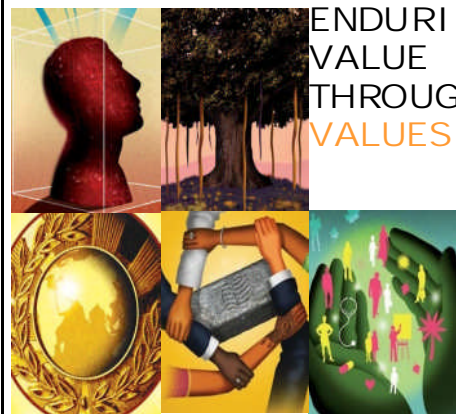


## National Award for "Excellence in Water Management"

Our Approach...

"The difficulty lies, not in the new ideas of water management and conservation, but in escaping the old ones"



ENDURING  
VALUE  
THROUGH  
VALUES



Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter  
2008



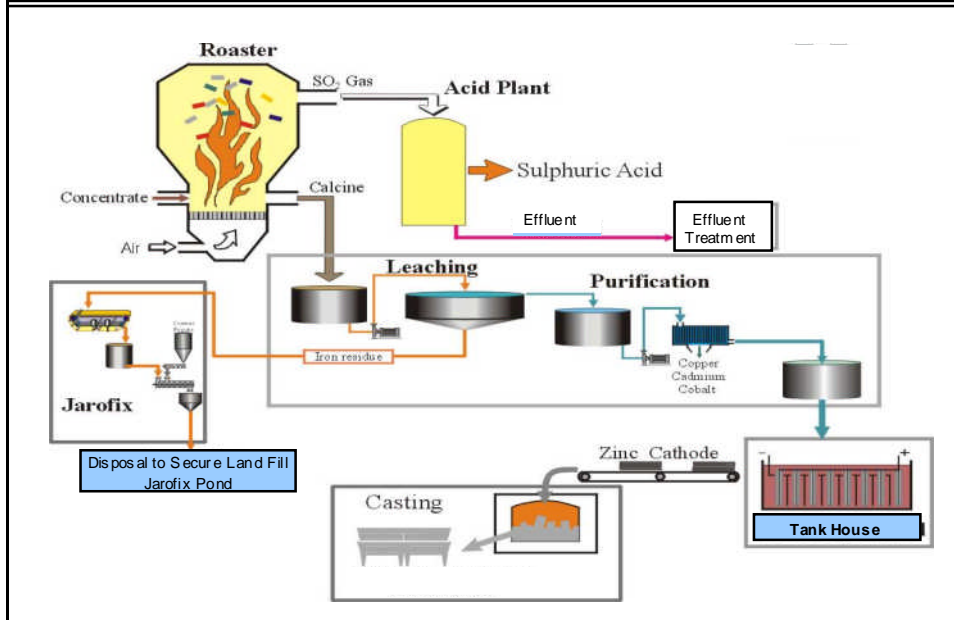
About Hindustan Zinc Ltd.



**HZL was created from the erstwhile Metal Corporation of India (MCI) in 1966 as a Public Sector Undertaking. In April 2002, became a part of Sterlite group**

**HZL - India's leading base metal producer and world's III Largest producer.**





- n Adoption of 5 R waste management principles
- n Adoption of sustainability framework by International Council of Mines & metals
- n Benchmarking with World's best in all operating parameters
- n Focused environmental initiatives for effective water management, waste minimization and recycling, reducing air emissions, energy conservation and sustainable development drivers.
- n Comprehensive GRI G3 guideline based online data management system to capture all Triple Bottom Line dimensions
- n Implementation of British Safety Council 's safety management system



