

Zawar Mines
Hindustan Zinc limited

(i) Unit Profile –

Zawar Mines is a mining unit of Hindustan Zinc Limited, a Vedanta group company. The unit is engaged in **underground mining and beneficiation** of Lead (Galena) & Zinc (Sphalerite) ore to produce Lead & Zinc concentrates for smelting. The unit is a certified Integrated Management System EHSQ Unit for ISO 14001: 2004, ISO 9001:2000 , ISO 18001:1999.

Zawar Mines is located at 44 KM south of Udaipur District in Arawali Hills acnes of Rajasthan. Zawar group of mines is having four different mines having different ore characteristics .

Integrated Beneficiation Plant

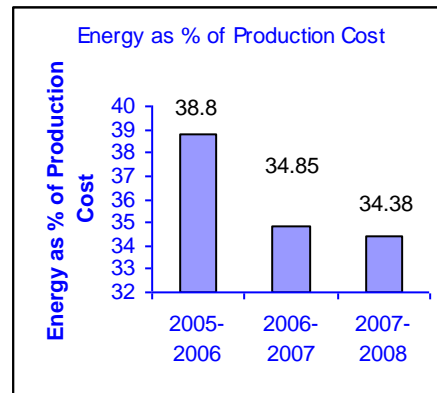
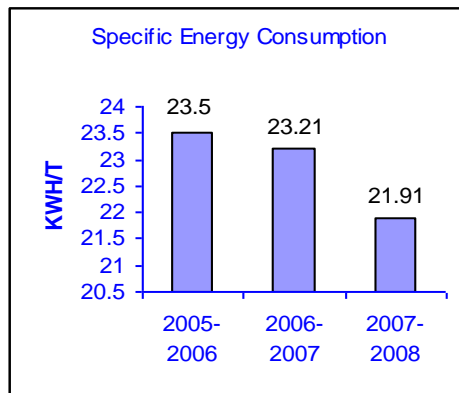
Mineral Processing Description: The ore hoisted from under ground mines is subjected to beneficiation process in 4000 TPD plant equipped with sophisticated IN STREAM ANALYZER (ISA) and computerized process control system. Mineral process involve crushing, grinding, Froth floatation, dewatering, tailing disposal and end product (Concentrate).. Ore to concentrate ratio is around 10 to10.5. Grade of lead concentrate is 64.5 % and zinc concentrate is 54.5 % produced at 84.34 % and 88.67 % recoveries respectively.



ii) Energy Consumption –

All the activities and process use only electrical energy in the plant. Electrical energy consumption of each section like Crushing, Grinding, Flootation and Filter are monitored on daily basis through communicable digital energy meters with RS485 port. With the implementation of various energy saving measures as ongoing practice, Specific Energy consumption has reduced as shown in the table.

