INSG: Changes in nickel production capacity on the horizon

Nickel is an important input for the stainless steel industry. But what is the outlook for the supply of nickel? In its “World Directory of Nickel Production Facilities - 2014” (Directory) released in December 2014, the International Nickel Study Group (INSG) presented data on the global market for nickel, with information on current and future mines, smelters and refineries. This article gives a brief overview of recent developments based on this data.

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The INSG Directory differentiates between “Committed Developments” and “Likely Project Developments” where the first group (“committed”) comprises new production facilities as well as expansions of existing ones confirmed for completion in the next four to five years, while the second group (“likely”) refers to projects at an earlier stage of development and hence coming to fruition in a longer period of time.

In the last three years the nickel market has recorded significant surpluses mainly due to the strong increase in nickel pig iron (NPI) production in China, supported by a very significant growth of nickel mine production in Indonesia and in the Philippines. According to INSG data, global mine production for nickel has generally trended upward over the last 15 years; mine production was 1.17 million tonnes in 2000 and rose to 2.6 million tonnes in 2013, when it peaked. In that year, Indonesia and the Philippines together accounted for 44% of world nickel mine production.

Historically, the development of new nickel projects has shown a pattern that has been apparently driven by prices (Graph 1), with increases in the price having an impact on the decision to commit to new projects. Recently, nickel prices hit peaks in 1995, in 2000 in 2007 and in 2011, and we have seen several new projects starting or postponed projects resumed.

A number of new operations, launched in periods of high prices in prior nickel cycles, began to be commissioned in early 2013. However, some of them continue to struggle to reach full capacity.

Mine production

Nickel occurs in nature in combination with oxygen, sulphur, silica and other elements. There are two main types of economically workable deposits: nickel sulphides and nickel laterites. Sulphide deposits are of igneous origin and often occur together with economically recoverable amounts of copper, cobalt, gold and platinum group metals. Nickel laterites form in tropical environments from the weathering of ultra-basic rocks that originally contained very small amounts of nickel. These can occur as wet or dry deposits. Laterites typically do not contain other valuable constituents in economically recoverable amounts, other than iron.

Graph 1 – Nickel prices and new projects
Historically, sulphides were used to produce about 60% of primary nickel (Graph 2), but from 2007 laterites gained importance with the advent of NPI production in China, reaching almost 90%, mainly because of ore exports from Indonesia and the Philippines.

The latest INSG data show that "committed developments" of new projects currently under way will add an additional annual capacity of 250,700 tonnes of nickel contained in ore and concentrates, and 193,400 tonnes of intermediate products.

Part of this increase in mine production will come from capacity being opened in new regions. New nickel mines have commenced operations in countries with little or no history of nickel production, including Madagascar, Vietnam, Myanmar, Guatemala, Papua New Guinea and the United States. In addition there has been considerable expansion of production in the Southeast Asia region. After the Indonesian ban on nickel exports, the Philippines has begun to play a major role in supplying nickel ore for the production of NPI in China. In 2014, according to China Customs the export of nickel ore from the Philippines to China increased by 23 per cent compared to the previous year reaching 36 million tons in gross weight and it is likely to remain at the same level this year. At the moment, there are five new ongoing developments in the Philippines with a projected additional capacity of 85,000 tonnes of nickel in ore and 30,000 tonnes of nickel in intermediate products.

Among new mining investments it is worth mentioning the RNC’s Dumont Project in Canada, a sulphide mine with an estimated capacity of 33,000 tons capacity, which could commence production in 2017 subject to completing financing and project commissioning.

Although a large number of new sources of nickel are becoming available, it will not necessarily be easy to increase nickel mine output as there are several major constraints to greater mine output - among these are emissions, cost of...
energy, types of ore, environmental concerns and the “social license” to operate a mine.

**Primary nickel production**

In the Directory, INSG has identified new “committed developments” of 768,500 tonnes of primary nickel. Among the projects that are ramping up production, the Ambatovy joint project (Sherritt 40%, who also serves as the operator, Sumitomo 27.5%, Kores 27.5%, and SNC-Lavalin 5%) in Madagascar is forecast to reach 54,000 tonnes production (90% of total nameplate capacity) in mid-2015. In addition, the Koniamboro project (a 51:49 joint venture between SMSP and Glencore – the operator) and Goro (Vale) project in New Caledonia should both significantly increase production this year. A further 24,000 tonnes will also be added at the Posco SMSP plant in South Korea.

Up to 2005 capacity utilization had been increasing (Graph 3; note that the capacity utilization rate excludes NPI). After 2007, that rate started to decrease to a level of around 70% from 2010. Over this period the production of world primary nickel production increased, supported by NPI production in China and the ramp up of new projects worldwide. Further “likely” projects to come into production could add up to 142,900 tonnes of ore and concentrate and 79,000 tonnes of primary nickel output.

**Nickel pig iron (NPI)**

The usage of NPI has been a distinct competitive advantage for Chinese stainless steel producers compared to European and American rivals. This product offers a low cost route to supply nickel units to stainless steel production. The nickel contained in the ore is not refined into pure nickel, but remains combined with iron present in the ore to make pig iron. NPI output has grown rapidly as Chinese firms have imported laterite ore from Indonesia and the Philippines. Although the Indonesian government imposed export restrictions on untreated ore, the production of NPI continued at a high level in China as stocks of nickel laterite ore had been accumulated in anticipation to the export ban. These stocks were supplemented by increased ore imports from the Philippines, allowing Chinese producers to maintain their operations. In this context, in 2015 the stocks of ore available in China will run down. The Indonesian ban has prompted investments, mainly from Chinese companies, to build up NPI facilities in Indonesia. INSG has identified 91,000 tonnes of potential additional NPI capacity in Indonesia, although most of the projects are still at an early stage of development. Tsingshan’s new 30,000 tonnes per year RKEF plant will be the most important coming on stream in 2015; also adding to capacity will be 4 or 5 smaller blast furnace operators. However, as these projects will just be ramping up, total new production for this year in Indonesia is forecast to be not higher than 20,000 tonnes.

**Conclusion**

Nickel production is experiencing one of its periodic upticks, with facilities opening in new regions, driven in part as a response to high prices for nickel in 2007 and 2011. The startup of new production typically lags a price peak by several years. Several significant projects came on stream in 2014 and the outlook is for some additional projects to ramp up in 2015. While the new mines will boost production, at the same time older facilities will be phased out due to depletion or for other reasons. Overall, the trend is upward but nickel production is constrained by a number of factors so increases are often hard won. The future balance in the nickel market will be determined by the rate of increase in demand, especially in the main user country (China), but also by the financial and technical capabilities of nickel producing companies to bring to fruition their own expansion plans.

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**About INSG**

The International Nickel Study Group (INSG) is an autonomous intergovernmental commodity organization with headquarters in Lisbon, Portugal. INSG is the sole multi-lateral institution dedicated to issues affecting nickel production, usage and trade - membership is open to any country involved in these matters. INSG’s activities, projects and publications cover a wide range of topics, focusing on market transparency, market access and sustainable development, and its main objectives and functions are: to conduct consultations and exchanges of information on the international nickel economy; to improve statistics on nickel; to increase market transparency; to undertake studies on issues related to nickel; to consider special problems or difficulties that exist or may arise in the international nickel economy.

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