



Enter the dragon

As the Chinese manufacturing, construction and power industries continue to advance, they will underpin the demand for copper, nickel, iron ore, zinc and other commodities. **John Chadwick** and **Sally Higgins** report on joint ventures aiming to satisfy the demand

China produces most commodities, the majority of which are consumed locally by state-owned enterprises or banks. It is the world's fourth-largest producer of gold and the largest producer and consumer of coal. It has huge reserves of coal but the quality is low and very high in sulphur content.

Figures show that nonferrous metal imports decreased dramatically from 2005 to 2006. Copper, for example experienced a reduction of 36%, tin of 22.9% and zinc of 15.9%. The only exception was nickel, which saw an increase in imports of 7.6% due to the rising global demand for stainless steel and the prospect of a global nickel supply gap (*IM*, January 2007, p6). Other nonferrous metals that underwent a decline were aluminium (-15.6%), copper concentrate (-11.9%), lead (-5.6%) and alumina (-1.1%). Chinese production of nonferrous metals is growing. Some metals saw huge increases in exports, such as copper, which increased by 138.5% year-on-year from 2005 to 2006. Zinc exports rose by 93.9%, nickel by 39.9% and lead by 20.1%. Decreasing exports in nonferrous metals included copper concentrate (-97.6%), tin (-25.2%), aluminium (-7.7%) and alumina (-4.5%).

The country has about 80,000 state-owned mining projects and 200,000 collectively-owned mines – but is working to reduce the number and shut down dangerous operations. China has created a segregated mining industry system with departments for geology, production, construction, scientific research, design, equipment manufacture, management, education and training. There is a need in China for the development of existing projects as several

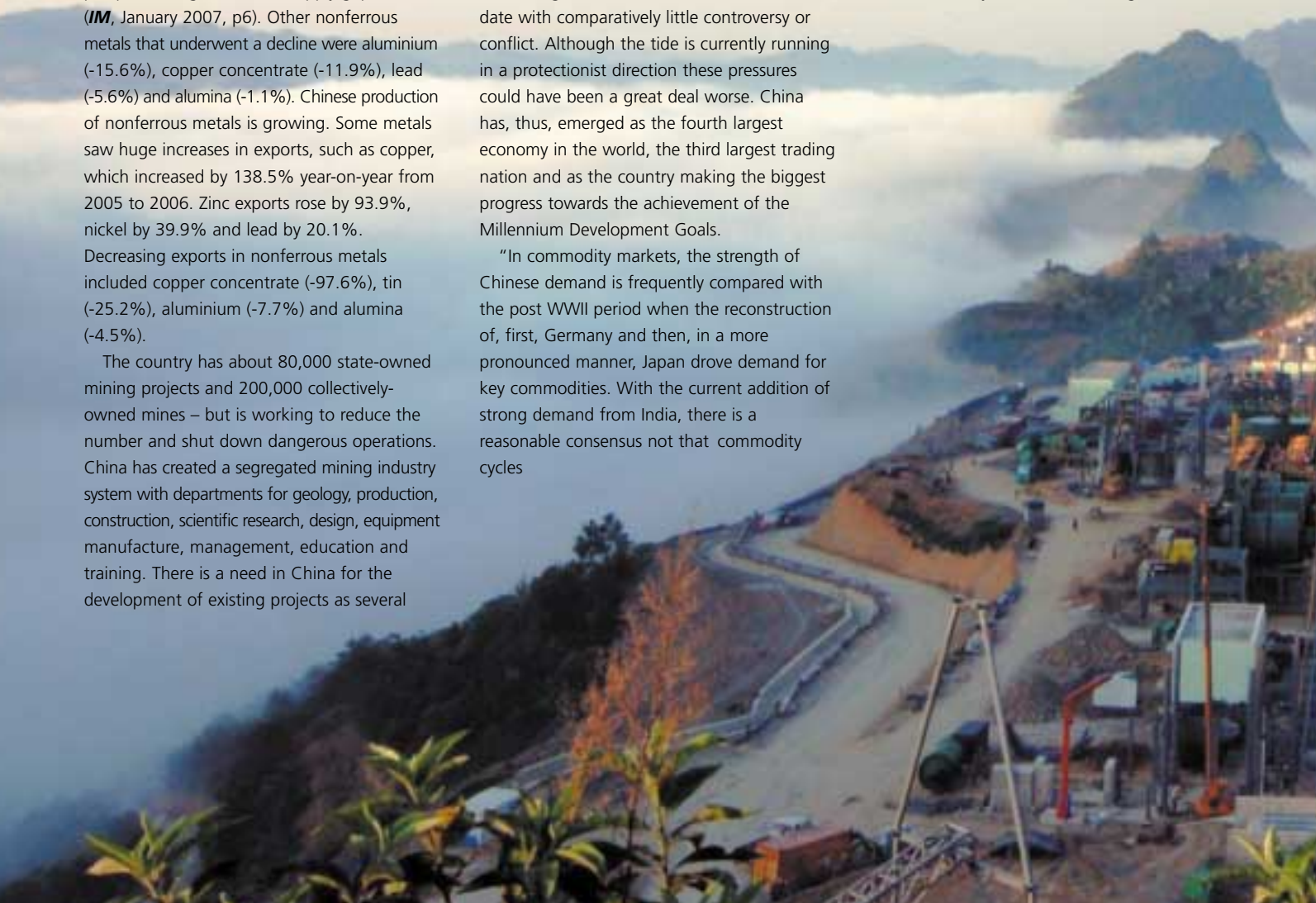
mining operations are nearing ore reserve depletion. The country actively encourages foreign investment in numerous sectors of the mining industry, making it a highly prospective country.