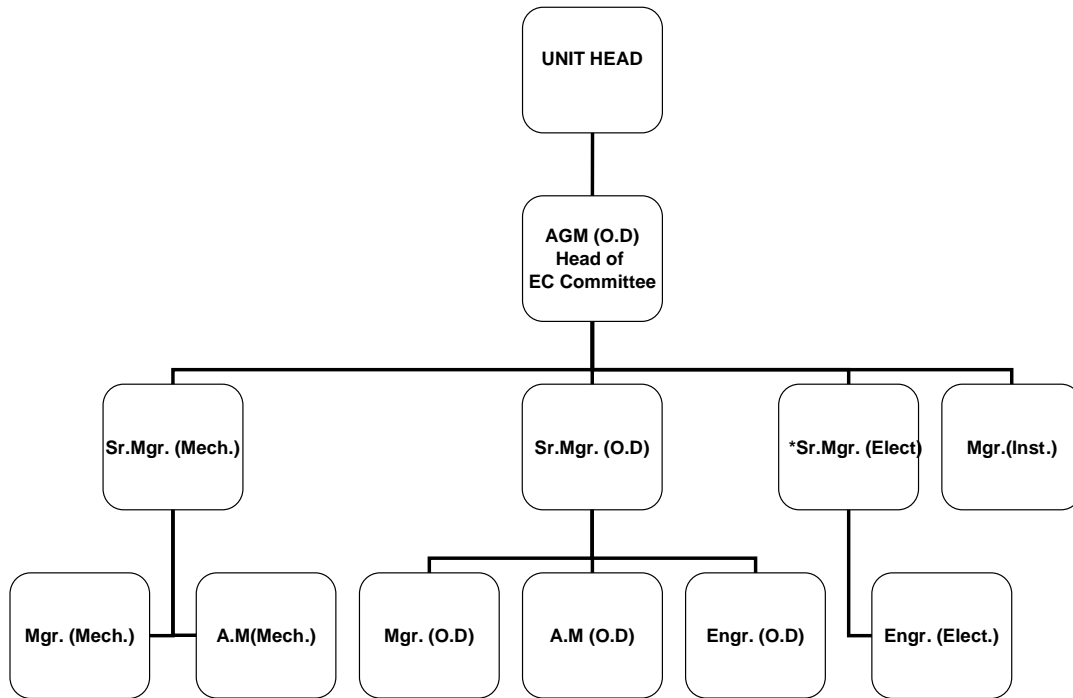
Description	Unit	2005-2006	2006-2007	2007-2008
SEC	KWH/T	23.5	23.21	21.91
Energy Consumed	KWH Lakhs	187.78	188.62	197.32
Total Production	TONNES	799220	812600	900341
Cost of Energy	Rs. Lakhs	856.20	851.15	889.02
Cost of Production	Rs. Lakhs	2206.10	2442.31	2585.61
Energy as % of Production Cost	%	38.8	34.85	34.38



(iii) Energy Conservation Commitment, Policy and Organizational Set-up -

The unit has an energy conservation policy and an organizational setup for implementing the policy. Identification of energy efficient products / Energy saving projects by all the concerned executives in production & maintenance and presented to the head of ENCON Committee. Proper budget allocation and implementation strategy is finalized. All the ENCON projects are monitored and their benefits are quantified and considered in setting the specific energy consumption targets.

ENCON CELL STRUCTURE:



* BEE Certified Energy Auditor

ENERGY POLICY

We, at Zawar Mines are committed to continuously improve our energy performance in all our Beneficiation activities so as to make it sustainable for future generation.

OUR MISSION

TO BE THE LOWEST SPECIFIC ENERGY CONSUMER IN THE INDUSTRY SEGMENT WE OPERATE

This Mission we achieve by implementing these:

- *To train employees to make Zawar Mines the pace starter in the field of energy conservation*
- *To carry out regular audits to identify areas for improvements*
- *To Benchmark continuously our performance against the best in the world*
- *To promote awareness among the employees*
- *Replacement of inefficient equipments with effective energy efficient.*
- *Exchange of ideas among the organization will enrich our experience*

*Unit Head
Zawar Mines
Hindustan Zinc Limited*

Energy conservation Achievements during 2005 – 2008:-

During period 2005-2008, the unit has implemented 10 Energy Saving proposals through engineering initiatives, periodic brain storming sessions, Workmen's suggestion schemes and auditor recommendations resulting in to total saving of Rs.92.48 Lakhs with an investment of 40.71 Lakhs. This has resulted in a reduction of 5.23 % in Specific Electrical Energy Consumption over 2004-2005.

