

Bhushan Limited

-Kolkata-
(Factory Overview)

Company background & general overview of energy management initiatives:-

Bhushan Limited, Kolkata is a highly energy intensive plant. It has got a steel reprocessing mills, Continuous Galvanizing Unit, CRCA Steel manufacturing complex, ERW Pipe & Tube Plant and Cable Tape unit in a large complex. Electrical Energy consumption is a major component in comparison to all other types of energies like fuel oil or gas etc.

Average electric power consumption is of approx 75 - 80 Lacs units per month. Out of the above, 20% is the share of utilities consisting of Cooling Water, Cooling Tower, Air Compressors, Boilers, and Air Conditioning Plants etc. Hence, to calculate specific energy consumption for each product, all the components of power were considered like Machine Power, Machine Auxiliaries & Utilities service requirements.

Bhushan Energy Management Cell had been constituted in the year 2005. Its first year, it has gone through various studies of technologies, plant equipment behaviours and process requirements.

Some of the key features of our Energy Management of plant are as follows: -

1. Power Factor = 0.99
2. Load Factor = $\geq 75\%$
3. Energy & Demand monitoring on daily basis.
4. Monthly review of Specific Energy Consumption for each type of product with the process owners.



Started some Energy Management Initiatives. Later on, we arranged an Energy Audit by a qualified Agency. It was done to assess ourselves. Arranged an AIR AUDIT of the plant from Air Compressor Manufacturer & Supplier.

For more information contact:

S. K. Gupta, General Manager, (Elec. & Automation)
Email: surenderguptag@yahoo.com



Performance of Energy Management Initiatives

EMI NO	Area of implementation	Date of energy initiative implementation	Investments (Rs.)	kWh saved Feb-06	Rupee saved Feb-06	Rupee saving since April-05 to Jan-06	Cumulative savings
EMI# 1*	G P return water pump # 1 & 2	Jun-05	3,50,000	14,784	59,136	2,18,400	2,77,536
EMI # 2	High pressure water pump # 1 & 2	Mar-05	3,00,000	7,005	28,020	3,00,000	3,28,020
EMI # 3	Chiller water pump # 1 & 2	Jul-05	4,00,000	24,097	96,388	5,28,000	6,24,388
EMI # 4	Circulating water pump circuit optimisation	Jul-05	50,000	33,600	1,34,400	8,64,000	9,98,400
EMI # 5	Air circuit optimisation	Jul-05	NIL	1,72,104	6,88,418	31,50,000	38,38,418
EMI # 6	Air dryer	May-05	5,00,000	11,250	45,000	3,60,000	4,05,000
EMP# 1	Technology upgradation & optimisation of cooling tower fan no # 3 (CGL)	Jan-06	3,50,000	16,512	66,048	-----	66,048
EMP# 5	Technology upgradation & optimisation of fume exhaust systems (6HI Mill # 3)	Jan-06	4,00,000	32,760	1,31,040	-----	1,31,040
av. Cost of Power = Rs 4 / - per kWh		Total=Rs.	23,50,000		12,48,450	54,20,400	65,05,432

* Details:

EMI # 1: GP return water pump # 1 & 2:

1. Process Study
2. Preliminary Automation of Water Tank Level Monitoring
3. Study of Power & Motor Capacity & Characteristics
4. It was concluded that only pump is sufficient for the process and it can be operated at half of the rated speed of the pump
5. To establish the variable speed requirement during the process, variable frequency drive was installed.
6. Thus saving of average 24 KW per hour of power.

EMI # 2: High pressure water pump # 1 & 2:

1. Pumps installed in line with R.O. Plant. Capacity synchronisation was not possible with R.O. Plant process requirement.
2. Two in Nos. Pumps were operated with 60% output. Hence power getting wasted for fixed speed motors.
3. Variable speed drives for A.C. Motors was installed and operated as per process requirements thus reducing waste of energy to the tune of average 14 KW per hour.

EMI # 3: AC plant chiller water pump # 1 & 2:

1. Improvement of power factor with application of variable frequency drives was utilized for this process.
2. Motor rated power was not getting utilized because of lower power factor, high current and hence abnormal heating of motor.
3. Earlier two pumps were operated at reduced output to avoid the motor heating.
4. Motor rated power could be utilized and one nos. pump was made as a study-by.