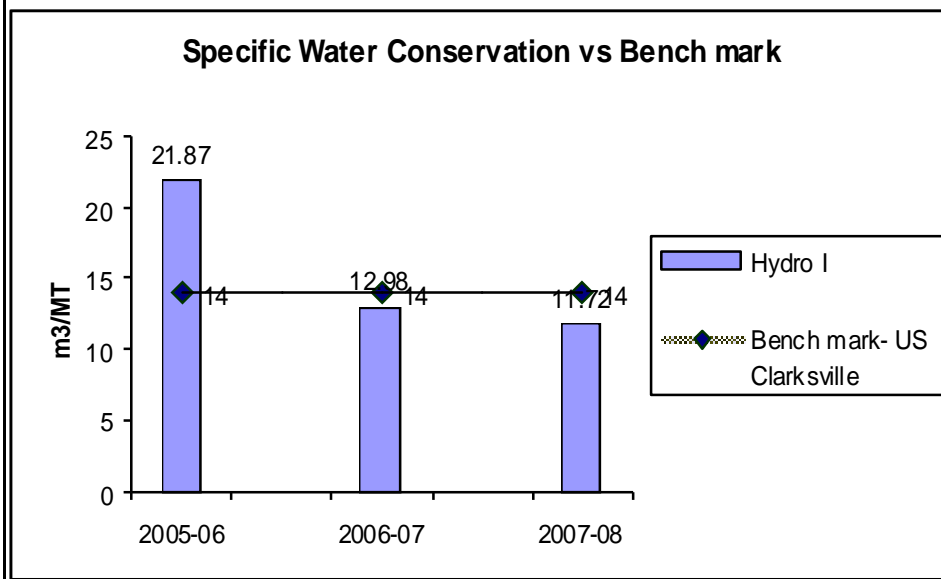
- n An integrated and structured approach -- comprising of Involvement of executives and contract labors like **Water Stewards** nominated for each Plant, further report to **Water Managers** and Unit Head for Water Conservation activities
- n Discussion of underlying factors behind the trends of HSE key performance indicators by top management during the monthly HSE review meetings.
- n Training - an efficient tool to improve the KPIs by motivating employees.
  - q Frequent training programs for external environment, safety and health, supervised by the HR head. The CEO usually takes feedback from Environment head and external faculty members who conduct the training program.







Year (Apr-Mar)	Annual Water consumption Quantity (m <sup>3</sup> )			Specific Water Consumption
	Industrial	Domes tic	Source	m <sup>3</sup> / MT
2005 – 06	1407000	142.9	Captive dam	21.87
2006 – 07	1755000	131.2	Captive dam	12.99
2007 – 08	1867670	93.1	Captive dam	11.72



Year (Apr - Mar)	Quantity generated (m <sup>3</sup> )	Quantity recycled (m <sup>3</sup> )	Quantity discharged (m <sup>3</sup> )
2005 – 06	74325	74325	0
2006 – 07	62358	62358	0
2007 – 08	52928	52928	0



 <b>Water Saving project implemented</b> 						
Sl No	Title of Water Saving project implemented	Year of Implementation	Annual Water Savings		Invest. Made	Payback Period (Months)
			M <sup>3</sup>	Rs. Lakhs	Rs. Lakhs	
1	ETP treated water to RO-I plant (88 m <sup>3</sup> /hr)	05 - 06	339190	25.43	215	55
2.	Process optimization of DM plant operation to reduce regeneration by increasing the OBR	06 - 07	29200	2.19	Nil	Nil
3.	Reduction in evaporation by optimization of CT fan operation according to the heat load	06 - 07	27375	2.05	Nil	Nil

