



## STERLITE INDUSTRIES INDIA LTD.,

(A UNIT OF VEDANTA RESOURCES PLC. LONDON)  
COPPER DIVISION, SILVASSA-DNH

### ***Unit Profile:***

Vedanta Resources Plc is a London listed FTSE 100 diversified metals and mining group with revenues in excess of US\$ 6.5 billion. Its principal operations are located throughout India, with further operations in Zambia and Australia. The major metals produced are aluminium, copper, zinc and lead. Vedanta has also recently acquired Sesa Goa Limited, India's largest producer exporter of Iron ore. With a talent pool of over 26,000 employees globally, the Group has a clear focus on achieving and sustaining global leadership in metals and mining business.

**Sterlite Industries (India) Limited (SIIL)**, a principal operating company of the Vedanta Group (Formerly Sterlite Group) is well positioned in the key core sector industries, has a strong track record of performance and is among the fast growing groups in India in the last 10 years with the increase in turnover from 50 Crores in 1997 to Rs. 12,663 Crores in 2007. SIIL was incorporated on September 8, 1975 as Rainbow Industries Ltd. It was later renamed to Sterlite Industries (India) Ltd. in 1986. SIIL is India's leading vertically integrated non-ferrous metallurgical company. SIIL has made considerable impact on the copper market as major producer of continuous cast copper rods (CCR) and Copper Cathode. SIIL has a clear vision of the vast scope available in the Non-ferrous metallurgical sector in the country and as a step towards the vision, the company set up the copper smelting and refining plants. This move of SIIL is a backward integration from producing cables to making the raw material for cables. In a move to become an international player in non-ferrous mining and metals, Sterlite set up a wholly owned new company-Sterlite Opportunities and Ventures Limited in 2002 which acts as a vehicle for its acquisitions and mergers. Sterlite acquired the Copper Mines of Tasmania (CMT) in Australia via acquisition of their holding company Monte Cello Corporation. It also acquired HZL, BALCO and built a green field project Vedanta Alumina in the last three years.

### ***Copper Operations at Silvassa:***

SIIL, Silvassa has a Refinery and two Continuous Cast Rod Plants (CCR). CCR of 10 MT/hr capacities was set up at Piparia in 1995. Another CC Rod Plant of 7 MT/hr capacities was set up at Chinchpada in 1996 which was expanded to 12 MT/hr in 1999. Refinery Plant of 60,000 MT/annum capacities was set up in 1997. The capacity was increased progressively in 6 steps to reach 1, 80,000 MT/annum through both de-bottlenecking and capacity expansion Route.

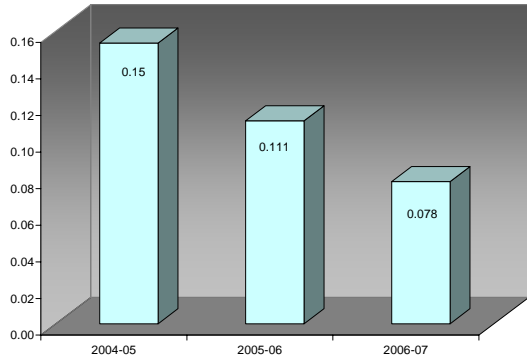
### ***Energy Highlights:***

In Sterlite Industries India Ltd., Energy conservation has prime importance in all our enabling initiative activities. As continuous measure energy conservation projects are carried out regularly and there is consistent decrease in Specific Energy Consumption year after year. In spite of addition of new Equipments to improve the quality & Process Efficiency Electrical power has been reduced & maintained at a constant level.