Sharing his views on the mining industry at the China Mining Conference, Mark Moody Stuart, Chairman of Anglo American said, "The health of the Chinese economy will be a key determinant of metals prices for the foreseeable future. The emergence of the scale of Chinese demand is a marker for perhaps the most rapid shift in the global economic balance of power ever experienced. It is heartening that such a shift has occurred to date with comparatively little controversy or conflict. Although the tide is currently running in a protectionist direction these pressures could have been a great deal worse. China has, thus, emerged as the fourth largest economy in the world, the third largest trading nation and as the country making the biggest progress towards the achievement of the Millennium Development Goals.

"In commodity markets, the strength of Chinese demand is frequently compared with the post WWII period when the reconstruction of, first, Germany and then, in a more pronounced manner, Japan drove demand for key commodities. With the current addition of strong demand from India, there is a reasonable consensus not that commodity cycles

have been abolished but that when the market falls from its current peaks, it will stabilize at a higher real terms level than in the late twentieth century. It seems that a floor has been placed under the price for many core commodities.

"China's share of demand has grown, for example, from 7% to 29% in the copper market over the last decade; from 9% to 33% in iron ore; and from 8% to 28% in aluminium. China is a critical growth market for platinum, having grown from 5% of the platinum jewellery market in 1995 to about 45% last year - with strong potential for additional growth coming from the automotive sector and, eventually, fuel cell technologies.



"Gaining secure access to supplies of natural resources has become an important driver of international economic relations over the last five years. In the West the debate is largely about energy security; in China it perhaps goes wider. Thus, China has shown itself determined to ensure that its economic fortunes are not vulnerable to an interruption in the supply of key commodities. This has helped drive China's overseas investment programme in which oil, gas and mining make up the largest single element.

"In terms of geography, whilst most Chinese investment has historically gone into Asia, over the last two years Africa has also seen a notable surge. Indeed, driven in large part by commodities, China's trade with Africa has risen fourfold since 2000. This phenomenon has been underlined by the recent Sino-African Summit. Thus, China is not only the home territory of some world-class companies like Chalco, Minmetals and Shenhua, viewed from the perspective of a Western multinational, it is the base for major emerging competitors and potential partners in third countries."

Keith Goode, Eagle Research Advisory, says "anyone that still insists that 'commodity prices have to fall', or 'China's growth has to

come to an end'.....you should ask them when was the last time you visited China?"

Putting forward a number of examples, he notes a November 2006 statement from the Transportation Director of the National Development and Reform Commission that \$38 billion was going to be invested in rail construction in 2007 as part of an almost \$190 billion investment to increase the rail network by 20% by 2010 (being the remaining time to December 2010 of China's 11th five-year plan). That \$190 billion includes \$32 billion on vehicle purchasing, \$76 billion on railway lines and \$79 billion on civil engineering. He also comments on the huge amount of construction – freeways, bridges and buildings. "If you want to see steel consumption, the Beijing Olympic venues must bring a smile to any metal producer's face."

