

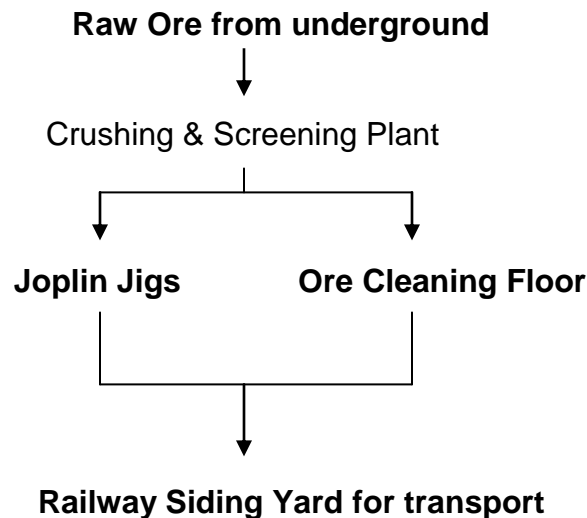
**MANGANESE ORE (INDIA) LIMITED
CHIKLA MINE**

UNIT PROFILE

Manganese ore (India) Limited is a leading manganese ore producing company of India, We share about 55% of Manganese ore production of India. MOIL has established a 10000 TPA capacity Ferro-Manganese plant at Balaghat (M.P.) and a 1200 TPA capacity Electrolytic Manganese Di Oxide plant at Dongri Buzurg in Maharashtra State. Energy conservation and for clean and green environment MOIL has **installed a 4.8 MW and 15.2 MW capacity Wind Energy Generator Plants at Dewas (M.P.), which are operating satisfactorily.**

Chikla Mine was established in the year 1899 by Central Provenance of Manganese Ore (CPMO) incorporated in Great Britain. Latter on it was taken over by MOIL in the year July 1962. Chikla Mine is an underground mine of the Manganese Ore (India) Limited, situated in Bhandara District of Maharashtra State. The annual production of Manganese Ore in Mine has gone up from 2 Lacs Ton per annum to 3.00 Lacs Ton per annum in couple of year. Total mining lease hold area of the Mine is 150.65 hectare., The total mineral reserve of the mine is 5.09 million tones. So far 58.86-hectare area of the mine is covered with afforestation.

Manganese ore produced from the underground is processed in the mine; process flow chart is as below: -



Energy Consumption

The energy consumption is controlled by taking various measures like improving the efficiency of the equipments and regulating the operation of equipments

Description	Unit	2005-06	2006-07	2007-08
Annual Production	Lakh Tonne	1.43	2.13	3.00
Total Electricity consumption	Lakh KWh	19.49	23.35	24.21
Specific electricity consumption	Kwh/Tonne	13.53	10.96	8.07