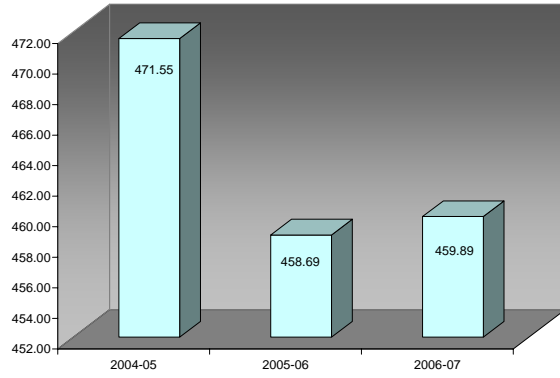
PRODUCT	2004-05			2005-06			2006-07		
	KWH/T	Million Kcal/T	% of COP	KWH/T	Million Kcal/T	% of COP	KWH/T	Million Kcal/T	% of COP
Cathode	471.55	0.15	56%	458.69	0.111	56%	459.89	0.078	52%
CC ROD	67.03	0.403	63%	71.72	0.403	67%	72.16	0.400	57%

## Specific Energy Consumption:

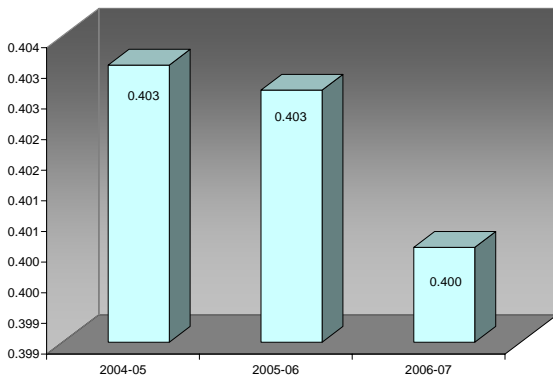
### CATHODE Million Kcal/T



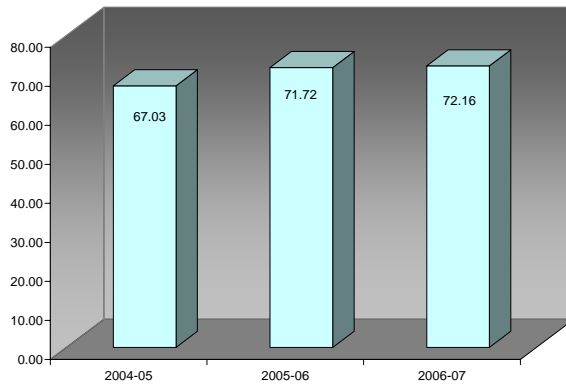
### Kwh/T



### CC RODS Million Kcal/T



### Kwh/T



## **Major Energy Conservation Projects**

### **Insulation of Launderers using Ceraboard**

Launderers redesigned and insulated with Cera boards to reduce the surface temperature to 150 deg C from 300 deg C. This has resulted in reduction of LPG Consumption by 1.5 kg/MT

**Investment: Rs 3 Lakhs**

**Annual Savings: Rs 39 Lakhs**

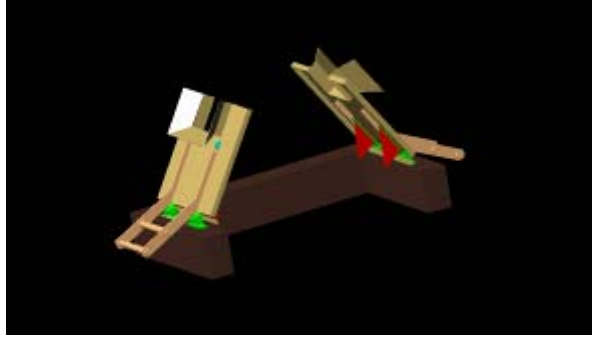


### **Exhaust door modification in ACP furnace**

Furnace Opening is reduced by modifying the exhaust door and thereby reducing the flue gas losses in the Furnace. The door is modified in such a way that that it does not create any back pressure inside the furnace

