

**Mining & Metals  
Global  
Special Report**

**Base Metals Outlook for 2008**  
*Are We There Yet?*

**Analysts**

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**Related Research**

- *"Base Metals: Insatiable Demand", Special Report dated August 22, 2007*

**Overview**

Fitch believes that prices for base metals have peaked in 2007 after advancing since 2002. Current destocking should result in a stronger second half of 2008.

Generally, base metals prices will be underpinned by rising cost bases coupled with supply discipline. Volatility, intensified by tight supply, is expected to persist over the short-to-medium term. Prices in the later half of 2006 and into 2007 exceeded our expectations, while the current correction is more in line with them. Fitch expects metals prices to fall with increased supply over the next 12–18 months but remain higher than long-term averages.

Constraints on earnings include declining ore grades, high energy and fuel prices, increased capital costs, increased labor costs, and increasing governmental and non-governmental public action to curtail production. As supply pressures ease, there may be opportunities to improve efficiency and lower production costs, but Fitch does not expect labor costs or energy costs to ease in the medium term. Persistent weakness in the US dollar tends to adversely affect margins, especially where costs are incurred in Australia, Canada, Brazil and Europe. By-product metal credits—particularly from molybdenum or gold—should continue to strongly benefit earnings.

The ratings outlook on the industry is stable.

**What to Watch**

Tighter lending markets in the United States are expected to dampen consumer spending, which could reverberate through exporting economies, in particular, China.

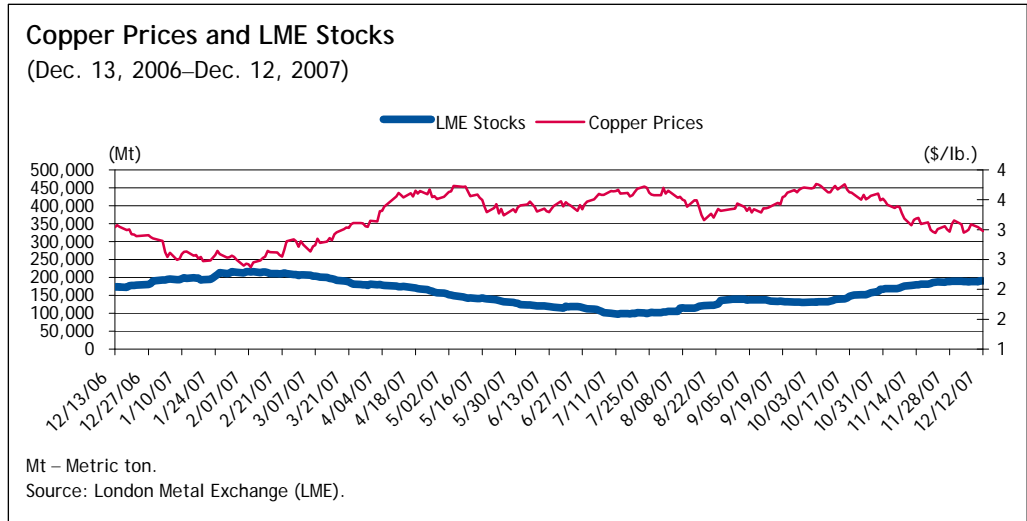
Deeper cuts in US residential construction are translating to declines in demand for copper and aluminum. A recession in the United States could prolong or deepen the downturn.

China accounts for 20%–30% of the world's consumption of base metals and continued fixed-asset investment underpins strong demand growth. Efforts to slow down the economy to rein in inflation may affect metals demand.

**Analysts' Metals Price Forecasts**

	Spot	2008	2009	2010
<b>Copper \$/lb.</b>	3.02			
Median		3.13	2.74	2.40
Mean		300.35	2.57	2.29
Forward		3.10	3.06	2.99
<b>Gold \$/oz</b>	811.50			
Median		734.00	706.25	673.00
Mean		739.9	680.46	638.17
Forward		846.5	859.96	899.34
<b>Molybdenum \$/lb.</b>	33.25			
Median		22.50	20.00	10.90
Mean		21.66	20.00	11.96
<b>Aluminum \$/lb.</b>	1.09			
Median		1.17	1.11	1.02
Mean		1.17	1.08	1.05
Forward		1.14	1.18	1.21
<b>Alumina \$/mt</b>	340.00			
Median		280.00	290.00	280.00
Mean		301.69	283.63	253.46
<b>Nickel \$/lb.</b>	11.90			
Median		13.55	11.95	9.00
Mean		13.06	11.38	8.91
Forward		12.05	12.07	11.96
<b>Zinc \$/lb.</b>	1.12			
Median		1.34	1.09	0.86
Mean		1.37	1.15	1.02
Forward		1.08	1.07	1.07

