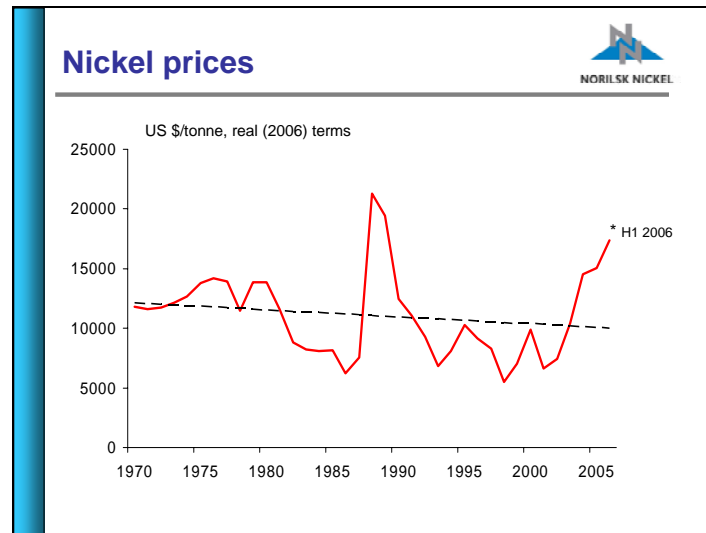


# Nickel: An Industry in Transition<sup>1</sup>

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## ***Introduction***

Over many years, consumers of nickel got used to the idea that nickel prices, while naturally cyclical, generally trended downwards in constant dollar terms. The metal was relatively abundant and competition amongst suppliers acute. Nickel producers, by the same token, got used to the idea that a strong focus on productivity would enable them not just to offset the effects of resource depletion but to reduce their costs of production as well.



Since 2003, this logic has shown signs of breaking down. Prices have not only risen higher but they have stayed higher, making this the longest cyclical upswing in the post-World War II era. This has inevitably posed challenges for nickel consumers. While there have been obvious and significant benefits for the shareholders of nickel companies, high prices have brought longer term worries for producers too. The success of any business depends on having a product that is available and competitively priced if it is to avoid the threat of customers searching for substitutes.

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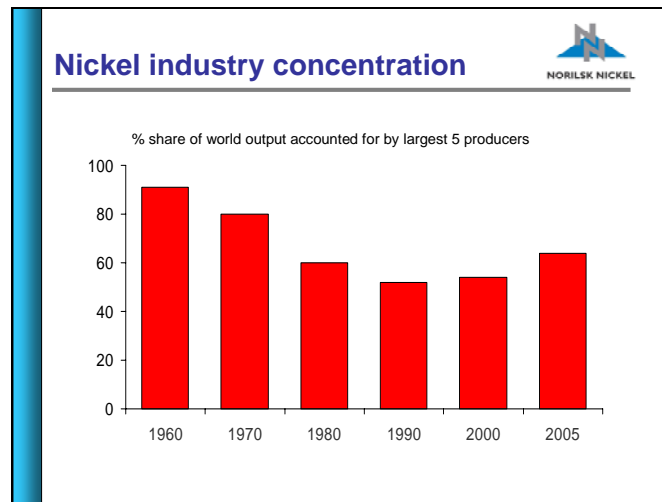
<sup>1</sup> Paper for presentation to CRU's 9<sup>th</sup> World Stainless Steel Conference, Dusseldorf, 17-19<sup>th</sup> September 2006.

This presentation argues that the period of declining prices was the product of a specific - and essentially non-repeatable - set of conditions which are coming to an end, and that the recent strong run of prices should be thought of less as a regular cycle than a symptom of an industry undergoing a transition. It then goes on to look at what might be some of the characteristics of the nickel industry post the transition.