**Investment: Rs 0.25 Lakhs**

**Annual Savings: Rs 9.20 Lakhs**



## Energy Reduction Projects- A Glance

### ELECTRICAL ENERGY REDUCTION

SL NO	PROJECTS	LAKHS KWH	SAVINGS (Rs LAKHS)	INVESTMENT (Rs LAKHS)
1	Modification of Busbar laying in Cell House.	12.00	36.00	81.04
2	Modification in Heat Exchanger lines	1.70	5.20	0
3	PLC Control in FO temperature	0.60	1.90	0
4	Cell Voltage Monitoring System	3.40	10.40	0
5	Cooling water pump Energy Efficiency Coating	0.80	2.60	0.80
	<b>TOTAL</b>	<b>18.50</b>	<b>56.10</b>	<b>81.84</b>

### FURNACE OIL REDUCTION

SL NO	PROJECTS	KL	M KCAL	SAVINGS (Rs LAKHS)	INVESTMENT (Rs LAKHS)
1	Steam flow meters fr Machines & Cell House.	24.00	238.26	4.00	5.15
2	Insulation of Leaching tanks	17.60	174.72	3.00	0.50
3	Installation of New RVD	33.60	333.56	5.70	5.00
4	Modification of Launder Burner & 4 <sup>th</sup> Burner in ACP.	273.24	2712.59	46.50	0
5	Installation of Economiser & Scheduled Burner Tuning in Boiler	12.04	119.53	2.00	0.20
6	Vaccum Pump for ETP	3.40	33.75	0.58	0.26
7	Additive addition in FO	0.01	0.10	0.20	0.50

8	Improvement in Leaching rate	41.22	409.21	7.00	0
9	Steam Control Valves for leaching tanks, DT Tanks	58.89	584.63	10.00	4.12
10	ACP Furnace Exhaust door Modification	53.89	534.99	9.20	0.25
11	Controlled Combustion through flue gas analysis	4.06	40.31	0.68	0
12	Auto Air fuel ration controller for ACP furnace	26.94	267.45	4.50	6.95
13	Installation of Recuperator in ACP Furnace	53.89	534.99	9.10	3.00
	<b>TOTAL</b>	<b>602.78</b>	<b>5984.10</b>	<b>102.46</b>	<b>25.93</b>