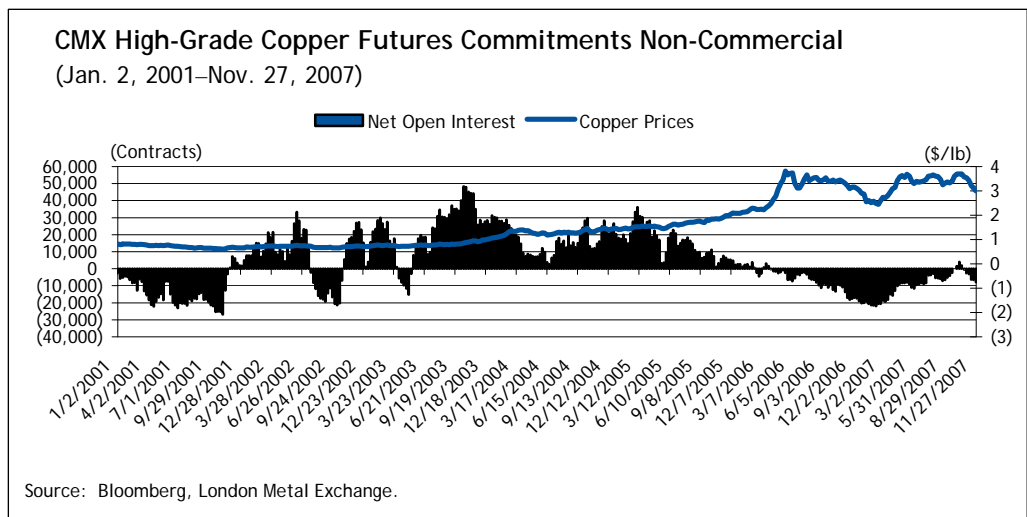
Mt – Metric ton. Source: Bloomberg as of Dec. 12, 2007



**Copper — Constrained Supply**

The copper market, expected to be 18.1 million metric tons (mt) in 2007, is exhibiting continued tightness in the face of robust demand from China, India and Russia; declining demand from other industrial economies; and limited new supply. China, accounting for about 22% of world consumption in 2006, should continue to show growth driven by the building of power generation facilities and the upgrading of urban infrastructure. By comparison, the United States accounts for about 13% of world consumption; 40% of American demand comes from automotive original equipment manufacturers and about 30% comes from construction. Fitch expects copper consumption to grow by about 4% annually over the next 18–24 months, driven by growth in developing nations.

Copper has been seeing demand destruction over the past two years due to sustained high prices and short supply. In particular, there has been substitution in plumbing applications with polyvinyl chloride tube, and replacement by thinner-walled, narrower tubes in air conditioning applications. Copper can be replaced with aluminum in power cables and electrical equipment, and optical fiber in telecommunications. Fitch estimates that annual demand on the order of 200,000 mt–300,000 mt has been replaced by aluminum or plastics.



**ICSG Outlook for World Copper**

(Thousand mt)

	2004	2005	2006	2007	2008
Mine Production	14,595	14,923	15,015	15,786	16,991
Adjusted Refined Production	15,915	16,588	17,353	18,119	18,951
Copper Usage	16,846	16,731	17,123	18,009	18,701
Refined Production - Usage Balance	(931)	(143)	230	111	249

Mt - Metric ton. Source: International Copper Study Group (ICSG).

Supply response has been limited by strikes, natural disasters, declining ore grades, and operating delays. Production, therefore, has undershot expectations by 4% annually over the past four years. The International Copper Study Group (ICSG) estimates that world mine production is up 5.1%, to 15.8 million mt of copper in 2007 after scant growth in 2006, and expects 2008 mine production to come in at 17 million mt due to production from new mines and expansions. Secondary production has been running at about 2 million mt of refined copper annually.