ENERGY POLICY

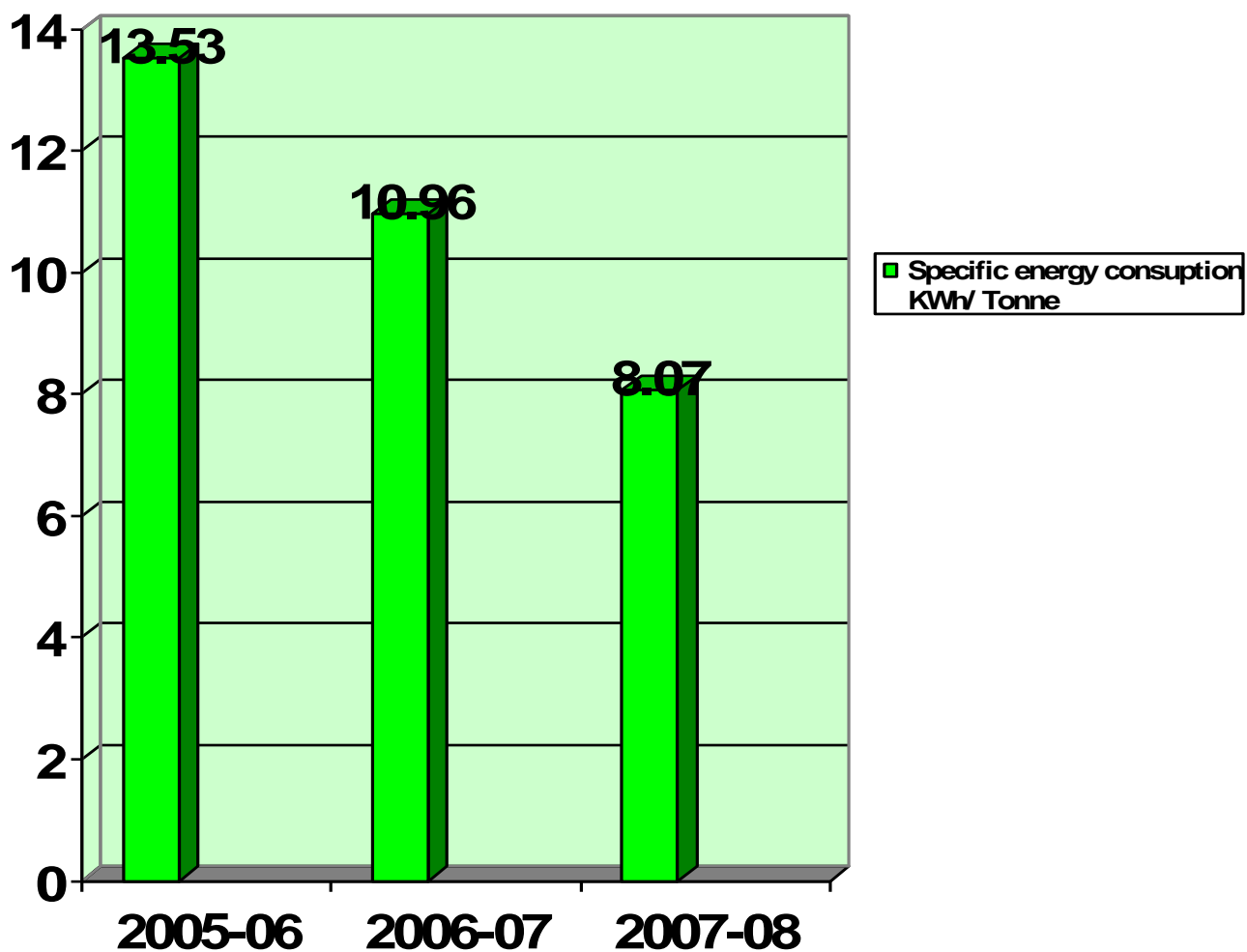
MOIL is the largest producer of Manganese Ore in India and also the market leader, commit to adopt a comprehensive approach towards conservation of energy in all its operations. To accomplish this we will:

- **Optimally utilize various form of energy in cost effective manner to effect conservation of energy sources.**
- **Maximize the use of renewable energy sources and non-conventional sources of energy.**
- **Train our employees to make energy conservation as a way of life and recognizing their initiatives in this regard. Also a cash prize has been introduced since 2006 to the employee consuming least Units.**
- **Carry out external audit in regular interval and to identify the areas of improvement.**
- **Reduce specific energy conservation by 1% every year till 2010.**
- **Improve capacity utilization.**