## LPG REDUCTION

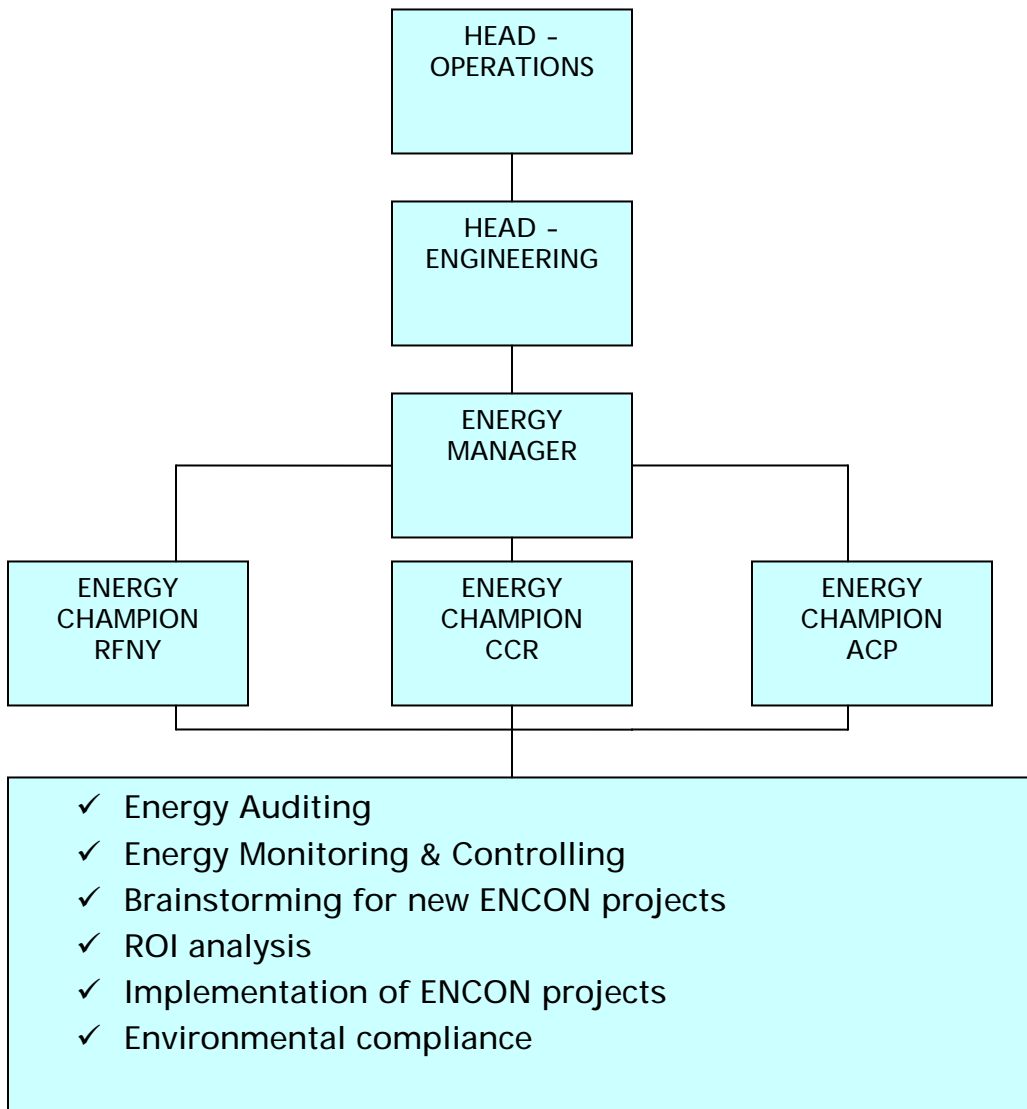
SL NO	PROJECTS	MT	M KCAL	SAVINGS (Rs LAKHS)	INVESTMENT (Rs LAKHS)
1	Insulation of Launderers using Ceraboard in CCR	130.44	1500.06	39.00	1.00
2	Installation of 25 KW Gas Heater in CCR Piparia	56.68	651.82	17.00	8.00
3	Installation of 1250 KVA DG set in CCR Piparia	18.89	217.24	5.00	55.00
	<b>TOTAL</b>	<b>206.01</b>	<b>2369.12</b>	<b>61.00</b>	<b>64.00</b>

## Energy Conservation Planned for Future

SL NO	ENERGY CONSERVATION MEASURES PLANNED	EXPECTED SAVINGS				INVESTMENT (Rs LAKHS)
		ENERGY VALUE			Rs LAKHS	
		KWH	LPG (MT)	FO (KL)		
1	High Density blocks for Launder Insulation		93.6		30.89	1.5
2	LPG static energy Insertion		125.42		41.39	4.5
3	Capacitor bank installation in CCR	187200			5.99	7
4	Furnace Modification in ACP			26.4	5.02	25

5	Burner modification in ACP			105.6	20.06	
6	Emmissivity Coating in Launderers surfaces		13.2		4.36	0.8
7	Compact band Filtration system for Finishing mill	140400			4.49	2.5
8	Burner Modification in Shaft Furnace		52.8		17.42	18
9	Bus Bar Modification in Refinery	1680000			53.76	40
	<b>TOTAL</b>	<b>2007600</b>	<b>285.024</b>	<b>132</b>	<b>183.38</b>	<b>99.3</b>

## EC Cell Structure



## ***EC Cell Activities***

Whole Plant is divided into 3 areas and Energy Consumption is monitored. Daily Consumption of Energy is getting recorded in each plant activity reports and is being circulated to the Head Operations along with all the functional departments.

There is a centralized energy monitoring & data acquisition system for monitoring power consumption in the plant. The software is provided to all sectional heads for continuous monitoring of consumption at any time in the plant.