S.NO.	Energy Conservation Measures (Implemented Year-wise)	Saving per Annum KWH (Lakhs)	Saving per Annum Rs.(Lakhs)	Investment Rs.(Lakhs)
1	2005-2006: Installation of single stage pumping :- In order to avoid double stage pumping , Three energy efficient pumps each of 47 Mts Head and 360 Cubic Meter flow installed in series for pumping tailing from Beneficiation plant to tailing dam at a distance of 3.5 Kms	6.44	28.98	23
2	Optimization of load on transformers by switching off standby transformers rated 1500 KVA and 1200 KVA which resulted saving of power .	0.87	3.94	Nil
3	2006-2007: Use of 100 HP vacuum pump in place of 150 HP vacuum pump.	2.16	9.7	10
4	Use of Variable frequency drive in 150 KW Motor of air blower which resulted load from 104 KW to 182KW.	1.58	7.12	4
5.	2007-2008: Use of 10 HP/15 HP Energy Efficient motors(7 Nos.) in place of standard low Efficient motors	0.63	2.83	0.35
6	Converting mercury vapour –power Guzzler 250 W to metal halide power saver 150 W	0.30	1.37	0.66
7	Use of Energy Efficient 28 W T5 lamps in place of 40 W T12 lamps.	0.11	0.52	0.30
8	Use of 75 HP vacuum pump in place of oversized 135 HP vacuum pump .	0.5	2.25	2.0
9	Downsizing of motor rating as per loading in tailing pumps, seal water pumps, spillage pumps.	1.2	5.40	0.4
10	Optimization of plant operation .	6.75	30.37	Nil
	Total	20.54	92.48	40.71

Major projects implemented for energy conservation during 2007-2008

1. Use of Energy Efficient motor in place of standard conventional motor :-



Energy Efficient Motor (10HP)

Energy Efficient motors (EEM) of 10 HP and 15 HP of 7 Nos. is used in spillage pump because of EEM motors are having 4 to 5% higher efficiency and fairly flat performance characteristics over a wide range (typically 50 to 100 %) of load.

Before :

Standard old motor rating	$10 \times 6 + 15 =$	75 HP
Efficiency of motor	83%	
Input power	90.36 HP	

After:

Energy efficient motor of rating	75 HP
Efficiency of motor	93%
Input power	80 HP

Annual saving : 0.63 Lakhs KWH

Monetary Saving Rs. 2.83 Lakhs

Cost Involved : 0.35 Lakhs

2. Downsizing of motor rating as per loading -



150 HP to 100 HP Motor

Motors rarely operate at their full load point and normally they operate at 60 % to 80% of their load .In many cases operate at below 50 % load. Operation of motors at no load is never energy efficient. Therefore Downsizing is carried out in tailing pump motor from 150 HP to 100 HP,150 HP to 125 HP,50 HP to 40 HP,20 HP to 15 HP in seal water pump



150 HP to 125 HP Motor

Before:

Total connected load	430 HP
Power consumption per annum	13.85 Lakhs KWH

After:

Total connected load after downsizing	330 HP
Power consumption per annum	12.65 Lakhs KWH
Power Saving per annum	1.2 Lakhs KWH

Cost Involved -	Rs 0.4 Lakhs
Monetary saving (@ Rs. 4.5/KWH) -	Rs 5.4 Lakhs

3. Replacement of oversized vacuum pump-



Before (135 HP Motor)



After (75 HP Motor)

Vacuum pump driven by 135 HP motor was operating far from the best operating point resulting in inefficient operation of pump. In order to ensure that pump should operate at its best efficiency. It is worth to replace pump with optimum sized ones. Therefore we replaced pump which is now being driven by 75 HP motor.

Before :

Load of Vacuum pump 78.5 KW
Power consumption per annum 1.13Lakhs KWH

After:

Load of Vacuum pump 44 KW
Power consumption per annum 0.63 Lakhs KWH
Power Saving per annum 0.5 Lakhs KWH
Cost Involved 2.0 Lakhs
Monetary saving (@ Rs. 4.5/KWH) –Rs 2.25 Lakhs

4. Converting Mercury Vapour - The power Guzzler 250 W to Metal Halide - The power saver 150 W :-



Before (250 W HPMV Lamp)



After (150 W Metal Halide)

The power Guzzler 250 W HPMV lamp is retrofitted into 150 W Metal Halide 50Nos. without sacrificing the desired lumens output. It reduces maintenance cost and power consumption. It also provides additional benefits such as much improved visibility, CRI and lumen per watt.