### ***Oversupply and cost attrition***

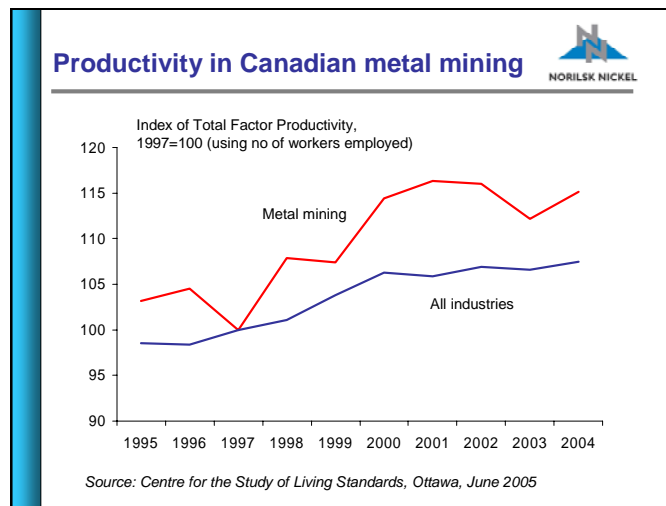
The 1970s are most commonly remembered in the metals industry for the depressing effect which the two oil shocks of those years had on global economic activity and on metals demand. Growth in the demand for nickel, which up to that point had been rattling along for decades at a healthy 6% a year, slumped dramatically.

However, the nickel industry was facing an equally substantial challenge on the supply front. An industry dominated by relatively few players operating a stable system of producer prices was beginning to fragment. With the entry into the market of new producers in Australia, the Philippines, Indonesia, South Africa and Botswana, the proportion of global supply accounted for by the largest five producers dropped from 80% to 60%. It continued to drop in the 1980s.

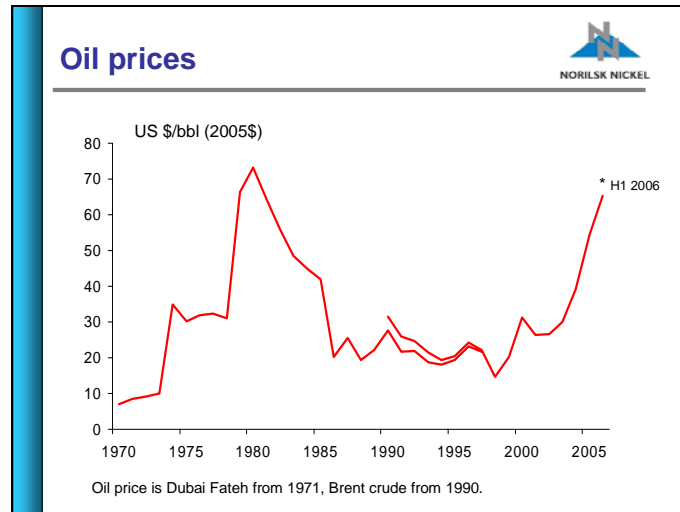


The combination of new producers trying to force their way into the market and existing producers fighting to retain market share, led to the breakdown of the producer pricing system. Free market pricing began to grow at the margins of the market and in 1979 the London Metal Exchange launched a contract for nickel. Although initially shunned by some western producers, the LME began to acquire liquidity as a result of flows of metal from the Soviet bloc and from active use by the metals trade. With the collapse of the Soviet Union during the early 1990s, the flow of metal from the former Soviet bloc became a flood, aggravating still further nickel's problems of oversupply.

Confronting a predicament of persistent oversupply and consequent pressure on prices, nickel was proving, even by the relatively low standards of the mining and metals industries, an extremely unprofitable business to be in. In an attempt to grow their margins, producers engaged in round after round of cost cutting. No part of the business remained unscathed. Cost reductions came from process improvement and technical innovation; from extracting price cuts from suppliers; from developments in logistics; from workplace reforms and from the application of information technologies. Capital efficiency - 'making the assets sweat' - became a byword in the industry. As prices fell in the late 1990s, so productivity in the mining industry pushed higher, as illustrated below with reference to Canada, one of the world's largest producers of nickel. However, successful as these efforts were, all too often they seemed simply to underwrite a further fall in prices instead of boosting margins. Certainly, they provided little incentive for companies to invest or to grow.