Monthly Energy consumption of the plant is getting recorded. Specific consumption details are calculated in terms of GJ/T. Energy report is getting prepared by the Energy Manager and is getting reviewed by the Head Operations in presence of Sectional Heads. The Energy report consists of Energy Share, Power distribution, Fuel Distribution, Specific Consumption, Trend analysis, Internal & External Benchmarking, Concerns and Action plan for the next month.

## ***Employee Involvement Activities***

### **PEP: (Performance Enhancement Plan)**

Performance Enhancement Plan is a platform which encourages involvement of total work force to implement new ideas for the development of Quality, Safety, COP, Energy Conservation etc. The methodology of the same is as below.

The employee submits his suggestion through the Lotus Notes, which sends intimation to the PEP coordinator. The PEP coordinator then arranges for presentation of the same to the PEP Review Committee. This is done on a monthly basis to review all the suggestions received in a month. The committee then decides whether the suggestion is feasible for

implementation else the suggestion is dropped. The approved suggestions are worked upon for implementation within a specified target date. The implemented PEPs are then audited by the Departmental coordinators with regards to its implementation, investment, benefits and sustainability. A get together is organized on a quarterly basis to give appreciation and recognition to the employees.

### **TQM: Total Quality Management**

Our Company has established a Quality council and comprises of members from "Senior management" and represents a member from various function. These are responsible for area of concern, which are to be addressed through problem solving. Quality Council also selects the team to work on identified projects. They are also responsible for necessary guidance and support and reviews the progress of various projects at regular interval (Monthly).

We will be on completion Six phases of our TQM journey and project under various heads have been identified like COP, Quality, Energy conservation, Safety, Process Improvement, System Improvement etc. Employee Involvement has been a major success factor for us.

### ***Awards- a glimpse:***



Head-IT distributing prizes



Head-Operations distributing prizes



Participants

### ***Environmental Contributions***

- ✓ Rain water harvesting in the plant. (9.6 Lakhs)
- ✓ Continuous monitoring of air, water and stack Quality.
- ✓ Reduction in air pollution by introducing scrubbers. (3.5 Lakhs)
- ✓ Installed Sewage Water Treatment facility. Treated water is being used for gardening purpose. (2.5 Lakhs)
- ✓ Installed air pre heater in the boiler to reduce fuel consumption. (5.5 Lakhs)
- ✓ Green belt development in and around the plant.
- ✓ Installed Acetylene Soot Collection System installed in CCR to improve working Environment. (5.6 lakhs)
- ✓ Soil Correction Carried out in Refinery. (2.62 Lakhs)
- ✓ Installation of Air Ventilators in Refinery & CCR. (3.23 Lakhs)

## ***Awards & Achievements***

- ✓ ISO 9001,14001 and 18001 (OHSAS) Certification by DNV
- ✓ “Sterlite” brand Copper cathode registered in LME in Dec-'01
- ✓ Awarded Commendation certificate RBNQA of IMC in March 2007
- ✓ Sterlite bagged IMEA - Silver corporate award of M/s Frost and Sullivan in Nov 2006
- ✓ Won First Prize at “Qualtech 2005” in Improvement – Manufacturing Category.
- ✓ Won finalist award at ASQ team competition-2006 held in Milwaukee,USA.
- ✓ NABL accreditation on chemical, electrical & mechanical testing in Aug-2003.
- ✓ Won 3rd Prize for Unique Employee Involvement by INSSAN – May 2007
- ✓ Appreciation letter from Gujarat safety council for excellent safety practices
- ✓ Central lab recognized as R&D centre by Govt., of India
- ✓ Won INSSAN Meritorious award Feb-2007
- ✓ Bagged consecutive prizes for best suggestor in INSSAN at Visakaptnam in July 2007
- ✓ Corporate award for Creative workplace
- ✓ Safety Innovation award by Institute of Engineers – Sept 2007
- ✓ Short listed for Platinum Band in IMEA.

✓ Won CII Excellent Energy Efficient Unit award-2007.