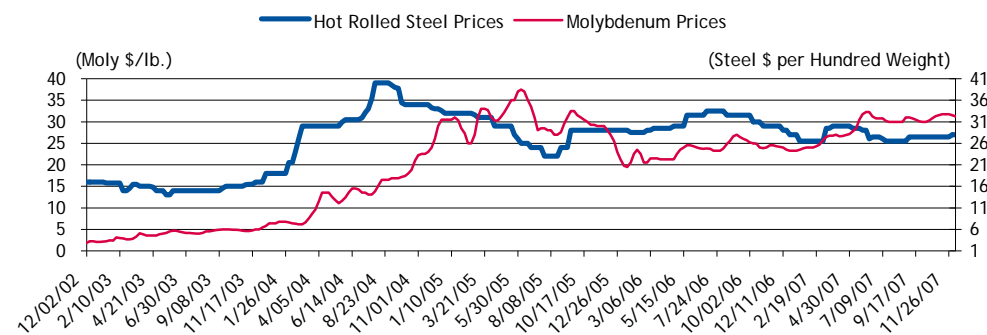
Fitch expects copper supply to be up about 5% in 2008 with fewer production disruptions, which may result in a small surplus, but overall the copper market should remain relatively tight over the next 18–24 months. Prices could moderate further but should remain at historically high levels.

**Molybdenum — Supply Deficit**

Demand for molybdenum, driven by pipeline projects and oil and gas drilling as well as China’s stainless steel demand, grows at about 4% annually, while production is expected to decline 5% or 20 million pounds this year on declining ore grade and maintenance shutdowns. Total global supply is estimated at 400 million pounds for 2007. The molybdenum market is expected to be in deficit until Freeport-McMoRan Copper & Gold Inc.’s Climax mine starts production in 2010. The mine has been on care and maintenance

**Molybdenum Prices and Hot Rolled Steel Prices**

(Dec. 2, 2002–Dec. 10, 2007)



Source: Platts Metals Week, American Metal Market.

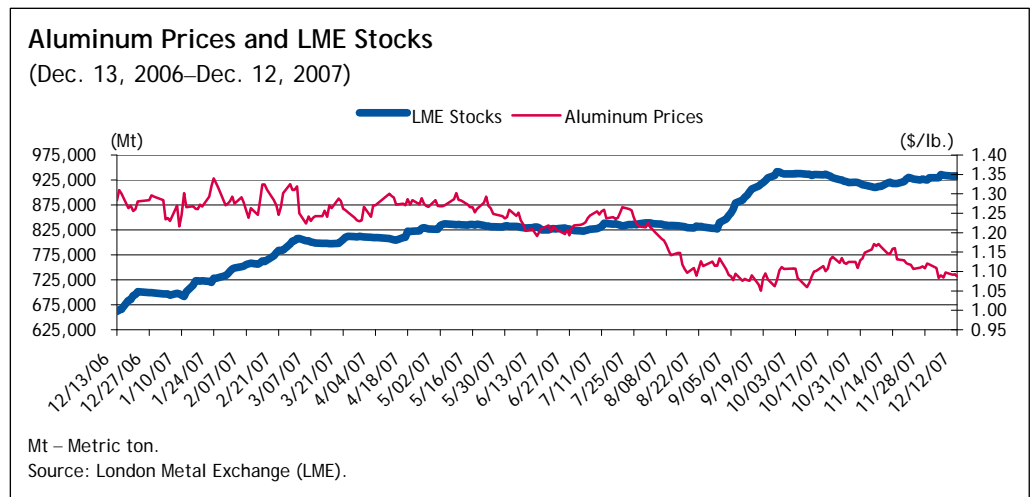
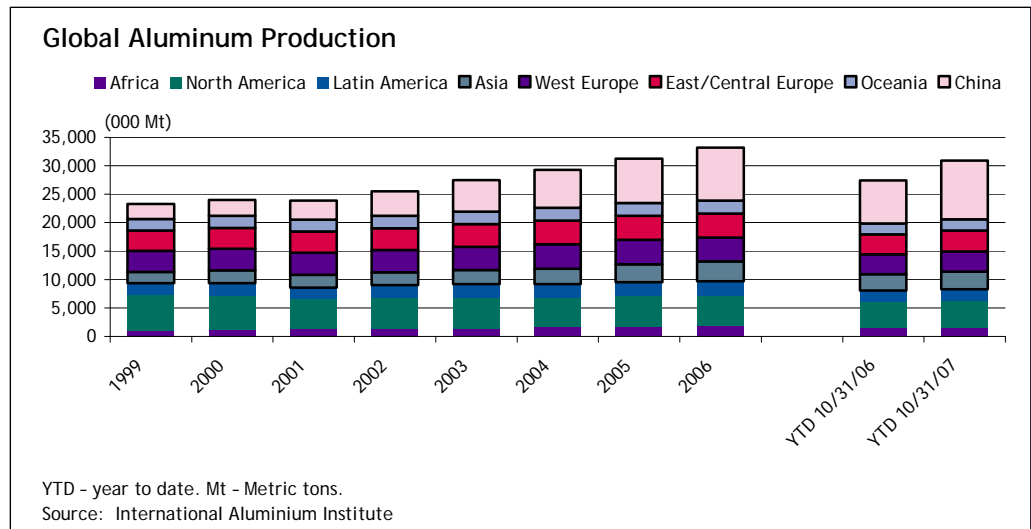
since 1995. The costs of restart are estimated at \$500 million, including the construction of new milling facilities. The mine could produce 30 million pounds annually beginning in 2010 with a cash cost of \$3.50/lb.