GRAPHICAL REPRESENTATION OF ENERGY CONSUMPTION

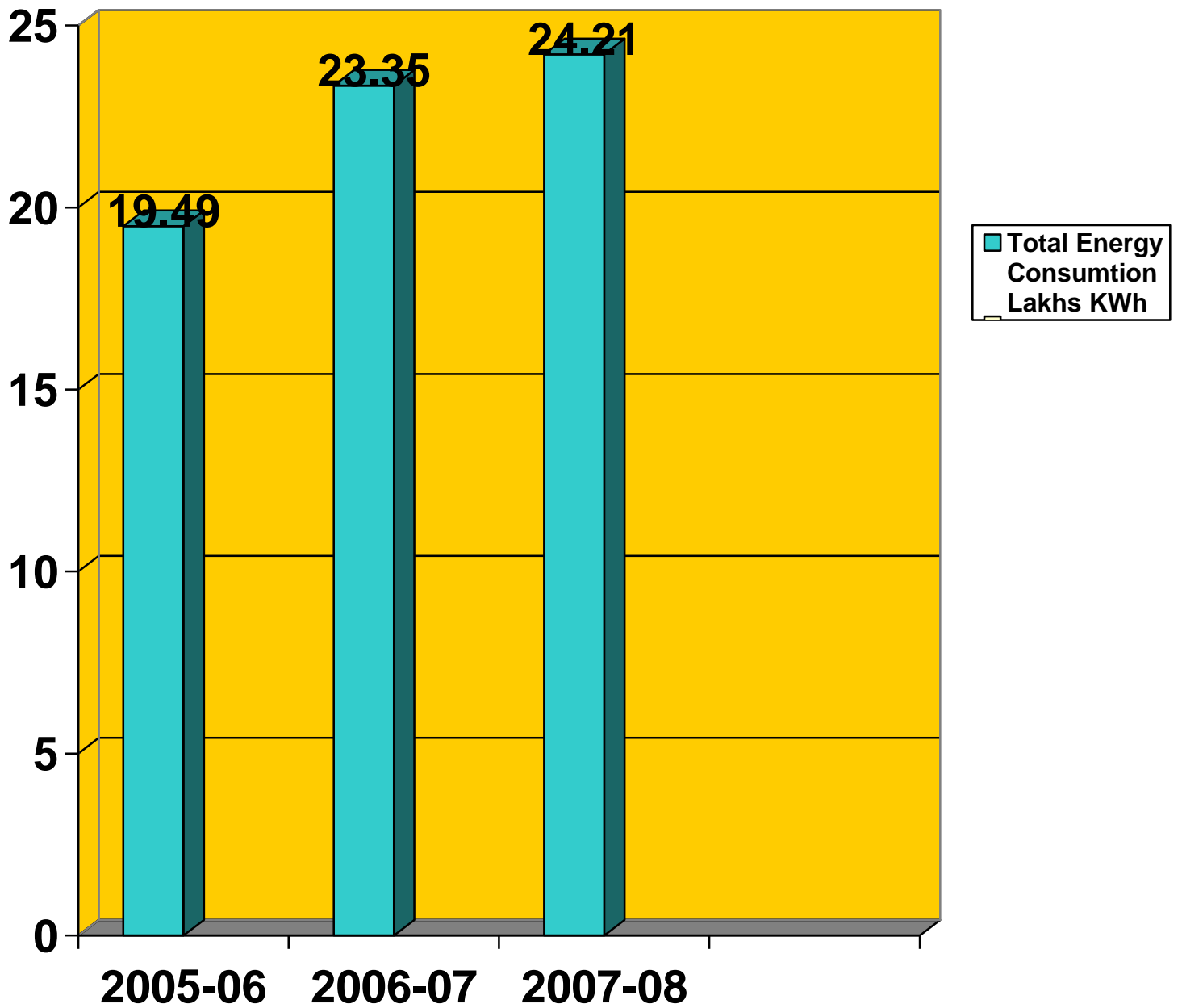
(1) Specific energy consumption: --

Description	2005-06	2006-07	2007-08
Specific Energy Consumption	13.53	10.96	8.07



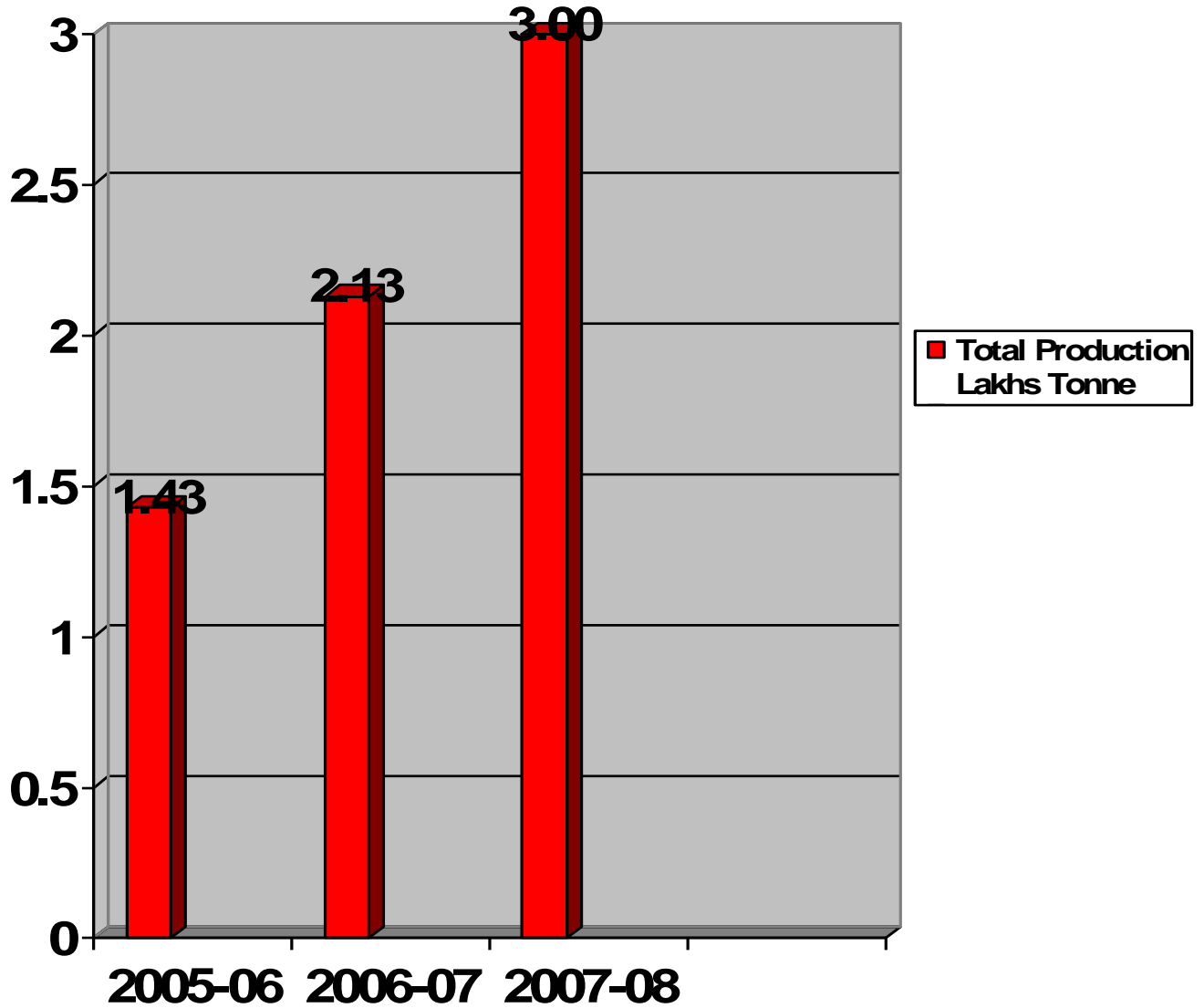
(2) Total energy consumption: --

Description	2005-06	2006-07	2007-08
Total Energy Consumption	19.49	23.35	24.21



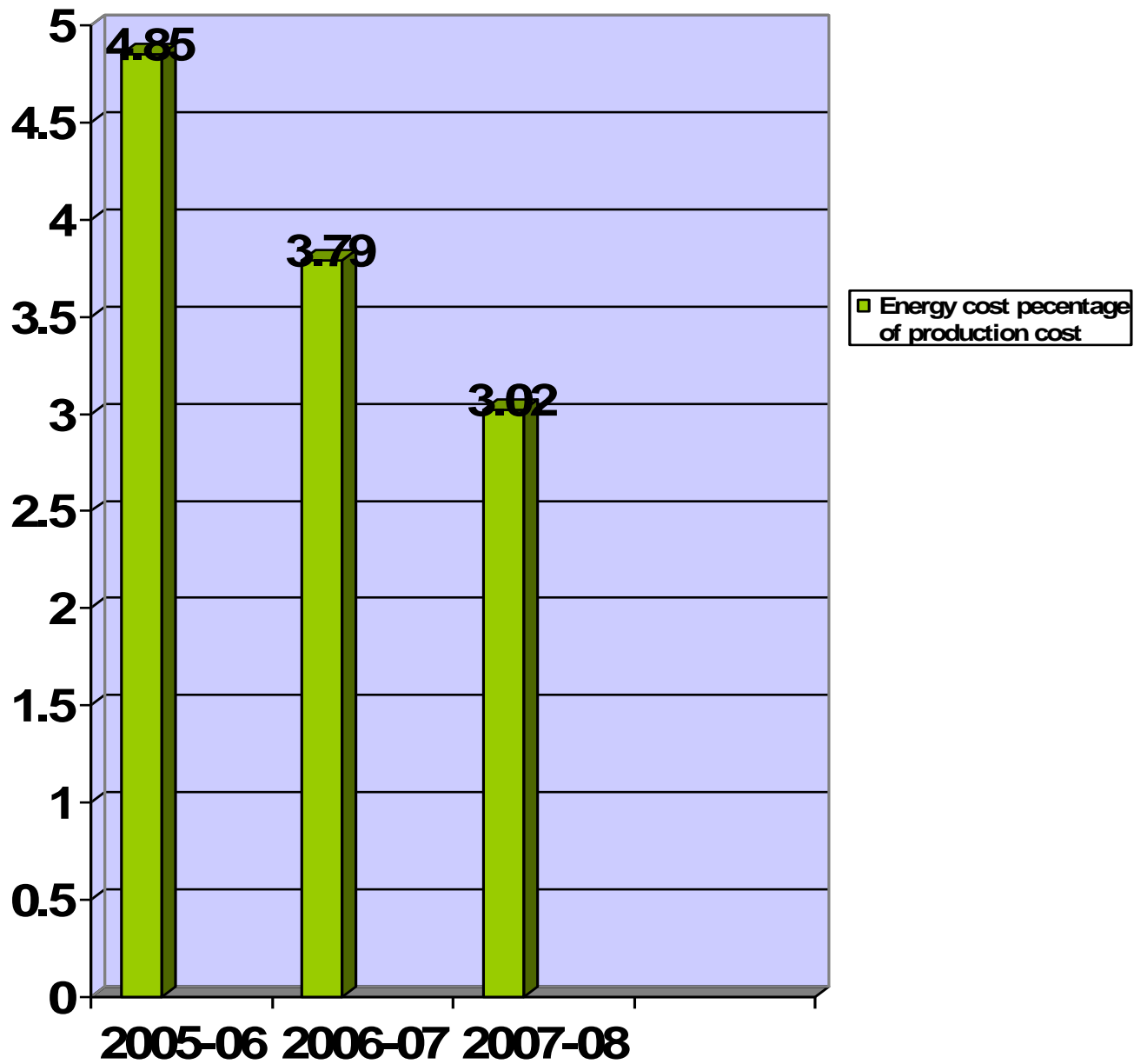
(c) Total production: -

Description	2005-06	2006-07	2007-08
Total Production	1.43	2.13	3.0



(D) Energy cost percentage of production cost: ----

Description	2005-06	2006-07	2007-08
Energy cost as percentage of production	4.85	3.79	3.02



ENERGY SAVINGS MEASURES IMPLEMENTED DURING THE YEAR 2007-08