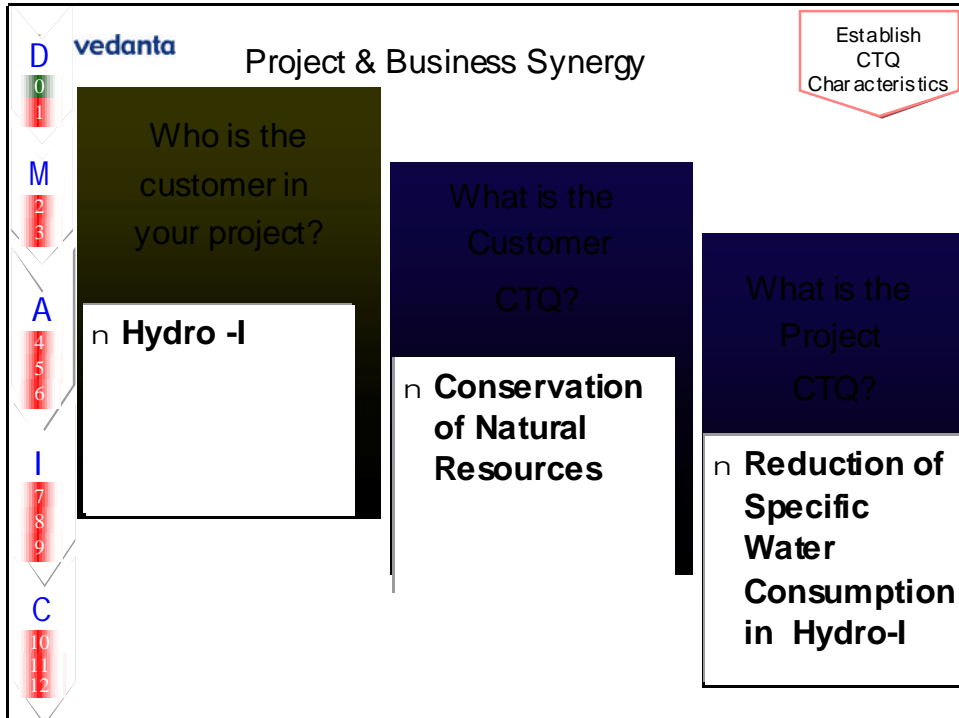
 <b>Water Saving project implemented</b> 						
Sl No	Title of Water Saving project implemented	Year of Implementation	Annual Water Savings		Invest. Made	Payback Period (Months)
			M <sup>3</sup>	Rs. Lakhs	Rs. Lakhs	
4.	Recirculation of vacuum pumps seal cooling water To CT as Make up water	07 - 08	36500	2.73	4.63	21
5.	Recirculation of steam Condensate from Leaching & purification to CT as make up water	07 - 08	73000	5.47	3.46	8
6.	RO treated water directly taken to Filter water storage tank, reduced PSF backwash frequency	07 - 08	27375	2.05	0.20	1
7.	Recirculation of Boiler blow down water to CT as Make up water	07 - 08	87600	6.57	0.72	1.5

Sl No	Title of Water Saving project implemented	Year of Implementation	Annual Water Savings		Invest. Made	Payback Period (Months)
8.	Optimization of CT water circulation rate by switching on/off pump as & when require <b>under six sigma project</b>	07 - 08	154395	11.58	Nil	Nil
9	Optimization of COC at CT by chemical treatment & continuous monitoring <b>under six sigma project</b>	07 - 08				
10.	Providing Level probe in all CT to avoid overflow <b>under six sigma project</b>	07 - 08				
11	ETP treated waterto RO-II plant (50 m <sup>3</sup> /hr)	07 - 08	192720	14.45	135	61
<b>Total</b>			<b>901655</b>	<b>72.52</b>	<b>359.01</b>	