In 2010–2012, General Moly Inc.’s Mount Hope Mine in Nevada should add annual production of 38 million pounds, and Moly Mines Limited’s Spinifex Ridge project in Australia should add annual production of 24 million pounds.

Fitch expects molybdenum prices to be supported by the supply deficit over the next 12 to 18 months.

### Aluminum — Supply Growth Is Rampant

Aluminum, at 37 million mt in 2007, is a relatively small base metal market, about three-quarters of copper by value but less than 15% of the value of world steel consumption. The market dynamics of aluminum behave more like a processed commodity such as steel rather than another base metal such as copper, nickel or zinc given the lack of supply-side constraints and short lead times. New production capacity has surged, primarily



where energy is relatively cheap or stranded (Iceland, the Middle East and Russia) or where capital costs are low (China). Idled capacity restarts have been significant as well, particularly in the United States and China where current high metal prices overcome the relatively high costs of power.

The United States accounts for about 18% of world aluminum demand and consumption has fallen with weakness in the US housing and automotive markets. The Aluminum Association reports that North American demand was off 3.8% for the first nine months of 2007 compared to the same period of 2006. China accounts for 25% of world consumption,

and growth there as well as in other transitional economies is expected to continue to be robust.

Aluminum manufacture (including alumina smelting) is energy-intensive with power accounting for about 40% of total costs. Given this dominance, the industry cost curve has been both rising and flattening, tending to underpin current prices.

Fitch expects aluminum demand and supply to show a slight surplus.

### Nickel — Demand to Rebound

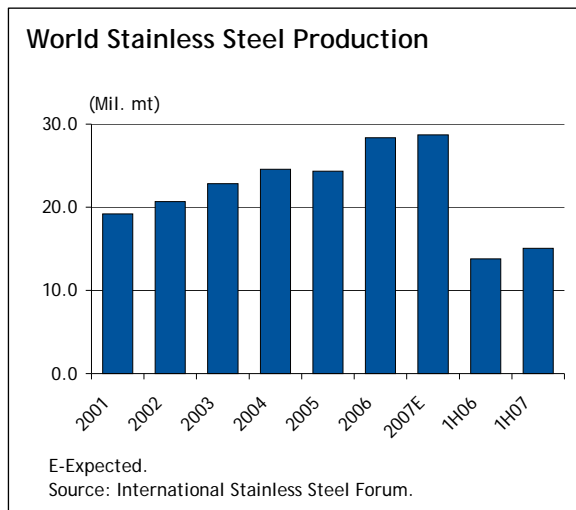
Nickel, at 1.5 million mt in 2007, compares at 32% of the copper market by value. Its primary use is in the manufacture of stainless steel (62%), steel alloys and superalloys

#### INSG Outlook for Nickel

(Thousand mt)

	2005	2006	2007	2008
Primary Nickel Production	1,296.7	1,362.0	1,470.1	1,569.2
Primary Nickel Usage	1,246.9	1,399.1	1,335.3	1,466.5
Balance	49.7	(37.1)	134.8	102.7