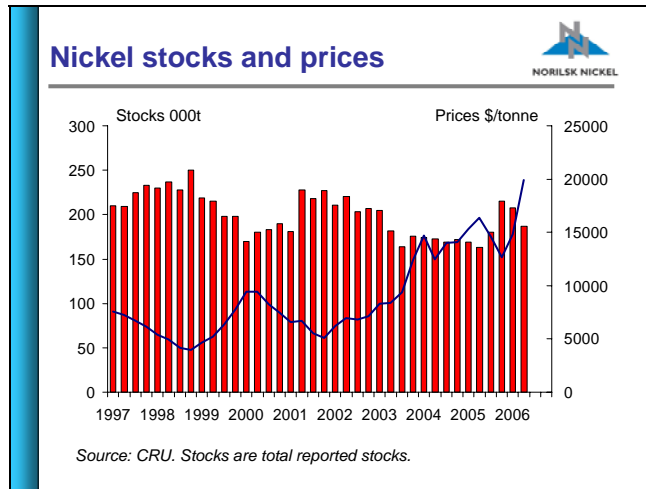
A key part in the process of cost reduction was played by energy. Metal production is an energy-intensive activity, on average accounting for 20-25% of the production costs of nickel. During the thirty years following the 1970s oil shocks, energy prices globally trended downwards, thereby helping to reduce the direct energy cost of mining and metallurgical production. No less important, it also had the indirect effect of encouraging the substitution of labour by capital in mining and metal production, thereby boosting labour productivity and facilitating the exploitation of economies of scale through the use of bigger, more efficient, machinery.



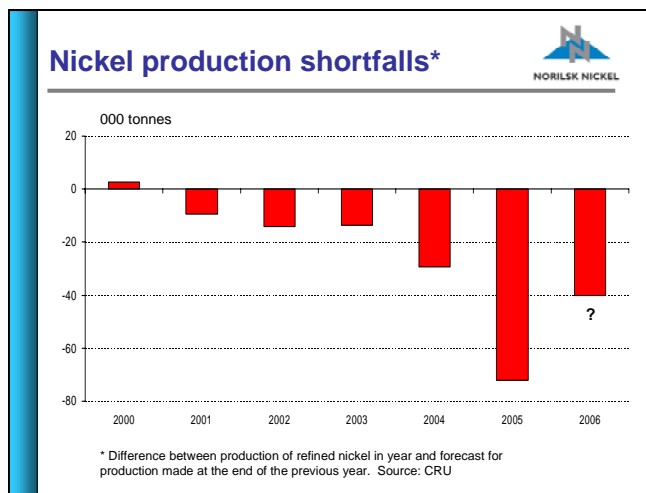
A third effect of lower energy prices was to boost the prospects for the development of nickel laterites, ore types in which nickel occurs in oxide form rather than as a sulphide. Although they are more abundant in nature than nickel sulphides, the growth of production from nickel laterites has historically been constrained by their higher energy requirements. By the end of the 1990s, the combined effects of lower energy prices (oil touched \$10/bbl at the end of 1998) and developments in processes for the recovery of nickel from oxides - notably, high pressure acid leach, or PAL - the future looked set fair for nickel laterite production. With the prospects of healthy cash flows from by-product cobalt, talk was of nickel produced at a cash breakeven cost of under \$1/lb. The promise of PAL appeared to open up large tracts of new ground to potential nickel development and production, these typically in tropical zones where most nickel-rich laterites are found. In addition to triggering a wave of exploration activity for nickel laterites, the developments also seemed to offer the prospect of a continuation of the trend of declining prices into the future.

### ***Catharsis and transition***

Events since 2001 have changed everything. Emerging from the depths of the technology market bust, an economic recession, chronically low prices and another period of acute financial pressure, the nickel industry was surprised by, and unprepared for, the subsequent sustained upsurge in demand. Adding to the burgeoning demand for nickel to feed China's growing production of stainless steel came a boost to demand from a strong and synchronised cyclical upswing in the main industrial economies of North America, Europe and Japan. Stocks of nickel started falling in 2002 and by 2005 were at critical levels.



Little in their recent history had prepared nickel-producing companies for this outcome and the industry had little capacity to respond. The mind set was still defensive - effectively a bunker mentality - more attuned to the idea of cost cutting and optimisation than development and expansion. Higher prices were viewed first and foremost as an opportunity to rebuild balance sheets rather than a signal to invest. In addition, the earlier emphasis on productivity and capital efficiency had left little scope to squeeze out further tonnage. Indeed, operating at the limit of their capacity meant that the attempt to push production further risked pushing it to the point of breakdown. At the same time, workforces, habituated to years of wage restraint, sensed a once-in-a-generation opportunity to do some catching up, adding to management's operational challenges. Combined with the usual problems associated with the start-up of new capacity, production fell substantially short of plan. In 2005, this shortfall is estimated by CRU to have reached 70,000 tonnes. But for this, the market would have had a much larger surplus than the 20,000 tonnes actually recorded. And, it is reasonable to suppose, prices would have been substantially lower. Production losses have continued in 2006, in the first half of the year amounting to over 20,000 tonnes.