According to Dorothy Kosich writing in *Mineweb.com* in December, the chairman of the China Gold Association has said Chinese consumption would be a record 350 t of gold in 2006, up 17% from 2005. Cheng Fumin also said gold output was likely to top 240 t in 2006. China is the world's third-largest gold consumer with gold usage exceeding 300 t in 2005, 80% of which was used for jewellery, according to the Xinhua News Agency.

At a forum on gold and other precious metals in Shanghai, Cheng said the nation's "conventional practice of operating gold mining entities will undergo major changes" between 2006 and 2010. "The state will no longer play the role of sole investor in the country's gold mining industry and the urgent task for the country's gold industry will be to diversify its operation. We hope the introduction of overseas funds, advanced technologies and management expertise can help restructure the gold sector."

Xinhua said foreign companies have invested in 277 mineral prospecting and exploration projects across China, including 166 gold projects. Kosich also reported that 60 overseas gold companies have prospected gold ore reserves equivalent to 400 t.

International unions

The activity in China today involves domestic mining, juniors from outside China, and now, increasingly, the world's major mining companies are moving in. One interesting aspect is the joint ventures being established between major mining companies and smaller firms.

Sino Gold and Gold Fields have formed a strategic alliance, combining Sino Gold's operational, development and business capabilities in China with the technical, financial and human resources of Gold Fields, the world's fourth largest gold company. The alliance creates a 50:50 jointly owned and funded group to target and explore China for new projects and will integrate Gold Fields' existing exploration assets and personnel in China into Sino Gold which will conduct all of Gold Fields' exploration activity in China. Sino Gold is developing Jinfeng mine in Guizhou Province that is expected to commence commercial gold production in the March 2007 quarter. With resources of 4 Moz and reserves of 2.9 Moz, Jinfeng will be a major, long-life operation.

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The alliance will explore primarily for porphyry, high-sulphidation epithermal or sediment-hosted disseminated orogenic style gold mineralization. These styles of mineralization are not currently the focus of Sino Gold's exploration programme in China. The exploration undertaken by the joint venture will be managed by Sino Gold and Gold Fields will manage the development and operation of any new projects resulting from it.

Sino Gold has been active in China since 1996. Its Jianchaling mine produced some 450,000 oz of gold from 1998 to 2006. The company is now developing Jinfeng mine in Guizhou Province that is expected to commence commercial gold production in the March 2007 quarter. With resources of 4 Moz and reserves of 2.9 Moz, Jinfeng will be a major, long-life operation.

Canada's Dynasty Gold and AngloGold Ashanti entered into a joint venture in February 2006 to explore Dynasty's Red Valley and Wild Horse properties in northwest China. These projects encompass over 14,000 km² of land in the provinces of Qinghai and Gansu, respectively. Both projects are located within the Qilian metallogenic belt, in areas of known gold mineralization, and are considered to be highly prospective for large mineral deposits.

AngloGold reviewed the properties and recognized the potential for the identification of significant mineral deposits at both. AngloGold's, Roric Smith, Exploration Manager-North Asia Region and Chief Representative-China commented, "We are looking forward to working together with the Dynasty team on these two exciting projects." The exploration programme for Red Valley and Wild Horse is being executed by an AngloGold/Dynasty team.

In an innovative move, Australia's Penfold Ltd invested as a minority partner in China's



The Xietongmen copper-gold deposit, located 240 km from the city of Lhasa in Tibet, is comprised of porphyry-like, disseminated and quartz stockwork mineralization lying within a 4 km long alteration zone. The northwest – southeast trending deposit is defined by 62 drillholes and extends over an area of 900 by 400 m, which averages some 200 m in thickness. The property is owned by Continental Minerals, which completed a merger with Great China Mining in December 2006.

Western Mining Co, operator of the country's largest lead and zinc mine. This was the first 'western' company investment in an operating mine in China. Western Mining Co, established in December 2000, is focussed on exploration for lead, zinc, copper and other non-ferrous metal resources. At present, the company owns four big and medium sized non-ferrous mines, six subsidiary companies, and various other corporate assets.