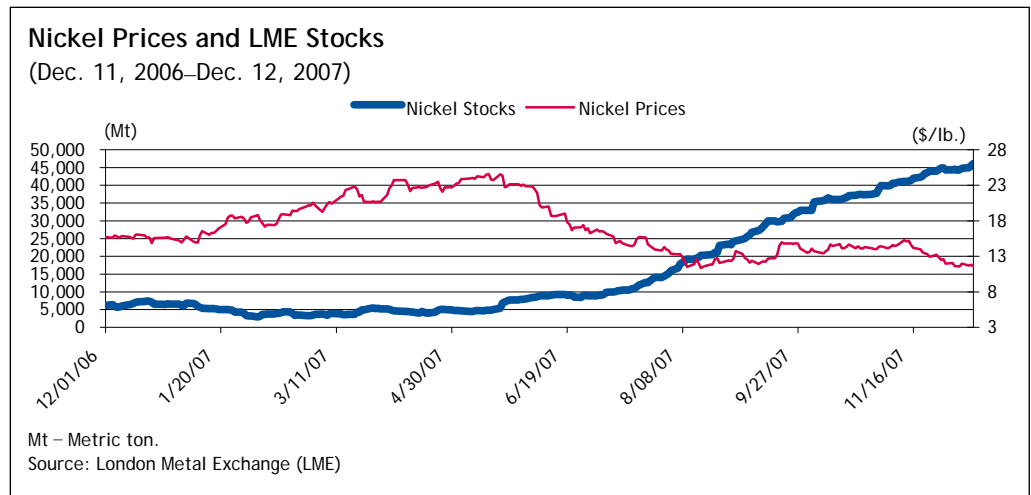
Source: International Nickel Study Group (INSG).



(12%), which have a major role in the development of the chemical and aerospace industries.

Chinese consumption of stainless steel has increased significantly over the past few years, and China has limited and low-quality nickel resources of its own. New stainless steel capacity additions scheduled in China are expected to drive strong nickel demand over the medium term.

2007 saw global consumption decline given destocking and some substitution. Nickel has suffered temporary substitution when prices are high:



Aluminum, galvanized steel and carbon steel are used in place of stainless steel; scrap nickel is used in place of primary nickel; and low-nickel or no-nickel alloys are used with greater penetration. Demand is expected to be up over 8% due to restocking as well as demand from China's stainless steel mills.

Primary nickel production is estimated to increase steadily, by 8% in 2007 and a further 7% in 2008. Fitch expects nickel prices to remain volatile but to trend down as new production comes on stream.

China has made increasing use of nickel pig iron in the manufacture of stainless steel. Crude nickel pig iron containing 2%–4% nickel requires a \$12–\$14 per pound nickel price and mainly replaces scrap. The use of electric arc furnaces to increase the nickel content increases energy costs and still requires nickel at over \$10/lb. to cover costs.

### Zinc — Near-Term New Mine Supply

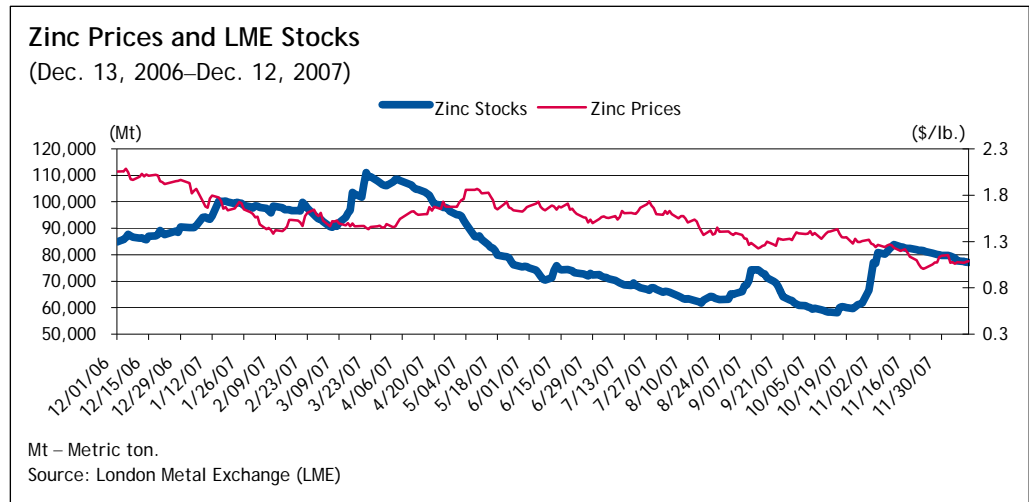
Zinc, at 11.3 million mt in 2007, is smaller than the nickel market by value. Zinc is primarily (48%) used to galvanize steel to prevent corrosion. It is also used in the manufacture of brass and bronze (19%) and die-cast alloys (15%).