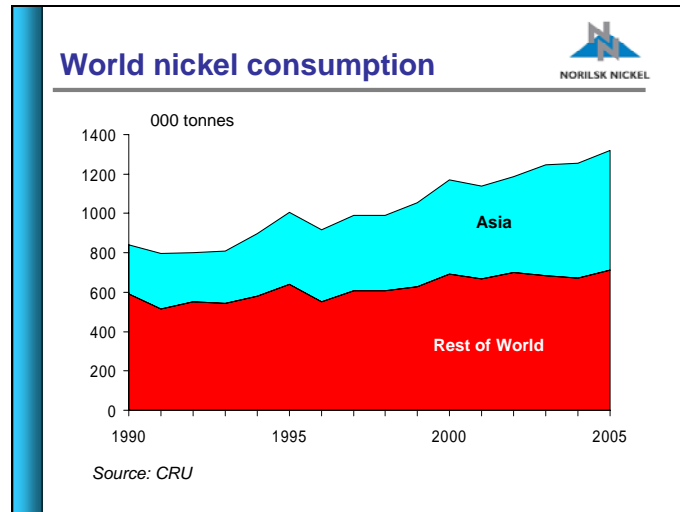
With few expansions and new projects in the pipeline, the industry response to evidence of impending shortage was slow. The world's largest producer, Norilsk Nickel in Russia, was struggling with some major financial and organisational challenges in the early part of the decade and in no position to commit to large-scale investment. In addition, the early PAL projects in Australia were encountering technological difficulties. They were not producing at design capacity and it was increasingly clear that they were not going to be producing at \$1/lb nickel. Nor was the going proving any easier for the second wave of larger PAL projects backed by industry majors, all of which were facing delays and substantial cost overruns. Meanwhile, energy prices were also now on the way up, further challenging the economics of PAL.

In a market caught between the resurgence of demand and constraints on supply, prices have done what prices do in this situation – they have risen. However, while a normal enough response to a temporary shortage of nickel, the length of time prices they have stayed up since they started to fly in 2003 and the extent to which costs have also spiralled upwards suggests there is a little more to this than the regular business cycle. Fund interest in commodities has undoubtedly given prices an extra twist but the conditions permitting them to do so are rooted in the physical market. Increasingly, it looks as if this sustained period of high prices marks the end of one distinct and discrete period in the life of the industry and the start of another.

### **Post the transition**

So what might be the key characteristics of this new phase of life in the nickel industry? What will it look like and how will it be different post the transition?

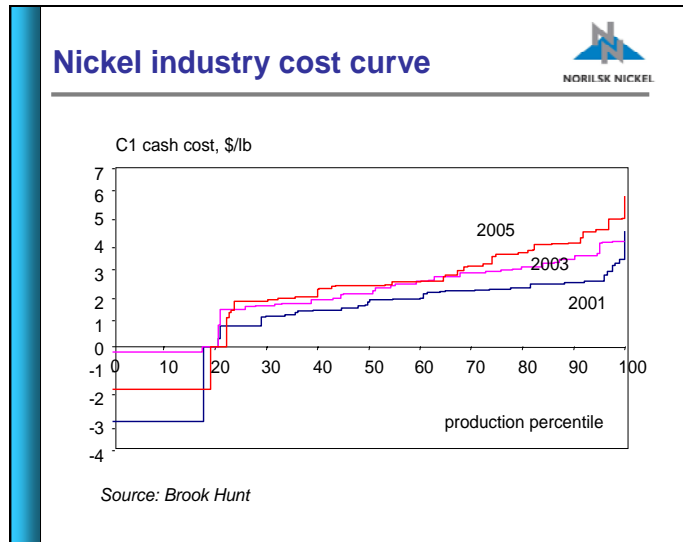
The first characteristic is that producers are likely to be confronted with a rather steeper demand growth trend than was the case through much of the 1980s and 1990s. The distribution of this growth is also likely to be a little different in as far as it will be dominated by Asia as the region continues with its industrialisation and as standards of living in the region continue to rise. However, although this is the characteristic most likely to grab the headlines - and Asian's impact on the commodities markets has been a consistent feature of press coverage and fund interest over the last year or two - it should not be got out of perspective. Part of the effect of growth in Asia will be to displace growth in nickel use elsewhere in the world and the net effect of Asia's demand growth will be no more than to add a percent or so to the underlying trend growth of nickel demand over the cycle – positive, certainly, but not in itself transformational for the industry. In the event that nickel prices remain as high as they have been recently, there could be damage to demand growth from the effects of substitution.



