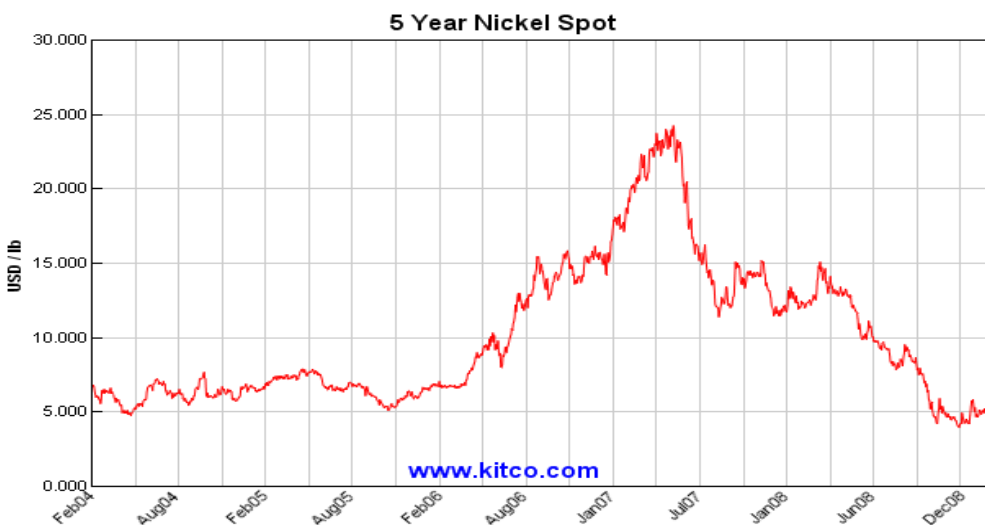


## THE NICKEL MARKET

### I. Historical Prices



Source: Kitco Base Metals

Like other commodities, nickel prices are volatile in nature, very much influenced by supply/demand conditions and, to some degree, speculation. In the 1990s, nickel supply was boosted by the flow of nickel exports from the former Soviet bloc, as the Soviet Union collapsed. Faced with oversupply or low demand, nickel producers sought to improve profit margins by increasing productivity through technical innovation, logistics and work reforms.

However, one important component of nickel production is the cost of energy, which accounts for 20%-25% of the total cost and is beyond the producers' control. In the period of low energy prices from the late 1970s to the early 2000s, producers actively developed nickel laterites, an oxide form rather than a sulphide, which are naturally abundant and requires more energy to produce. On the demand side, demand for nickel was negatively impacted by the 1982 economic recession, the 1997 Asian crisis, and the 2001 economic recession. As a result of the above factors, nickel prices were depressed at or below the US\$5/lb level for a long period prior to 2003.

From 2003 to mid-2007, nickel prices skyrocketed to a record level of almost US\$25/lb. This phenomenon reflected the following:

- (1) Slow growth of nickel supply, as nickel inventories fell sharply. The London Metal Exchange (LME) nickel stock fell from 36,000 tonnes at January 2006 to below 10,000 tonnes by August 2006 and remained at this level until July 2007. The nickel production shortfall in 2005 was approximately 70,000 tonnes and over 40,000 tonnes in 2006 (source: Norilsk Nickel);
- (2) Massive growth in Chinese consumption of nickel, as production of stainless steel increased significantly (stainless steel and alloys accounts for 87% of nickel consumption). In this period, the world's economy also witnessed strong demand growth for stainless steel from North America, Europe and Japan; and



- (3) The role of hedge funds and large institutional traders, as these institutions played a significant role in triggering a short squeeze on the futures markets. According to David Humphries, Chief Economist for MMC Norilsk Nickel, the spike in nickel prices was also caused by institutional traders who were caught with open bets on lower prices and then were forced to cover by purchasing the metal.

Starting in mid-2007, nickel prices began a sharp decline from US\$25/lb to the US\$10/lb level by mid-2008 and, currently, to US\$4.35/lb in mid-February 2009. This downward trend reflects rising nickel production, largely from Canada, Australia, and New Caledonia. Also, as a result of high nickel prices, stainless steel production fell by 17% in Q3/2007 (Deutsche Bank), which lowered demand for nickel. The nickel stock at the LME started moving up, reaching 50,000 tonnes by April 2008. Stainless steel producers, including China, Japan, and South Korea, started making investments in new technologies. Some steel producers used nickel free stainless steel, known as the 400 series, further driving down demand for nickel.

## II. Supply/Demand

Strong world economic growth from 2003 to 2007 increased demand for stainless steel production which, in turn, encouraged nickel production and capital investment in new nickel production capacity. In 2007, the world's primary nickel production was 24% higher than in 2002. Substantial capital expenditures were committed in Russia, China, Norway, Australia and New Caledonia.