In the year 2007-2008 it was decided to incorporate additional capacitor bank to improve power factor due to increase in overall load as well as reactive load. The additional capacitor improved power factor resulting in incentive for higher power factor from electricity board as well as control of MD.

1. Additional Installation of fixed capacitor banks during 2007-08

The total investment during 2007-08 for the above Rs 0.75 Lakhs

The saving achieved from installation of fixed capacitor panels is as below,

Saving in terms of KWh energy consumption during 2007-08				
Year	Electrical consumption Lack Kwh With unity power factor	Electrical consumption Lack Kwh with assumed 0.98 power factor	Saving	
			Lacs in KWh	Rs. In Lacs
2007-08	23.51	23.98	0.478	2.53
Total saving			0.478	2.53

Saving achieved by reduction in KVA Maximum Demand		
Year	Reduction in KVA M.D.	Saving Lakhs Rs.
2007-08	372(31/month)	1.16

Saving from PF incentive in energy bills of MSEDCL for unity power factor	
Year	Total savings in Incentive in Lacs Of Rs.
2007-08	3.20

2. Savings achieved by replacement of Tube light type street light fitting and HPSV Luminaries with CFL during 2007-08

Tube light and out door type conventional street light fittings has been replaced by Energy efficient CFL fittings. 250Watts HPSV street light fittings have been replaced by energy efficient street light CFL fittings. The CFL lamps provide adequate illumination and it also enable us to reduce the electrical energy consumed.

Total investment for CFL Lamps	0.10 Lacs
Total saving in KWH	5694
Total saving in cost in Lacs of Rs.	0.312

3. Saving achieved by shifting of Compressor unit from Main Hill to New 14-16 Substation i.e. Nearer to Load center to reduce the line losses and build up pressure timely.