**D M A I C**

**Reduction of Specific Water Consumption in Hydro –I**

**CASE STUDY**



**vedanta** Defining a Project

Theme Selection Matrix

Stream	Department	SN	Theme Name	Customer CTQ	Internal CTQ/CS P	Alignment to CBP	Customer Satisfaction	Financial Benefits	Effort/s*	Priority Score	Selection	
Hydro	Miscellaneous	1	Reduction of Specific Water Consumption	Conservation of Natural Resources	Conservation of Water	9	9	1	3	243	Yes	
		2	Reduction of SIS in Calcine	Reduction of COP	Reduction of MnO2 in Leaching & Improvement of Cell House Operation	9	9	3	3	729	Yes	
	Roaster	3	Reduction of Auxiliary Power Consumption in Acid Plant	Customer's Satisfaction	Cost Reduction	8	3	3	3	216	Yes	
		4	Reduction of Water Soluble Zinc in Jarosite Cake	Reduction of COP	Recovery Improvement	9	9	3	3	729	Yes	
	Leaching	5	Reduction of Zn Dust in Purification	Reduction of COP	To Reduce consumables Consumption	9	9	3	3	729	Yes	
		6	Improvement of availability of Casting/M/C in Cell House	Reduction in COP	OEE Improvement	9	9	3	3	729	Yes	
	Cell House	7	Improvement of Cell House Rating	Reduction in COP	Power Saving	9	9	9	1	729	Yes	
		8	Improvement of Equipments availability in Cell House	Reduction in COP	Improvement of OEE	9	9	3	3	729	Yes	
	CPP	CPP	9	Reduction of Auxiliary Power Consumption in CPP	Reduction of COP	Reduction of Power consumption	9	9	9	1	729	Yes
			10	Reduction of Coal Consumption in Power plant.	Reduction of COP	Customer's Satisfaction	9	9	9	1	729	Yes
		11	Improvement of Mills Availability	Customer's Satisfaction	Quality Improvement	3	9	3	3	243	No	
		12	Reduction of SO2 Emission from CPP	Environmental Protection	Reduction of Sox	3	1	1	3	9	No	

**vedanta**  
Project Scoping

Define a Project

**Longitudinal Scope**

It start from Raw Water Pond at DM Plant at Hydro-I and ends at ETP

**Lateral Scope**

Water saving at each SBU's at Hydro I

**Outside Scope**

- Period when there is continuous heavy rains
- When any of SBU is not in operation on a particular day for more than 8 hrs.

**Loss - Gain Matrix**

	Gains	Loss
<b>Short Term</b>	Reduced water Consumption.	ETP treatment cost will be high
	Maintenance of zero discharge	Water cess will be high
	Lower effluent generation	
<b>Long Term</b>	Sustainable growth	Violation of zero discharge conditions
	Cost reduction	During draught years continuity of operations may suffer
	Learning & satisfaction of team members	
	Better image within stakeholders	

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List of X's Chosen for Screening

Identify Variation Sources

Sl. No.	Name of 'X'	Description of 'X'
X <sub>1</sub>	COC	Cycle of concentration i.e TDS in circulation water to TDS in Make Up water is to be maintained > 7
X <sub>2</sub>	Water Level Probe	Probes at all the CT's were optimized
X <sub>3</sub>	Stoppage of Use of Filter Water for HBF washing	Filter water use at HBF cake washing as well as at cloth washing reduced and replaced with recycled water.

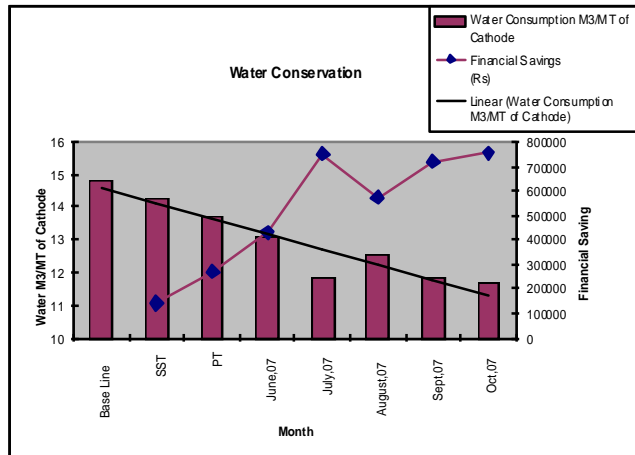
**vedanta**  
List of X's Chosen for Screening

