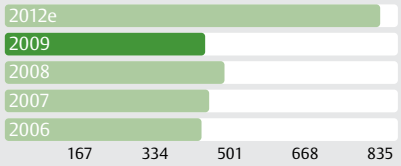
Copper

Copper ktpa
Production and proposed capacity



Description

Vedanta is one of the largest copper producers in Asia and Africa, with mining and processing facilities located in Zambia, Australia and India.

506.8 million tonnes of Reserves and Resources of ore.

Key locations

Zambia

Konkola Mine
Nchanga Mine
Tailing Leach Plant
Nchanga smelter

Australia

Tasmania – Mt Lyell Mine

India

Tuticorin – Copper smelter & refinery
Silvassa – Copper refinery

India/Australia

The performance of our Copper India/Australia business in FY 2009 is set out below.

(in US$ millions, except as stated)	FY 2009	FY 2008	% Change
Production volumes (in kt)			
Mined metal content	27	28	(3.6)
Cathode	313	339	(7.7)
Rod	220	225	(2.2)
Average LME cash settlement prices (US$ per tonne)	5,885	7,588	(22.4)
Average exchange rate (INR per US$)	45.91	40.24	14.1
Unit conversion costs (US cents per lb)	3.1	1.8	72.2
Unit conversion costs (INR per tonne)	3,138	1,563	100.8
Realised TC-RCs (US cents per lb)	11.7	15.7	(25.5)
Revenue	2,537.9	3,118.8	(18.6)
EBITDA	293.7	327.2	(10.2)
EBITDA margin	11.5%	10.5%	–
Operating profit	242.9	284.9	(14.7)

Production Performance
Production of cathodes at our Copper-India business was 313,000 tonnes in FY 2009, down 7.7% compared with FY 2008 due to planned bi-annual maintenance in the first quarter of FY 2009 and an unplanned shut-down to repair damage in the cooling tower structure in Q3 FY 2009.

Mined metal production at our Australian mines was broadly in line at 27,000 tonnes in FY 2009. CMT supplies c.9% of our total concentrate requirements at the Indian copper smelting operations.

Unit Costs
Net cost of 3.1 US cents per lb (INR 3,138 per tonne) in FY 2009 was higher than 1.8 US cents/lb (INR 1,563 per tonne) in FY 2008, largely due to higher power costs in H1 FY 2009 and a decline in by-product realisations during H2 FY 2009.

Unit CoP at our Australian operations in FY 2009 was 140 US cents per lb down from 160 US cents per lb in FY 2008, primarily on account of lower TC-RC paid to the smelter and a reduction in royalty which is LME linked.

TC-RC
Realised TC-RCs for FY 2009 were 11.7 US cents per lb, down 25.5% compared with FY 2008. We were largely insulated from the volatility in the spot market as a large part of our total concentrate requirement was sourced through long-term contracts with mines as well as through captive supplies from our Australian mines. Based on long-term settlements at better terms and current market conditions, we expect TC-RCs to improve in FY 2010.

Sales
Sales in the domestic market was 198,000 tonnes in FY 2009, a substantial increase of 26.1% compared with FY 2008, giving us better contribution vis-à-vis exports. This increase was primarily due to growth in the domestic electrical and power sector. Exports correspondingly fell to 114,000 tonnes.

Financial Performance
EBITDA for FY 2009 was US$293.7 million, down 10.2% compared with FY 2008 due to lower by-product realisations in H2 FY 2009 and weaker TC-RC realisations during the year. However, EBITDA from allied businesses including phosphoric acid and precious metals contributed US$65 million to EBIDTA, in line with FY 2008.

Case study

Sulphuric Acid Plant Cooling Tower Erection

Sulphuric Acid Plant cooling tower is one of the critical equipments of the plant, primarily used for supplying cooling water to Sulphuric acid plant for maintaining the acid temperatures and also in Gas cleaning Plant (GCP) heat exchangers.

