External Environment and Business Strategy

Global Non-Ferrous Metals Industry Overview

*Rising demand plus fiercer competition to secure resources*

Prices of non-ferrous metals such as copper and nickel have been rising fast since 2003. Underpinning this boom has been strong economic growth within the BRICs emerging nations, which collectively account for about 40% of the world’s population and 10% of global GDP. Supply has failed to keep up with the sharp increase in demand for non-ferrous metals, which has pushed up prices. Economic growth is projected to remain robust in BRICs nations going forward and these major emerging markets are expected to continue to drive growth in global non-ferrous metals demand. This undercurrent of the major expansion in demand has been a distinctive feature of the surge in prices.

As the upward trend in non-ferrous metals prices has developed, we have also seen the emergence of resource nationalism and national strategies to secure resources. At the same time, the major mining firms based outside Japan have engaged in a series of mergers and acquisitions. The resulting consolidation of the industry is leading to the world’s mineral resources being controlled by ever fewer players. The global deployment of huge amounts of capital and the increasing involvement of nation states are expected to lead to fiercer competition to secure resources in the future.

Amid rising demand and intense competition for mineral resources, industrial action by miners, production stoppages and various other factors have added to supply uncertainties. An influx of speculative trading funds into commodity markets has been an additional factor. Overall, the trends seen in non-ferrous metals prices have been unlike anything recorded in the past.
Global and BRICs demand for copper (forecast)

Global nickel production volume and China's stainless steel production volume

Source: BROOK HUNT

Source: Estimate by SMM
Copper: Prices continue to surge while production falters as the result of lower-quality ores and mine obsolescence

The quality of ore extracted from many of the world’s major copper mines has fallen noticeably in recent years. Usually these ores contain about 1–2% of copper by weight, but recently the amounts of ores with grades of less than 1% have been increasing. This trend means that production output of metal falls unless higher volumes of copper ores are processed, putting pressure on smelting firms to raise production. It is also one of the factors spurring the expanded use of recycled raw materials as secondary sources of copper.

While many mines are increasingly approaching obsolescence, little progress is being made in terms of developing new sources of copper. Impeding factors include rising development costs and a trend toward using M&A to control existing resources rather than focusing on development of new mines. The emergence of resource nationalism has also prompted countries to tighten rules and exert more authority over state-controlled mineral resource assets.

Copper prices have risen sharply since late 2003. In part this reflects supply constraints due to the suspension or termination of production at high-cost mines in response to the depressed prices recorded prior to the current boom. However, a major cause is the rise in demand from countries such as China. A relative lack of supply has been the main factor pushing up market prices.

Nickel: Prices expected to rise in reflection of robust demand, particularly from China

Stainless steel accounts for more than 60% of global demand for nickel. While demand for nickel has stayed buoyant in Western countries, consistently high rates of economic growth in China have contributed to fast growth in demand for stainless steel. Global demand has grown substantially as a result. China has now overtaken Japan as the world’s leading source of demand.

Applications related to energy and power generation are also creating strong growth in demand for nickel-rich specialty steels and alloys. For example, due to the high price of oil, companies are increasingly looking to exploit deep-well technology to develop deep-sea oil and natural gas reserves in projects that had been previously overlooked owing to the high costs involved. This is one of the factors pushing up demand for nickel-rich alloys, whose high resistance to corrosion is useful in extreme operating environments. Led by the BRICs economies, global energy demand is projected to increase in the future, thus continuing to push up demand for nickel.
External Environment and Business Strategy

Copper Price (LME)

Nickel Price (LME)

Gold Price (London Fixing)
The market for nickel is small compared with those for other base metals such as copper and aluminum. This tends to make nickel prices more susceptible to changes in the supply-demand balance or to an influx of speculative trading capital. Nickel prices soared rapidly in response to the sharp rise in demand from China and an influx of trading capital, but retreated after the London Metal Exchange (LME) imposed restrictions on speculation in June 2007. Although nickel prices have since fallen sharply to levels less than half of the peak, prices are still high relative to those recorded in 2003 prior to the surge. The residual pricing differential reflects the impact of rising demand for the metal from emerging markets.

While the gold production output of major producing nations such as South Africa, the United States and Peru has been declining, annual output in China has been on the increase. Replacing South Africa, China assumed the mantle of top global producer in 2007. Production in South Africa has halved over the past ten years, reflecting the depletion of productive veins and problems with retaining technical personnel and mine laborers. Although major gold mining companies based in North America and South Africa have actively entered into mergers, acquisitions and strategic alliances, production output has failed to generate any significant growth. On the demand side, countries such as China and India now account for around 30% of total global demand for gold used in fabrication, mainly in jewelry and electronics-related applications.

The cross-cultural value of gold means that price formation in this market is not governed purely by supply and demand. The price of gold has traditionally also reflected other factors such as global geopolitical or financial conditions. The metal is often regarded as a store of value in times of trouble, meaning that its price tends to rise during periods of political or financial uncertainty. Gold is also seen as an inflation hedge: any uncertainty concerning inflation due to factors such as high oil prices tends to support the price of gold.