S.N.	COMPRESSOR PARAMETERS	CALCULATIONS
1	Line pressure loss is	3%
2	3 Numbers compressors of 250HP were running	$250 \times 0.746 \times 12.5 \text{Hrs} \times 26 \text{Days}$ = 60612.5Kwh
3	After Shifting Compressor Hrs. reduced by 1.5Hrs / Day	$250 \times 0.746 \times 11 \text{Hrs} \times 26 \text{Days}$ = 53339Kwh
4	Recovery of line loss	1818.3 / Month
5	saving	$60612.5 - 53339 = 7273.5$ / Month
6	Net Saving / Month	$1818.3 + 7273.5 = 9091.8$ / Month Say 9092
7	Net Saving / Annum	$9092 \times 12 = 109104$ Kwh / Year
8	TOTAL SAVINGS IN LACS OF Rs.	4.90
9	TOTAL INVESTMENT IN LACS OF Rs.	35.00

4. Savings achieved by using 1ST level underground as a sump in place of over head tank on Surface for Sand Stowing.

Earlier water for sand stowing was used through continuous pumping from underground pumps. As a energy savings measure dewatering from under ground to surface has been stopped for sand stowing purpose. The below ground level i.e. "1st Level" sump is being used as storage tank and water for sand stowing at 3rd level is being received through gravity from 1st Level. This has reduced the head of pumping as well as time required for pumping resulting in lesser pumping hours as well as lesser energy consumption.

S.N	PARTICULARS OF DEWATERING UNITS	UNITS	AMOUNT
1	AVERAGE MONTHLY CONSUMPTION IN KWH : FOR PUMPS	64194	385164
2	AVERAGE MONTHLY CONSUMPTION OF 1 ST LEVEL OTHER THAN MONSOON FOR PUMPS	3848	23088
3	TOTAL SAVINGS DUE TO STOPPAGE OF DEWATERING FROM 1 ST LEVEL OTHER THAN MONSOON SEASON IN KWH	3848	23088
4	ASSUMING 40% OF TOTAL ENERGY WILL BE USED FOR DEWATERING ON SURFACE FROM PUMPS BELOW 1 ST LEVEL	1540	9240
5	APPROX. 60% OF TOTAL ENERGY PRESENTLY USED FOR DEWATERING ON SURFACE FROM PUMPS BELOW 1 ST LEVEL	2301	13806
6	ENERGY CONSUMPTION AFTER USING 2 ND TH LEVEL AS SUMP	41379	248274
7	TOTAL SAVINGS IN ENERGY CONSUMPTION	41379	248274
	TOTAL SAVINGS IN KWH 41379		VALUING Rs. 2.48 Lacs
	TOTAL INVESTMENT IN LACS OF Rs.		1.80

ENVIRONMENT AND SAFETY

Environment: - The environment around the mine is being maintained in a good condition by a regular plantation near in the mine areas and residential colonies. About 58% of total land is covered with the green trees and the percentage is increasing every year.

The consent under section 26 of the water (prevention and control of pollution) Act 1974 under section 21 of the Air (prevention & Control of pollution) Act, 1981 and authorization under rule 5 of the Hazardous waste management handling, issued by the Maharashtra pollution Control Board is enclosed.

Safety: - The safety in the mine is maintained as per the MMR 1961, a senior executive in the mine is deputed as a safety officer, he takes a monthly meeting with the departmental heads and the workers representatives, the finding in the meeting is strictly implemented and the status of the implication is reviewed in the next meeting

Chikla Mine has bagged first prize in underground under ground safety week organized by the DGMS Nagpur region for metal ferrous mines. Safety policy of the company is enclosed in Annexure "C".

