progress during the training period. The select group of students were those who belonged to socially and economically weak background. The training did not include any academic sessions; rather it focused on personality development, skill development and community

exposure. Sessions were conducted to impart computer literacy, learn performing arts like dramatics and dance, enhancing soft skills, etc. These activities were intended to increase their employability, language skills, public relations skills, and understanding of entrepreneurship. Astitva thus aimed to unleash self confidence amongst the students with poor academic performance.

The focal point of the project was to give exposure to the students about a world of opportunities lying within grasp. The different mode of knowledge acquisition kindled students' interest in the activities and enhanced their curiosity to collect new information. Opportunities were created to involve them in the CSR project initiated by Hotel Renaissance, Powai where they experienced a three-day stay in a 5star hotel. They wrote, directed and enacted street plays in the community nodal centres. They celebrated festivals and cultural events with gusto. They spoke in public events and hosted programs themselves. They found themselves in the centre of innumerable activities which they had never attempted or thought themselves capable of being a part. The realization of the wealth of potentiality within them helped them overcome many disturbing factors in life which marred their academic performance.

The project brought many tangible and intangible changes in the students. Some success stories are -

- Ms.Bhosale a student of this project was someone who had enrolled in the college with 4 mark sheets. Today she is not only a gold medallist in History but has gone ahead to take up civil service by clearing MPSC exams.
- Ms.Madhura is a radio jockey with OYE FM.
- Ms.Bharati is pursuing higher studies and is also an entrepreneur of a mobile beauty salon “Gojiri”.

The entire batch of 100 students passed their College/University exams with high scores. Astitva project gave 100 students a reason to believe in themselves and helped them



BEQET 3rd Prize winner team receiving Trophy & certificate from Dr. H. M. Mehta, Trustee of NCQM