5. To establish the variable speed requirement during the process, variable frequency drive was installed. Thus saving of 35 KW per hour of power.

EMI # 4: Circulating water circuit optimisation:

1. Plant expansion was done in two phases.
2. Circulating water pumps output separate headers were installed.
3. To maintain water flow & pressure requirements two independent circuits were operated with more nos. of pumps.
4. Two pressure headers were joined to make a single common header.
5. Four nos. of pumps became sufficient for process instead of five pumps of 75 KW each operated previously.
6. Thus saving one pump operation of 75 KW motor, net saving of Average 60 KW per hour.

EMI # 5: Compressed air circuit optimisation:

1. Compressed Air requirement was studied at all the major air consumption machines.
2. Actual air usage was analysed with respect to the requirement.
3. Consultations done with OEM & process people to remove psychological barriers.
4. Excess airflows were curtailed to suit the process requirement.
5. Reassessment was done and compressor operation was managed accordingly thus saving Thus saving of about 1.7 Lacs units of power every month.

EMI # 6: AIR dryer:

1. Technology development in the field of Compressed Air Dryers was utilized for this initiative.
2. Electrical heater type Air Dryer was replaced with Refrigerant type Air Dryer. Thus saving of about 11,000 units of power per month.

ENERGY management programes:

EMP # 1: Optimisation of cooling tower

Operations in GP line:

1. Strip cooling after Hot Dip Galvanizing is being done to maintain strip temperature near ambient to avoid damage of rolls and proper adhesiveness of zinc alloy coating.
2. Cooling fans employed and strip temperature profile was studied.
3. Adhesiveness of zinc coating was studied
4. Cooling air requirements adjusted / synchronised with strip temperature at critical path & points.
5. Automation done for strip Temperature Controls with variable speed of Air fans.
6. Thus saving of electrical power of about 900 KWH / day

EMP # 6: Optimisation of fume exhaust system at

6 HI mills:

1. No Production = No power consumption concept was utilized / exhibited here.
2. During cold rolling process, synthetic oil emulsion is being sprayed at the rolls to remove the frictional heat. In this process, due to high temperature, oil emulsion vapours got generated and make the surrounding environment difficult for the operator and the machine high power. Fume Exhaust system of 132 KW has been installed for the purpose.
3. During process study, it was observed that the fume generation is very little during 50% time duration of the rolling cycle.
4. Hence the optimisation of the fume extraction system operation with the application of variable speed drive, thus saving of approx. 45% of power consumption.
5. Thus saving of about 30,000 Units of power every month.

Future Plans:

We are of the target of continual improvements. It is difficult at this stage to visualise the benefits of the energy savings to the tune of Rs.10 - 12 Lacs per month in a Electricity Bill of Rs.30 million per month. We have still a long path to go to realise and exhibit the savings on Large Scale in comparison to our monthly or yearly bills.

We have made a plan for the year 2006 - 07 and we are continuously moving ahead in terms of process studies and targeting on to energy saving opportunities. Energy Initiatives for the year 2006 - 2007 is being enclosed herewith for reference.

Energy initiatives in progress				
EMP No	Description	Area of implementation	Investments (Rs.)	Expected returns in a year (Rs.)
EMP # 1	Technology upgradation & optimisation of cooling tower fan no # 1	GP Line	3,00,000	4,80,000
EMP # 2	Technology upgradation & optimisation of cooling tower fan no # 2	GP Line	3,00,000	4,80,000
EMP # 3	Technology upgradation & optimisation of fume exhaust systems	6HI Mil # 1	5,00,000	9,60,000
EMP # 4	Technology upgradation & optimisation of fume exhaust systems	6HI Mil # 2	5,00,000	9,60,000
EMP # 5	Technology upgradation & optimisation of fume exhaust systems	6HI Mil # 3	5,00,000	9,60,000
EMP # 6	Technology upgradation to improve energy efficiency for cut length machines	CTL # 1	12,50,000	15,00,000
EMP # 7	Technology upgradation to improve energy efficiency for cut length machines	CTL # 3	12,50,000	15,00,000
EMP # 8	Technology upgradation for pneumatic circuits to optimise the usage of compressed air	Utility	18,00,000	60,00,000
		Total	64,00,000	1,28,40,000