The second is that meeting demand will be more costly than in the past. The nickel-producing industry is facing some new economic realities. This has several aspects. The first has already been alluded to. This is the higher cost of producing nickel as a result of higher energy prices. The second relates to the fact that the limited availability of large, low cost, sulphide deposits means that an increasing proportion of future production is going to have to come from laterite deposits. Aside from being a more energy-intensive process, production from new laterite operations also poses technological challenges which have yet to be satisfactorily overcome on a commercial scale.

Equally importantly, nickel laterite projects tend to be more capital intensive per unit of production capacity than do sulphide projects. This not only increases the all-up cost of entry into nickel production but higher capital intensity implies a higher ratio of fixed to variable costs in production and correspondingly greater commercial risk. Also having a bearing on project cost and project financing is the geologically-determined fact that most laterite deposits are in tropical, developing, countries with significant infrastructure requirements and a more challenging project risk profile. Aggravating this problem in recent years has been growing evidence of a resurgence of resource nationalism.

In short, it seems most improbable that producers will be able to drive down their costs of production in the future as they have been able to in the past 20-30 years. In non-economic terms, the industry can be said to be confronting the reality of resource depletion. In economic terms, what we are looking at here seems to be both a lifting and steepening of the industry cost curve. A comparison of industry cost curves between 2001 and 2005 does provide some support for the idea of lifting and steepening. Although, admittedly, these are short run cost curves and, as such, heavily influenced by cyclical factors, their upwards shift is probably indicative of what is happening to the long run cost curve also.



The depleting nickel resource base and the consequent increased technical and financial challenges of entering the business and operating in it leads logically to the third characteristic of the new industry which is its changing corporate structure. After years of fragmentation, the nickel industry is consolidating. The list of corporate activity in nickel is long and, interestingly, seemingly longer than for other parts of the mining industry. A proximate cause of this is that nickel is perceived as a good business to be in and that M&A is a quicker (and, some think, cheaper) way to get into the business than to find and develop new resources. But, in any event, the reality is that when the dust settles on this phase of activity, a higher proportion of nickel is going to be controlled by large diversified players.

In principle, larger, more diversified companies are better placed to ensure the future development of the industry than smaller, single commodity players. They are more likely to have the balance sheets to support financially the large-scale projects that will be required and to invest countercyclically. Their greater technological and managerial depth means that they should be better able to manage the inevitable challenges of bringing big projects to fruition. And their greater geographic and commodity diversification means that they should be better able to manage the geopolitical and price risks which large projects for a volatile metal in developing countries implies. It is not so much that there is a physical shortage of nickel in the world but there is, or has been, a shortage of companies with the practical and financial muscle to turn the available resources into mines and smelters given the rising costs of developing these resources and their attendant technological and commercial challenges.

Paradoxically, it could be that an additional challenge to nickel producers in future is posed by China. Although undoubtedly a positive influence on global demand, there are risks in the fact that China has become effectively the only growth market focus for stainless steel production. There is also a challenge in the fact that China is becoming a feature on the supply side of the industry and a potential competitor for nickel-producing



companies as it scours the world for resources to feed its metallurgical plants and its manufacturing industries.