HUMAN RESOURCES DEVELOPMENT FOR ENERGY EFFICIENCY IMPROVEMENT

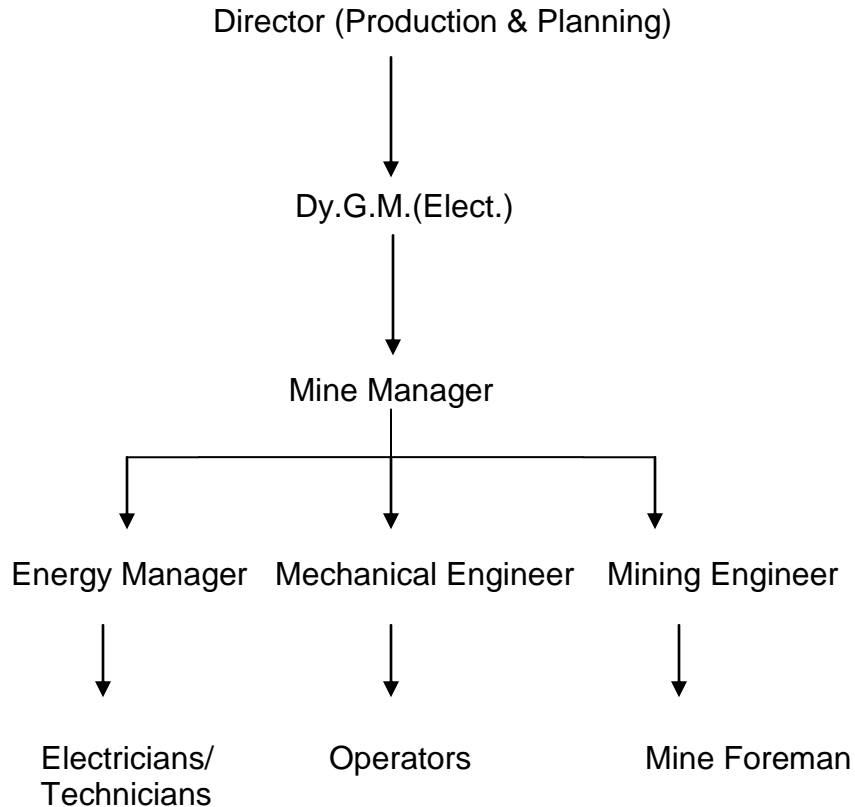
Manganese Ore (India) Limited is having well equipped in house training facility, In house training Programme is being conducted regularly, periodically in all the mines creating awareness for the energy conservation, improving managerial skill in turn improving the efficiency operational skill in turn improving the efficiency resulting in energy conservation.

In addition to this the training regarding safety and the basic trade training is being implemented regularly, also required under Mines Vocational Rule 1966.

Also officers and staffs are being sent regularly in phased manner for training within India at OEM's premises, training institutes to gain the knowledge of equipments and to know the proper operation, so that it can be used efficiently and energy can be saved. The finding of the programme is circulated between the workers to make awareness among them; also the posters related to the energy conservation are displayed in working areas and residential colonies.

ORGANIZATIONAL SET-UP OF ENERGY CONSERVATION CELL

The energy conservation cell structure



The unit has Energy Conservation Cell headed by Director (Prod. & Pl.) assisted by Sr. Dy. Gen. Manager (Elect. – P.P.) and supported by unit head of the Mine with his team. This team finds various means to bring the energy saving in the working areas through various Quality Circle meetings in which various techniques such as brain storming, bench marking, parato diagram analysis, 5'S techniques are used. The outcomes of the team findings are implemented very sincerely and have been followed with continue monitoring. It already achieved the goal the team is committed for technical up gradation to avoid any energy losses by continuous maintenance and replacement of equipment where was necessary. The team has been interested with the work of reducing electric power. The Quality Circle team has been exposed for training relating to the statistical process control techniques to enable them to adopt at the shop floor.

(1) Power Factor Improvement:

Fixed capacitor bank has been incorporated to maintain the power factor to unity. Unity power factor enable us for incentive from board and this will also reduce Maximum Demand of unit.

(2) Replacement of partial conventional street light fittings by CFL fitting.

Conventional tube light fittings have been replaced by energy Efficient CFL fittings. This has provided better illumination with lesser consumption. This enables us to save Electrical energy.

(3) Shifting of compressor nearer to utilization point.

Earlier compressors were installed at a far location. This will take higher pressure built-up time and pressure loss due to leakages. Shifting of unit reduces the pressure built-up time and reduces leakage also. This enables us to save energy.

(4) Recycling of water for sand stowing at U/g

FUTURE ENERGY CONSERVATION PLANS AND TARGETS

Sr.no.	Energy Saving measures	Investment (Rs.Lakhs)	Project
(1)	Installation of variable frequency drives	8.00	2008-09
(2)	Installation of photo switches for street	0.40	2008-09
(3)	Installation of solar street lights	1.50	2008-09