In November 2008,four decks of the cooling tower collapsed and consequently brought the smelter to a halt. The initial time estimates to rebuild the cooling tower were 7-8 months. The cooling tower water flow is 11000 m3. None of the suppliers were willing to supply for the total circulation rate in a short period of time.

The copper maintenance team took initiative to look for a model based on the operating factors.

The packaged cooling towers of smaller capacities of FRP material were available in the market with maximum capacity of 625 cum/hr circulation rate. An idea of separating cooling water requirements to the plant was then devised, whereby each small capacity cooling towers could be located nearer to the equipments, as plant does not have place to keep series of smaller cooling towers. Also laying piping to greater distances was a difficult and time consuming option.

Based on this idea, three sets of packaged cooling towers were fixed -. 4100 cum/hr for Gas cleaning plant and 1875 cum/hr for Sulphuric acid plant I and also 1850 cum / hr for Sulphuric acid plant II

The procurement of these cooling towers was done within two weeks. Structural foundation and pedestals for these mobile cooling towers were made prior to the erection activities. Also structural materials, valves, piping materials, inclusive of cable, cable trays and MCC panel structures were arranged concurrently. Erection of the Cooling towers, MCC panels, Cable erection and cable tray erection were planned accordingly and the entire activities of 180 tons of structural fabrication and 2 Km of pipe line laying and also separate tanks for plant I and II was fabricated and erected within 15 days. Within 10 hrs of shutdown, these mobile cooling towers in GCP area, SAP-1 and 2 were dovetailed and the entire plant was taken on line without any trouble.

With this arrangement, a major disaster has been averted and the production started immediately within four weeks of the incident as compared to 15 to 20 weeks required in the normal course. The cooling towers are working satisfactorily.

Copper (continued)

Zambia

The performance of our Copper- Zambia business in FY 2009 is set out below.

(in US$ millions, except as stated)	FY 2009	FY 2008	% change
Production volumes (in kt)			
Mined metal content	81	76	6.6
Cathode	133	150	(11.3)
Average LME cash settlement prices (US$ per tonne)	5,585	7,588	(26.4)
Unit costs (US cents per lb)	258.3	191.5	34.9
Revenue	773.1	1,103.1	(29.9)
EBITDA	(70.8)	340.1	(120.8)
EBITDA margin	(9.2%)	30.8%	–
Operating (loss)/profit	(165.9)	250.6	(166.2)

Production Performance

Cathode production at our Copper-Zambia business was 133,000 tonnes in FY 2009 compared with 150,000 tonnes in FY 2008, lower by 11.3% primarily due to organic contamination in the tailings leach plant in the first quarter of FY 2009 and the gradual ramp down of the Nkana smelter in Q3 FY 2009 where operating costs are high, in order to facilitate feed to the new Nchanga smelter.

The new Nchanga smelter performed well in February and March 2009. Recovery of sulphur and cobalt in the new smelting process helped to significantly reduce net CoP. In April 2009, there was a leakage in the furnace leading to production disruption. Our technology provider and brick supplier have been engaged in assessing the root cause of the problem to provide a robust technical solution. The plant is expected to restart in the first week of May 2009.

Mining output is being increased and sustained in the open pits with pit optimisation and adequate plant to dewater/desilt the mines during the monsoon. External contracting of water removal for certain sections of the mine has played a vital role in the turnaround. Mined metal production in FY 2009 was 81,000 tonnes, up 6.6% compared with FY 2008 due to a series of measures including pre-stripping of open-pit mines, improved underground mine development and better plant availability/refurbishment of equipment. These measures provide increased confidence that we will achieve better production from our mines and consequently from our smelting facilities. We have also identified new areas at Chingola Open Pit A to be mined in FY 2010. Further, cobalt mining has started from the Nchanga Open Pit at Cut II. We are optimistic about further enhancing value from this cobalt stream.

Unit Costs

Unit CoP was 258.3 US cents per lb in FY 2009, up 33% compared with FY 2008. Costs in H1 FY 2009 were at a historical high on account of higher input costs, higher manpower costs, lower production and a strong Zambian kwacha.