Funds have flowed into the gold market following the depreciation of the U.S. dollar and the economic volatility sparked by the subprime loan crisis. The price of gold has also exhibited a robust upward trend as gold producers have curtailed their earlier hedging practice of forward-selling projected output in the commodity futures markets.
Overview of Semiconductor and Advanced Materials Markets

**Semiconductors:**
Demand growth driven by digital appliances and the automotive sector

The global semiconductor market has expanded consistently to date and is forecast to continue growing over the medium and long term.

Emerging trends include ongoing growth in demand for mobile phones and other types of electronic equipment in developing countries and the projected replacement demand within developed markets for laptop PCs and 3G mobile handsets with advanced functionality. At the same time, the automotive sector is also expected to generate significant demand growth. Vehicles are rapidly incorporating more electronic components in the form of engine controls and various types of sensors. The proportion of semiconductor demand derived from automotive applications is set to rise above 20% within the near future.

Global demand for flat-screen televisions is rising quickly. Falling sales prices for these products are promoting consumer uptake in emerging markets such as China. Another major demand driver is an ongoing shift in Japan and other developed country markets toward full high-definition models.

In recent years, companies in South Korea and Taiwan have emerged as a force in LCD panel materials, which traditionally has been an area of specialty for Japanese producers. For example, Taiwanese firms with manufacturing bases in coastal China now account for 40% of global output in LCD driver ICs. This makes Taiwan one of the leading producer markets within this sector. The market is projected to continue growing amid broader competition between companies in terms of both technology and price.

Technical progress is accelerating the evolution of rechargeable secondary batteries, and the market for these products has expanded as the range of applications has broadened. Secondary lithium-ion batteries combining high power output with low weight and superior cost performance power many of the latest PCs and mobile handsets.

Automotive applications for rechargeable secondary batteries are expected to increase in the future with the growing adoption of the hybrid electric vehicle (HEV). Currently the United States is the largest market for such HEVs, but the global market for such vehicles is expected to grow rapidly going forward as more models are launched.

Most of the batteries that power the current lineup of HEVs are of the nickel metal hydride variety. However, attention is also focusing on development of lithium-ion batteries for automotive applications owing to the potential benefits in terms of higher performance, reduced weight and lower replacement cost. The competition between various manufacturers to develop rechargeable secondary batteries for automotive use has intensified amid rising oil prices and mounting environmental concerns. Expectations have risen that this will lead to the emergence of new materials and technologies.

**Overview of Semiconductor and Advanced Materials Markets**

**Semiconductors:**
Demand growth driven by digital appliances and the automotive sector

**LCDs:** Taiwan emerging as a key market amid rising demand

**Battery materials:** Prospects broaden for next-generation batteries as development accelerates
Semiconductor monthly shipment value (actual)

Large-area TFT-LCD panel demand (estimation)

Hybrid car production (forecast)
Overview of longer-term business strategy and FY2007–9 Medium-term Business Plan

-Strategic objectives: become a major player in the non-ferrous metal industry (Mineral Resources and Metals); secure leading global market shares for our key products (Semiconductor and Advanced Materials)

The FY2007–9 Medium-term Business Plan marks the second stage of our longer-term business strategy. Fiscal 2008 is the second year of this plan.

The longer-term business strategy is to focus on our two core businesses in the mineral resources and metals and semiconductor and advanced materials sectors. The basic strategic objectives for the SMM Group are to become a major within the non-ferrous metals industry in the mineral resources and metals sector, and to secure leading global market shares for our products in the semiconductor and advanced materials sector.

To develop and grow these core businesses, in the mineral resources and metals sector we are focusing on raising production output by boosting the scale of production at the mines around the world in which the SMM Group owns equity interests, while at the same time expanding smelting capacity. In the semiconductor and advanced materials sector, we are focusing our efforts on developing new products and on expanding our sales beyond the domestic market in Taiwan and China.

Other areas of focus include reinforcing the management infrastructure by strengthening occupational health and safety, environmental preservation and compliance programs so that we can uphold the SMM Group Corporate Philosophy; expanding and upgrading programs to retain and develop human resources; making further progress with the SMM Group’s financial strategy; and improving corporate governance and CSR activities.

Through such initiatives aimed at further strengthening our management capabilities and general business vitality — and by trying to raise the bar in each of these areas -- we aim to build enterprise value.
Toyo Smelter & Refinery: Establish 450ktpa set-up for copper

We are on track to build a 450ktpa set-up for electrolytic copper at the Toyo Smelter & Refinery by fiscal 2009. With a capacity of 450ktpa, the electrolytic copper production line is one of the single largest such facilities in the world.