Identify Variation Sources

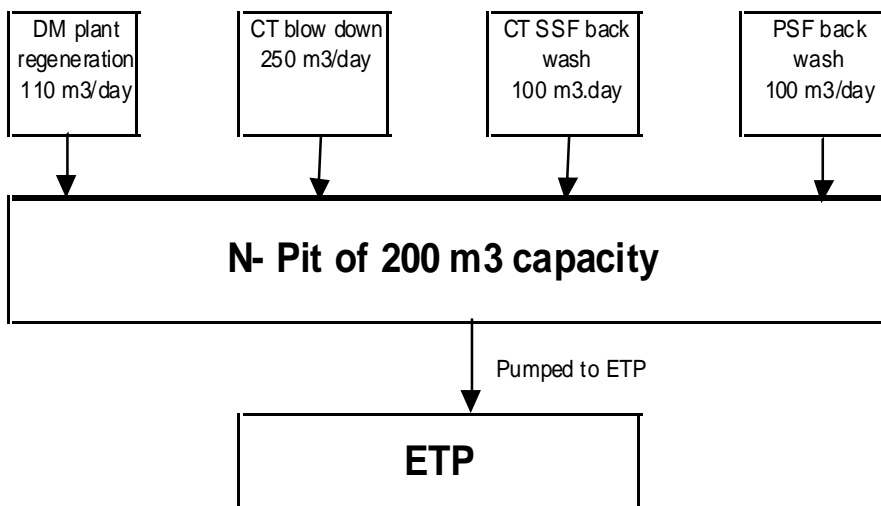
Sl. No.	Name of 'X'	Description of 'X'
X <sub>4</sub>	Transfer of Condensate to Cooling Tower	Condensate tanks line earlier connected with CT3, Now shifted to CT1 & 2 for reduction in makeup water.
X <sub>5</sub>	Frequent Cleaning of Cooling Tower Nozzles	Schedule has been made and being followed for cleaning of nozzles at all CT's
X <sub>6</sub>	Optimization of Cooling Tower Circulation	Circulation rate of CT pumps are optimized based on requirement at end use.