At Konkola, measures including replacement of old compressed air lines and electrical lines have yielded significant improvements in mining operations. Our continued efforts to curtail costs, optimise assets, ramp down high cost operations, renegotiate all contracts for supplies, commodities and logistics and enhance recoveries of cobalt and sulphuric acid, were helped by cost deflation in major inputs. All these steps were further supported by the depreciation of the Zambian kwacha against the US dollar in H2 FY 2009. As part of our measures to reduce costs, we have shut down the high cost Nkana smelter and have also reduced manpower at this operation by 2,000 people to date.

These initiatives helped us in achieving a significant reduction in unit CoP in H2 FY 2009 to 222.3 US cents per lb. We exited FY 2009 with substantially lower unit CoP of approximately 140.0 US cents per lb in March 2009.

Financial Performance

We incurred EBITDA losses of US$70.8 million in FY 2009 compared with EBITDA profits of US$340.1 million in FY 2008, primarily due to increased operating costs in FY 2009 (US$69 million), a 26.4% drop in LME prices (US$275 million), lower volumes (US$48 million) and one time inventory write-downs (US$79 million).

Exploration

We have rich deposits at our copper mines, with current reserves and resources of 470 million tonnes of ore at an average grade of 2.5%, equivalent to c.12 million tonnes of copper content. In line with our approach to ensure

long mine life in our operations, we plan to soon commence extensive exploration work at KCM and expect to add significant reserves and resources through brown field exploration.

Projects

The new Nchanga smelter is commissioned and is now ramping up. We expect the smelter to achieve its rated capacity by Q2 FY 2010. Abundant availability of copper concentrate within the proximity of our plants provides us with an opportunity to engage in custom smelting to supplement the production from our integrated operations.

Construction activity at the Konkola Deeps mine expansion project is progressing well. We achieved a major milestone in Q4 FY 2009 by sinking the production shaft to a depth of c.950 metres, supported by a satisfactory orientation between the two sub-shafts. We are on course for mid-shaft commissioning by mid FY 2010 by which additional hoisting capacity of about 3 mtpa of ore will become available with the use of one rock winder in one compartment of the shaft. Sinking of the Number 4 shaft to its final depth of 1,490 metres will continue through the other compartment. The remaining infrastructure, including the bottom crusher, loading station, deepening of Number 1 shaft, and the 1,390 metre level pump chamber will be completed by end CY2011.

Case study

Cobalt Alloy Production at KCM- Breaking New Grounds

As a standard practice, from the copper mining reserves, the copper concentrate is made and from that the copper metal is produced with other minerals being lost in the form of tailings / slag.

The ore at Zambia, besides being rich in copper also has cobalt in it. In a bid to drive change through innovation, KCM emerged with a new development in the metallurgical complex by recovering cobalt from the process molten slag in form of an alloy of copper, iron and cobalt. This is achieved through the adoption of a two stage electric slag-cleaning furnace system - the first of its kind. The cobalt in the concentrates is fixed in the slag from the flash furnace after smelting. The slag also contains an appreciable amount of copper. The primary slag-cleaning furnace utilizes carbothermic reduction using metallurgical coke as a reducing agent to recover copper only in the first electric furnace.

Cobalt is recovered in the second stage electric furnace (also called the Cobalt Recovery Furnace (CRF)), which handles slag from first slag-cleaning furnace. Apart from the molten slag, a bone dry concentrate feed mixture is injected to induce sulfur, which helps in the adjustment of the liquidus temperature. The metal droplets in the SCF slag and the reduction products settle through the slag layer and form the CRF metallic alloy. The highly reduced slag from the CRF is tapped from the slag tapping holes via launders into the granulation pond. The cobalt alloy design spec of 63% Cu, 23.6%Fe, 6.3%Co and the rest sulphur is tapped through launders directly for granulation. The cobalt alloy production at peak rate is expected to be 70tpd.

We expect to have a cobalt recovery of 37% and produce about 4.4 tonnes per day of cobalt in the form of cobalt copper alloy.