- Production output:
  - FY2004: 268kt
  - FY2005: 327kt
  - FY2006: 366kt
  - FY2007: 407kt

Copper: Secure supply of smelting ores (proprietary ore ratio of 40%)

We have sought to secure supplies of copper smelting ores while at the same time expanding our smelting capacity. As part of this strategy, we invested in an equity stake in a sulfide ore development project at the Cerro Verde Copper Mine. The commencement of operations at this project in November 2006 has helped to boost our proprietary ore ratio for copper to 40%.

- Off-take rights for half of the copper concentrates produced at Cerro Verde (equivalent to 90ktpa of copper) for an initial ten-year period
- Active investment in exploration activities to boost the ratio to two-thirds

Nickel: Create building blocks for 100ktpa set-up

This is the major theme of the FY2007–9 Plan. We are putting in place the building blocks needed to achieve a 100ktpa level of output for nickel by fiscal 2013. By further honing advanced refining technologies such as HPAL*3 and MCLE, which have drawn critical approval worldwide, we aim to expand production by securing a stable supply of raw materials.

- CBNC: second-phase plant operational by April 2009 (22ktpa)
- Expansion of electrolytic nickel production capacity in Japan by FY2012 (from 30ktpa to 65ktpa)
- Goro Nickel Project: operational by end of 2008 (60ktpa)
- Taganito Nickel Project: provisionally operational by FY2012 (30ktpa)

Pogo Gold Mine: Ongoing production ramp-up to 12tpa

Located in Alaska in the US, Pogo is a gold mine in which the SMM Group has a majority interest. It was developed following a successful in-house prospecting project. Production began in February 2006, around 11 years after the initial discovery of gold seams.

- Ongoing ramp-up in operating capacity toward 12tpa target for 2009

Accelerate product development

Establish four core development themes (including development of more advanced materials)

- Battery materials (such as LNO*12)
- Single-crystal materials (such as sapphire substrates)
- Thin-film materials*4 (such as materials for sputtering targets*9)
- Thin-film chip packaging materials (including CCPF and IC substrates)
Progress Status of Major Projects

Copper

Realizing 450ktpa production set-up by steadily raising the ratio of ores purchased in-house

Under the FY2007-8 Plan, we are focused on securing smelting ores and bolstering the earnings base through the stable operation of overseas mines such as Cerro Verde in Peru. We are also undertaking an aggressive exploration program with the aim of developing copper mines in which the SMM Group has a controlling stake. Our aim is to raise the proportionate ore ratio for copper from 40% at present to around two-thirds in the future. Production output from the Toyo facility has increased steadily in line with internal projections.

Nickel

Expansion of operating capacity and exploration activities with the aim of establishing a 100ktpa production set-up

At Philippine-based CBINC, where the first phase plant is already operating, production at a second phase plant is due to commence around April 2009. This will enable use to secure 22ktpa of raw materials. As a follow-on project, we are also pushing forward with the Taganito Project to supply raw materials using HPAL technology. Alongside these two projects, we are also upgrading nickel refining capacity at our facilities in Japan with the ultimate aim of expanding electrolytic nickel output to 85ktpa by 2013. Moreover, in New Caledonia, we are jointly developing the Goro Nickel Mine in partnership with Vale Inco. Production is due to commence in late 2008. By 2013, we thus intend to raise overall nickel production capacity to 100ktpa, from the current level of 55ktpa.

Another key exploration project to secure nickel resources to increase output beyond the 100ktpa mark is currently progressing in the Solomon Islands.

Gold

Close to full operating capacity at majority-interest Pogo Gold Mine

The Pogo Gold Mine is important in that it is the SMM Group’s first overseas mine in which we own a majority interest. Located in Alaska, USA, the Pogo mine began production in 2006. After some initial teething troubles, output reached 80% of full design capacity in fiscal 2007. During fiscal 2008, our priority is to increase production up to the 11tpa level ahead of a further rise to 12tpa (full capacity) in fiscal 2009.

Semiconductor & Advanced Materials

Cultivating inherent strengths and promoting new product development through organizational restructuring

In this sector, we have established four core development themes (including the development of more advanced materials).

- Core development themes include battery materials (such as LNO*12), single-crystal materials (such as sapphire substrates), thin-film materials*9 (such as materials for sputtering targets*9) and thin-film chip packaging materials (such as CCPF and IC substrates). Based on these various themes, we are aiming to re-cultivate the strengths of the SMM Group in materials technologies while also reinforcing new product development. An organizational restructuring to achieve these aims has been underway since October 2008.

- We have also upgraded our production capacity both in Japan and overseas in response to rising global demand for LCD panel materials. Taiwan-based producers in particular have been grabbing market share for LCD driver ICs*5, and have now around 40% of the world market for these products. With a view to capitalizing on this trend, in 2008 we commenced production of COF*6 substrates used in LCD driver applications at a new plant in Taiwan. In lead frames*7 we are aiming to maintain and build on our leading share of the global market by increasing operating capacity at our production facility in Suzhou (Jiangsu Province, China).

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