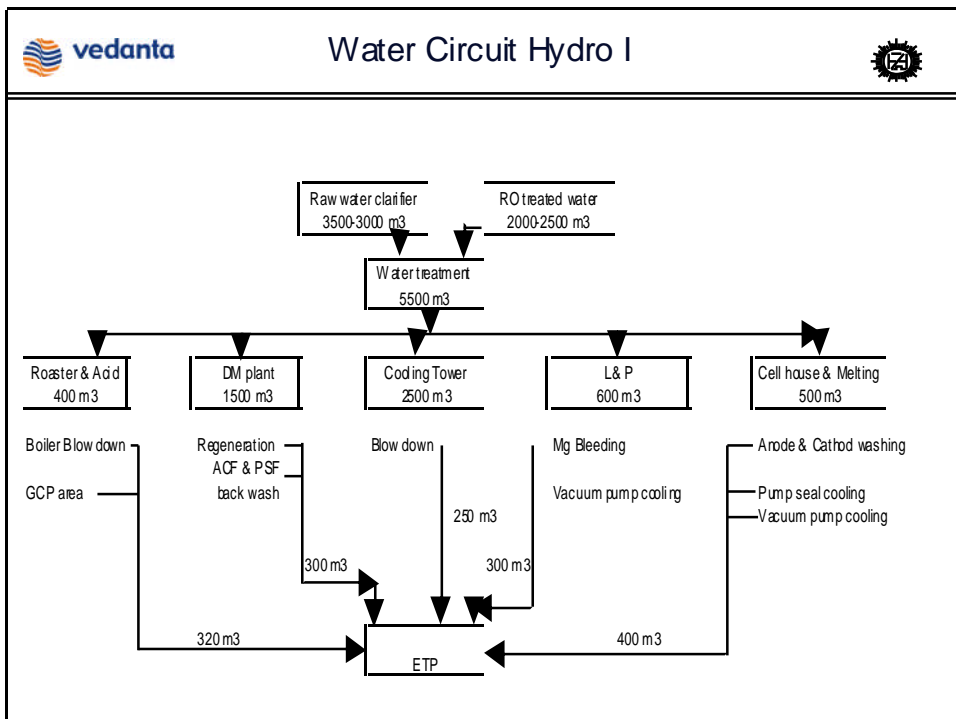
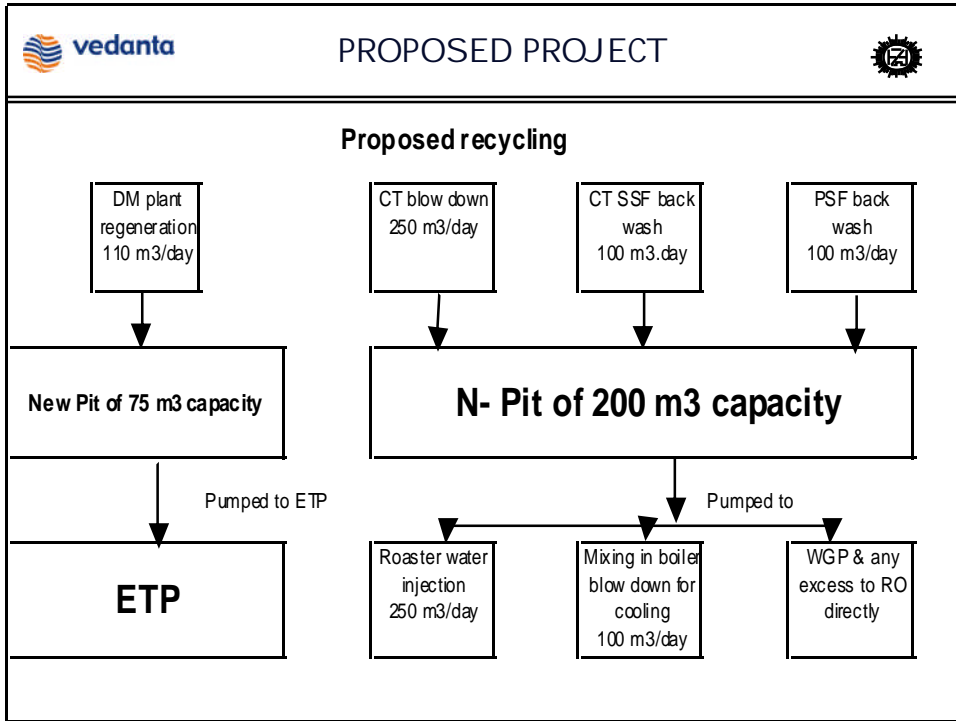
### Water Saving & Financial Impact in terms of Monthly Saving:-

Month	Water Consumption M3/MT of Cathode	Financial Savings (Rs)
Base Line	14.79	
SST	14.25	141762
PT	13.75	273023
June.07	13.05	432400
July.07	11.83	748007
August.07	12.57	570289
Sept.07	11.82	715241
Oct.07	11.65	752124



### Present effluent flow at DM plant







**DAILY WATER CONSUMPTION DATA SHEET**

DATE: / /

Time : A.M.

	Description	Initial Reading	Final Reading	Cons. (m <sup>3</sup> )	Remark
1	Raw water to Clarifier (X 10 m <sup>3</sup> )				
2	CT Make up				
3	DM water to CST				
4	SW to Service water tank				
5	Raw water to Fire Hydrant tank (X 10 m <sup>3</sup> )				
6	Potable water to Potable water tank				



Activities for awareness on water conservation in Plant



- n We celebrate "World Environment Day" on June 5 every year
- n **CHANGE: Challenge for How to Acknowledge the Green Education** was organized in May, 08 as One day awareness workshop on Water Conservation.
- n One week was fully dedicated and Declared as WATER WEEK from 5TH June to 11th June, 08 in Colony as water conservation and capacity building initiative.
- n Green Employee of the Month Scheme is in practice to recognize the efforts of plant personal towards Water Conservation Activities.
- n We also publish quarterly magazine on HSE titled "Saath Saath"
- n Posters on water conservation are displayed at various locations of the plant
- n In-house intra net based web-site titled 'Apna HSE Web Portal'
- n Promotion of use of treated sewage water for lawns & plantation in respective households
- n Rain water harvesting thereby recharging old bore wells at Township adopted