#### ILZSG Zinc Outlook

(Thousand mt)

	2005	2006	2007	2008
Mine Production	10,148	10,462	11,180	12,240
Metal Production	10,229	10,691	11,320	12,200
Metal Consumption	10,617	11,035	11,380	11,960
Balance	(388)	(344)	(60)	240

Source: International Lead and Zinc Study Group (ILZSG).



China is a significant producer of mined and refined zinc, and was a net exporter of the metal until 2004. More recently, a ramp-up of galvanized steel production resulted in periods where China is a net importer of concentrate and refined zinc.

Despite some 970,000 mt and 820,000 mt of additional zinc mine capacity due to come on stream in 2007 and 2008, respectively, the zinc market is expected to remain in deficit this year with a slight surplus in 2008.

## **Appendix I: Key Rating Criteria in Analyzing Mining Companies**

In addition to Fitch's standard corporate methodology, the agency considers the following when analyzing companies in the metals and mining sector.

**Diversity** — Diversification by mine/operation, product and geography; economies of scale; operating flexibility; ability to withstand downturns in specific product cycles and end-customer sectors; and the risks of product substitution.

### **Production**

- **Costs** — Cost advantages/disadvantages arising from: orebody, raw material or labor sources; transportation; operating efficiency; degree of pricing power; smelting and refining; and cost of capital.
- **Operating Risk** — Mining method, ore processing technology, and metallurgy.
- **Exploration and Development** — Geology, engineering, metallurgy, risk-sharing partnerships, capital and operating costs.
- **Mine Reserves** — Valuation analysis including assessing public disclosure, basis of reporting, and evaluating historical experience.
- **Project Pipeline** — Evaluating the organic growth potential and its financial effect as demonstrated by capital budgeting.

**Sustainability** — Given the long-term nature of many mining assets, the following aspects require assessment:

- **Corporate Governance** — Quality of disclosure, ownership structure, management experience and transparency.
- **Environmental, Health and Safety Considerations** — Practices, monitoring and reporting relative to international benchmarks; current provisions and legacy liabilities; trends in new regulation.
- **Social and Political Issues** — Sovereign and political risks which may affect repatriation of cash, recognition of mining rights and concessions, or disrupt operations; non-governmental organization or local citizen action to halt or discourage development or operation.
- **Financial Profile** — Ability to maintain satisfactory credit metrics and manage cash flows across a downcycle.

**Project Finance** — Specific risks associated with mining projects (see the Criteria report, "Fitch's Rating Approach to Mining Projects," dated Jan. 13, 2005, and available at [www.fitchratings.com](http://www.fitchratings.com)).

## Appendix II: Fitch Ratings' Public Ratings of Base Metals Producers

### Fitch Ratings' Public Ratings of Base Metals Producers

Issuer	Long-Term Rating	Outlook	Watch	Analyst
Alcoa Inc.	'A-'	Negative	—	Monica Bonar
Alcoa Aluminio S.A.	'BBB'	Stable	—	Anita Saha
Aluminium Corporation of China	'A-'	Stable	—	Frederic Gits
Anglo American PLC	'A'	Stable	—	Peter Archbold
Clarendon Alumina Production Limited (CAP)	'B'	Stable	—	Anita Saha
Companhia Vale do Rio Doce (Vale)	'BBB-'	Positive	—	Anita Saha
Corporacion Nacional del Cobre de Chile (Codelco)	'A'	Positive	—	Giovanny Grosso
Freeport-McMoRan Copper & Gold Inc.	'BB+'	Positive	—	Monica Bonar
Grupo Mexico, S.A. de C.V. (Grupo Mexico)	'BBB-'	Stable	—	Anita Saha
Norilsk Nickel	'BBB-'	Stable	—	Peter Archbold
Rio Tinto Plc	'A-'	Stable	—	Peter Archbold
Southern Copper Corporation	'BBB'	Stable	—	Anita Saha
Zinifex Limited	'BB+'	Stable	—	Maurice O'Connell
<b>National Scale Ratings</b>				
Companhia Vale do Rio Doce (Vale)	'AA+' (BRA)	Positive	—	Anita Saha
Corporacion Nacional del Cobre de Chile (Codelco)	'AAA' (CHL)	Positive	—	Giovanny Grosso
Minera Escondida Ltda.	'AAA' (CHL)	Stable	—	Giovanny Grosso
Hindalco Industries Limited	'AA' (IND)	Stable	—	Priyamvada Balaji

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