Western's Xitieshan Pb-Zn mine has a production capacity of over 1.5 Mt/y of lead-zinc ores and produces 160,000 t/y of metals, and is the biggest independent mine in China. Dependent on Western Mining, the Qinghai Ganhe Industrial Park was developed as one of four key industrial parks in Qinghai Province. Its three backbone industries are in metallurgy, chemical processing and building materials, with ancillary production facilities and infrastructure.

Chinese overseas

For many years, Chinese mining companies have been investing overseas. There is, for

example, an important presence in Zambia and NFC Mining has a contract in the Konkola Deep project (page 17, this issue). Also in Zambia, Albidon recently signed an Offtake Agreement with Jinchuan Group for the purchase of nickel concentrates from its Munali project, over the life of the project. Agreement was reached on the terms of an offtake financing package under which Jinchuan will provide \$20 million of subordinated debt finance to fund the development of the Munali nickel project and Jinchuan will invest \$5 million in Albidon. Albidon says its agreement with Jinchuan "establishes a relationship with the largest nickel group in the rapidly expanding Chinese market."

Munali is located some 60 km south of Zambia's capital, Lusaka.

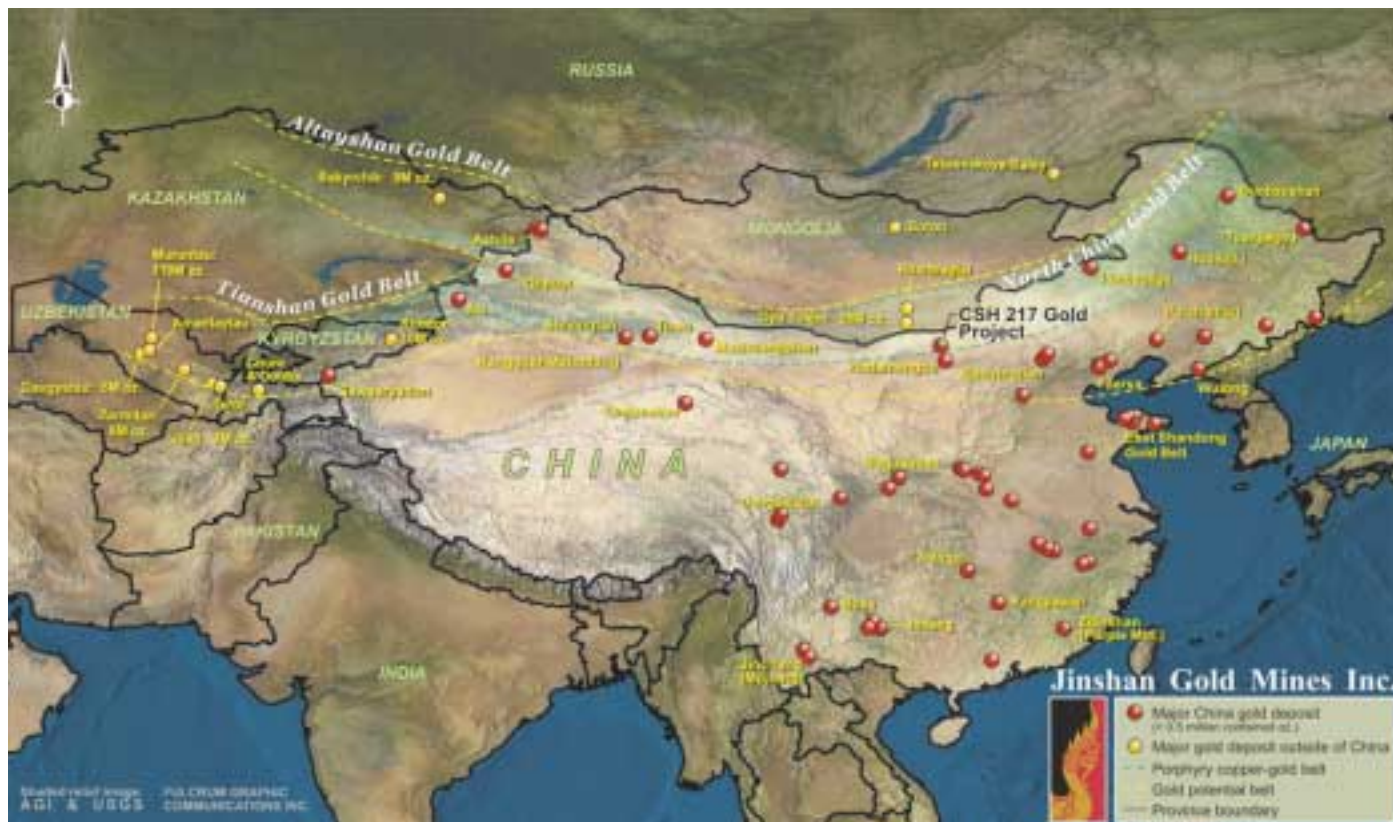
A positive BFS was completed in July 2006 and site works commenced in September.