Before

Load of 50 nos 250 W HPMV lamp with ballast 14 KW
Annual Power Consumption 71540 Units

After

Load of 50 nos 150 W Metal Halide with ballast 8 KW
Annual power consumption 40880 Units

Annual saving	30660 Units
Annual saving in Rs.	1.37 Lakhs
Investment in Rs.	0.66 Lakhs

5. Converting T12 fluorescent lamp 53 Watt into T5 lamp 30 Watt :-



Before (53 W T12 Lamp)



After (30 W T5 Lamp)

T12 fluorescent lamp with magnetic ballast which consume 53 Watt (40W+13W) is converted into T5 Lamp which consume (28W+2 W) 100Nos. without sacrificing the desired lumens output. It gives 16 % more illumination level than T12 lamp.

Before

Load of 100 nos T12 lamp	5.3KW
Annual Power Consumption	27083 Units

After

Load of 100 nos T5 lamp	3.0 KW
Annual power consumption	15330 Units

Annual saving	11753 Units
Annual saving in Rs.	0.53Lakhs
Cost involved in Rs.	0.30Lakhs

(v)Energy Conservation plans & targets for 2008-2010

S no.	Energy Conservation Measures (Planned)	Anticipated saving per Annum in KWH (Lakhs)	Saving per Annum in Rs.(Lakhs)	Approx. Investment Rs.(Lakhs)
1.	Replacement of old and inefficient motors by Energy efficient motors EFF1	3.0	13.5	13
2.	Replacing of oversized motors with correct size .	3.0	13.5	5.0
3.	Replacement of T12 tube-lights by Energy efficient T5	0.22	1.0	0.65
4.	Use of 200 LED in place of filament indication bulb.	0.12	0.55	0.34
6.	Stopping idle and redundant running of motors in plant	0.12	0.5	0.5
7	Online Energy Management System .	0.7	3.15	2.5
8	Use of variable speed drive in feeders.	2.0	9.0	5.0
9	Use of 150 W Metal halide in place of 250 W HPMV luminaries.	0.30	1.35	0.8
10	Use of 70 W Metal halide in place of 125 W HPMV luminaries.	0.15	0.67	0.70
11	Use of Energy Efficient pumps for pumping tailing from beneficiation plant to tailing dam at a distance of 3.5 KM.	1.95	8.7	8.0
	Total	11.56	51.92	36.49

Safety and Environment

Safety

Zawar group of mines has been accredited with Occupational Health Safety Assessment Series (OHSAS-18001) since 2004. Accordingly appropriate SOPs and Work Instructions are prepared and implemented. Zawar Mines has Safety Department which maintains stringent safety standards and ensure that safety measures are being followed strictly. Safety Department co-ordinates and organizes necessary help required from outside agencies as well as in-house in case of emergency.

Unit has a Central Hospital in complex managed by Doctor round the clock. An ambulance is also readily available to shift the patients in case of emergency.

Environment:

Zawar unit has been accredited with Environment Management System (ISO14001:2004) since 2004. The Environment cell is regularly monitoring environmental attitudes inside and outside premises. As a part of culture, it is unit's endeavor to maintain zero leakages of hazardous chemicals as well as water and air. In recognition to our efforts for continual improvements , Greentech Foundation has awarded Silver award in 2004 and Gold award in 2006.



Hindustan Zinc Limited

ENVIRONMENT, OCCUPATIONAL HEALTH, SAFETY, SECURITY AND COMMUNITY POLICY

HZL believes in sustainable development in harmony with nature and accordingly, is committed to the effective management of health, security and safety of all its employees, protecting its surrounding environment and making a contribution to the development of the local community.

This commitment encompasses efficient use of natural resources, protection of assets and provision of a safe workplace with support systems for zero harm to the environment.

Accordingly, HZL will strive to:

- Maintain management systems for health, safety, security, environment and the community that are in compliance with law and consistent with world-class standards like ISO 14001, OHSAS 18001.
- Develop a working culture conducive to continuous improvements in performance without compromising with safety, security and health of its employees and its commitment to develop in harmony with nature.
- Develop employees through training and leadership.
- Conserve natural resources through efficient use.
- Work with communities to contribute to their development.
- Institute and update systems to report progress with high standards of reporting integrity.

Date : 13th December, 2005
Place: Udaipur

M.S. Mehta
CEO & Whole-time Director