Up to now, the focus of China has been largely on seeking to tie up raw materials from non-integrated mining companies (in Australia, Spain and the Philippines) to feed domestic refineries but there are several initiatives by Chinese companies and state organisations to invest directly in offshore mining and metallurgical developments in, for example, Papua New Guinea, the Philippines, Cuba and Myanmar. That these initiatives are driven by consideration of security of supply rather than strict commercial logic makes this a potential competitive threat to companies trying to make a living as miners.

### *Concluding comment*

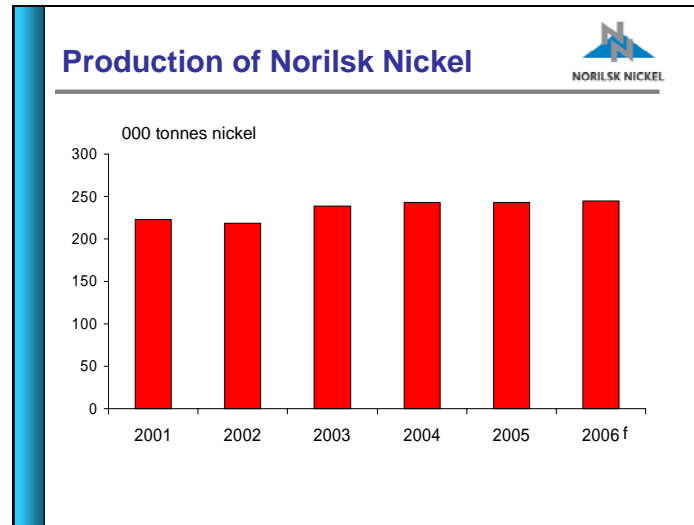
So what does this transition in the industry mean for the future availability and price of nickel?

The high nickel prices that the market has experienced since 2003 are triggering a supply response, as they always do. Eventually markets work – but it takes time. The response may not have been as fast as some consumers would have liked but the problems that the industry is facing were built up over a generation and cannot be resolved quickly. Given the threat to demand from substitution which arises when prices of a product remain high for a long while, it is in the interest of producers to see a closer balance in the market. It is likely that a slowing in global economic growth in coming months will play a part in bringing about such a re-balancing. But while prices will fall from recent high levels, there is little prospect that they will fall back to when they were at the beginning of this decade.

There is no shortage of nickel in the world. Resources are substantial. However, these resources are of variable quality and it does not seem likely that costs of producing nickel from them can continue to decline in the same way that they did during the final quarter of the last century. The years during which prices and costs chased each other down year after year was ultimately unsustainable in so far as this process was funded by the destruction of shareholder value on a heroic scale. The industry was, in effect, competing itself to death.

The recent consolidation of the industry can be seen in part as an adjustment to the new economic realities facing the nickel industry. These realities are that capital costs for producing nickel have risen, operating costs have risen and the risks associated with building and financing new capacity have risen. All this against the background of an industry which is working a depleting asset base and in which, as in any other sustainable business, capital must be made to pay for itself. Clearly, consolidation will not produce an immediate impact on supply but it will result in an industry better able to respond to the considerable challenges of opening up new high cost and high risk resources in the future, thereby ensuring a competitive supply of nickel for users over the long term.

As regards Norilsk Nickel, the production of which goes mostly to the stainless steel sector, it is also adjusting to some new realities. Despite possessing extensive high quality reserves of nickel – arguably the best in the world – as well as access to low cost energy resources, the turbulent economic and political conditions of Russia over many years meant that these assets were significantly underinvested. This notwithstanding, output from the operations of Norilsk Nickel has been remarkably stable since 2001, a testament to the skills of management in an industry where many producers have struggled to perform.



The obstacles that prevented the company from investing in the past have been largely removed. In July this year, the company finally achieved full ownership of its electrical power resources in the Norilsk region, permitting the more efficient use of these resources and ensuring security of supply for the long term. The company is also building its own fleet of state-of-the-art ice-breaker carriers to give it control over its sea transport links to Norilsk. The first ship was delivered in April this year; four more are on order. And in June this year, the company year committed to an investment programme that will involve the spending of the better part of \$1 billion a year on developing its nickel operations in Russia over 2007-2010. While the investment plans will result in only a modest increase in production, they will serve to avert what would otherwise have been significant reduction in production resulting from declining ore grades and ensure that Norilsk Nickel can maintain its position as a large and reliable supplier to the stainless steel industry for many years to come.