Jinchuan's current nickel production is about 100,000 t/y, with a target to reach 150,000 t/y by the year 2010. The purchase of high quality concentrates such as those from Munali is a key part of the strategy to achieve this. Albidon and Jinchuan intend to work together on the design and construction of the Munali concentrator to optimize the grade-recovery performance for all metals.

A recent issue of *International Mining Project News* reported on Chinese moves into Zimbabwe and our fortnightly e-letter has many other examples of Chinese investment overseas, and joint ventures with 'western' operators both inside and outside China.

Another example is that of Ridge Mining, in which Zijin Mining Group has taken an approximate 20% interest. Zijin has a market capitalization of some \$5.2 billion and is one of China's leading mining groups principally engaged in the exploration, mining, production, refining and sale of gold and other mineral resources. During 2005, Zijin produced about 491,000 oz of gold of which some 369,000 oz were produced from the large open pit Zijinshan gold mine in Fujian province. It also produced 19,869 t of copper during 2005 primarily from the Ashele copper mine in Xinjiang.

The investment by Zijin in Ridge is intended to provide a platform for future collaboration and technical co-operation between the two companies for the development of future projects. Zijin's expertise in the open pit mining of large scale lower grade ore bodies is



expected to be particularly valuable in respect of Sheba's Ridge. Chen Jinghe, Chairman of Zijin commented: "The investment in Ridge Mining is an important step in our long-term

Jiangxi Copper Corp (JCC) says it owns the top five copper mines in China. It has just signed a joint venture agreement with Canada's BioteQ Environmental Technologies for a water treatment facility at JCC's Dexing mine in Jiangxi Province. Dexing copper mine, located near Dexing City, produces 120,000 t/y of copper concentrate from flotation and also operates a heap leach/SX-EW facility to produce copper cathode from low grade stockpiles.

strategic objective to increase our resources and production base overseas. It also represents a breakthrough for Zijin in the South African precious metals mining industry."

Copper Resources Corp (CRC) has signed a memorandum of understanding with Glencore and Nanjing Xixia Mountain Xin Yang Mining (Nanjing Mining) to form a joint venture to develop the Hinoba-an project in the Philippines. Glencore and Nanjing Mining will fund the remaining cost of the BFS, which is anticipated to be completed mid-2007, and will also provide the full equity, including CRC's share, required to bring the project into production.

Jinshan Gold Mines received the mining permit for the Chang Shan Hao (217) gold project, Inner Mongolia, in September 2006, from the Ministry of Land and Resources in Beijing. Jinshan has been advancing construction and permitting over the past year to meet a gold production start-up target date of early 2007. Construction has been on-going through the summer months and the ore pads and process plant facility are proceeding as planned. It is anticipated that the 217 mine, estimated to be China's fourth largest gold mine, will pour its first commercial bar of gold in the spring of 2007.

CRC will manage the completion of the BFS; Nanjing Mining will be the operator of the project; and Glencore will be responsible for off-take of copper concentrates.

Nanjing Mining is a Chinese zinc-lead-silver mining group that was privatized in 2001 and which has had a close relationship with Glencore since 1990. The group has extensive operational, engineering, fabrication and construction capabilities.

A Hinoba-an scoping study undertaken in 1998 envisioned a 15-year mine life based on a geological resource of 254 Mt at 0.46% Cu at a 0.30% Cu cutoff. The study showed that the deposits could be profitably mined by open pit mining with the ore processed in a conventional flotation mill to produce approximately 910,000 t of recoverable copper and other by-products. Annual production was estimated at 56,000 t of recoverable copper. **IM**