### 1. Production by Country (Supply)

Mine Nickel Production by Country								
(Tonnes)	2002	2003	2004	2005	2006	2007	2007%	CAGR
Russia	310,000	330,000	315,000	315,000	320,000	322,000	19%	0.8%
Canada	178,338	180,000	187,000	196,000	233,000	258,000	16%	7.7%
Australia	122,000	120,000	133,000	140,000	140,000	180,000	11%	8.1%
Indonesia	211,000	220,000	178,000	210,000	140,000	145,000	9%	-7.2%
New Caledonia	99,650	120,000	118,000	122,000	103,000	119,000	7%	3.6%
Colombia	58,196	65,000	75,000	72,500	94,100	99,500	6%	11.3%
China	54,500	56,000	64,000	71,000	82,100	80,000	5%	8.0%
Brazil	45,029	46,000	45,200	46,000	82,500	75,300	5%	10.8%
Rest of the World	261,287	263,000	284,800	327,500	340,300	381,200	23%	7.8%
	1,340,000	1,400,000	1,400,000	1,500,000	1,580,000	1,660,000	100%	4.4%

Source: USGS (US Geological Survey)

CAGR = compound annual growth rate

World's Top 5 Producers	Location	Market Share (%) (estimate)
Norilsk Nickel	Russia	18%
Companhia Vale do Rio Does (CVRD)	Canada, UK, Japan, Indonesia	17%
BHP Billiton	Australia, Colombia	11%
Xstrata	Canada, Dominican Republic	9%
Jinchuan	China	8%
Rest of World		37%
Total		100%

(Source: CRU Group)

Nickel production from Russia remains relatively stable at the low 300,000-tonne level. However, Russia remains the largest nickel supply country, accounting for 19% of global 2007 production. Production from Canada increased by 45% to 258,000 tonnes between 2002 and 2007, with a CAGR of 7.7%. This made Canada the second-largest producing country (fourth-largest in 2002) in the world.



According to the CRU (an independent consultant group focused on mining and metals), supply over the next few years should keep up with demand growth.

Existing nickel projects should provide an increase in production capacity by approximately 370,000 tonnes per year (tpy) by 2012, net of replacement. This reflects increases in the number of current laterite projects in primarily Australia, Indonesia and New Caledonia.

## 2. Consumption (Demand)

### (a) Demand by Type

Stainless Steel	65%
Other Alloys	22%
Electroplating	8%
Chemicals	5%
<b>Totals</b>	<b>100%</b>

### (b) Demand by Region

(Thousands of Tonnes)	2005	2006	2007	2008	2009	2010	CAGR
<b>China</b>	195	249	311	380	422	486	20.0%
% of global demand	15.4%	19.4%	21.8%	24.2%	25.5%	27.2%	
<b>USA</b>	135	142	151	153	154	155	2.8%
% of global demand	10.7%	11.0%	10.6%	9.7%	9.3%	8.7%	
<b>European Region</b>	410	349	433	455	472	498	4.0%
% of global demand	32.4%	27.1%	30.3%	29.0%	28.5%	27.9%	
<b>Rest of World</b>	524	546	534	583	610	647	4.3%
% of global demand	41.5%	42.5%	37.4%	37.1%	36.8%	36.2%	
<b>Total</b>	1,264	1,286	1,429	1,571	1,658	1,786	7.2%
Demand Growth (YOY)		1.74%	11.12%	9.94%	5.54%	7.72%	
Source: Deutsche Bank AG/London			YOY = year over year				

Stainless steel and alloys are the main sources of nickel consumption. The demand for stainless steel has increased significantly over the past decade, due to rapid industrialization in countries such as China, Russia and India. China is responsible for the highest increase in nickel consumption, with a CAGR of 50% in the 2002-2006 period. Since 2002, the world's demand for nickel has grown at the rate of 10% per year (The Economics of Nickel, 11<sup>th</sup> Edition 2006, reported by Roskill Information Services).

China is expected to remain a leader in demand growth with an annual growth rate of 20% over the 2005-2010 period: an additional 175,000 tonnes will be required in 2010 over 2007 consumption.

Deutsche Bank forecasts an increase in global nickel demand by an average of 7.7% per annum for the next three years, with an additional amount of 293,000 tonnes being required in 2010. The CRU forecasts additional consumption of 355,000 tonnes by 2011.



### III. Outlook

#### Demand and Supply Outlook

(Thousands of Tonnes)

	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008E</u>	<u>2009E</u>	<u>2010E</u>	<u>CAGR</u>
World Refined Demand	1264	1286	1429	1571	1658	1786	7.2%
World Refined Supply	<u>1288</u>	<u>1361</u>	<u>1463</u>	<u>1542</u>	<u>1674</u>	<u>1809</u>	7.0%
Supply Overage/(Shortfall)	24	75	34	(29)	16	23	

CAGR: Compound Annual Growth Rate; E: Estimate

Source: Deutsche Bank AG/Brook Hunt

Having assessed global nickel supply/demand conditions, and having taken into account existing nickel projects that are highly likely to be in operation over the next five years, we predict the following trends in the nickel market:

- China will continue as a major source of consumption; however, countries such as India, Russia and Brazil should add to demand growth, reflecting increasing demand for stainless steel and alloys in these countries.
- China and other major industrialized countries will continue to look for alternatives such as non-nickel stainless steels.
- Nickel production from laterite ores will continue to increase. However, costs will increase should there be a return to higher energy prices. This would close the gap in production costs between laterite and sulphide.
- Supply should keep pace with demand growth over the next five years, assuming all major nickel projects to be completed and brought into preproduction as expected (the Koniambo project in New Caledonia is expected to be in production in 2010 with total production of 35 thousand tonnes, increasing to 100 thousand tonnes per year in 2011).
- However, any disruption in major nickel producing mines or delays in current nickel projects could create a short-term situation where demand would outpace supply. Should this happen, we may see the nickel price rise sharply, as traders and speculators in commodities have become major players in influencing short-term prices.
- There continues to be price pressure on nickel. It reached a low of US\$4.00/lb in December 2008 and currently is US\$4.35/lb. These low prices reflect the deteriorating global economic situation. We expect these low prices will prevail until global economics stabilize and recovery begins.
- The long-term nickel price should reflect supply/demand conditions, as well as costs of nickel production. As a result, we believe an average of US\$10/lb-US\$15/lb is a more likely range over the next five years.

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