Global Mg Industry Update
Prepared for the IMA by C&M Consulting

- **Magnesium prices stable around US$2,700/t FOB China**
- **Global primary production forecast to increase 24% in 2010**
- **Shaanxi producers have emerged as the low cost producers**
- **Strong demand forecast continues for China**

**Summary**

2009 was a difficult year for the global magnesium industry, due to the fall in demand following the global financial crisis (GFC). However, through the first half of 2010 the industry has shown the early signs of recovery; prices have stabilised over the last 12 months, inventory levels are falling and global production is resuming.

From the demand perspective, magnesium remains an attractive lightweight material for the die-casting industry, specifically for an automotive industry seeking to meet climate change policy objectives. Future magnesium demand growth is forecast to be strong, especially in China where the magnesium to aluminium price ratio remains attractive.

**Commentary**

- Primary magnesium prices have stabilised since the GFC, but remained low compared with its peer metals (e.g. Mo, W and Ni).
- In May 2008, magnesium prices FOB China spiked above US$5,500/t, due in part to a Chinese dominated supply base.
- By November 2008, prices had fallen to around US$2,700/t FOB China, reflecting the collapse in demand as a result of the onset of the GFC.
- In the 21 months since November 2008, prices have stabilised at around US$2,700/t FOB.

- Growth in global primary magnesium supply was strong prior to 2008. From 2002 to 2008 global primary magnesium supply increased from 408kt to 641kt, around 8% year-on-year.
- Over this period, C&M estimates China’s primary magnesium production increased from 231kt to 508kt and China’s share of global supply increased from 55% to 79%.
- In 2009, global production fell to 461kt, down 28% year-on-year, as a result of the GFC. China produced 348kt in 2009, down 31% year-on-year.
- For 2010, C&M forecasts an increase in global magnesium production of 24% to 571kt, including 438kt from China, representing 77% of global supply.
- 2010 also sees CVM Minerals, a new non-China Pidgeon plant in Malaysia approaching commercial production.
The fall in China’s primary magnesium production in 2009 was not consistent throughout the country. C&M found that whilst Shanxi magnesium production fell significantly, decreasing 47% year-on-year to 170kt for 2009, production in Shaanxi increased 13% year-on-year to 103kt. For 2010 we are forecasting a further 31% increase in Shaanxi production to 138kt, with Shanxi production forecast to increase 13%.

Over the period from 2004 to 2009, Shaanxi production share of the China total increased from 1% to 30% and we are forecasting a further increase to 32% in 2010.

The emergence of Shaanxi as a key magnesium province was due to the producers’ ability to utilise waste gases from the coking process, reducing energy costs significantly. These lower energy costs give Shaanxi producers a cost advantage over other producers and enabled them to operate profitably despite lower magnesium prices and increasing ferro-silicon prices. Our estimate for Shaanxi magnesium production ex works cash cost is US$1,770/t ex works (exc. VAT), 17% lower than our Shanxi cash cost of US$2,140/t ex works (exc. VAT).

The lower energy cost accounts for 90% (US$330/t) of the difference in cost between the average Shaanxi and Shanxi producer.

The migration of production to the low cost Shaanxi producers has helped China’s magnesium industry maintain an average cash cost of around US$2,100/t (exc. VAT), despite ferro-silicon cost increasing around 17%.

Ferro-silicon price, a key material in the Pidgeon magnesium process, has increased 34% from the lows in 2008 to US$1,353/t FOB China. Historically, magnesium prices in China have followed ferro-silicon prices relatively consistently, maintaining a magnesium : ferro-silicon ratio of 2.5.

The exception was at the end of 2007-early 2008, when magnesium prices increased above market fundamentals. However, recently the magnesium : ferro-silicon ratio has fallen to around 2, due in part to the cost savings with the utilisation of waste coking process gases.
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- Magnesium market prices are currently around C&M’s China average cash operating cost of US$2,100/t (~US$2,750 FOB China equivalent). Indicating that current prices are in line with the market fundamentals.
- China’s magnesium producers are spread across the global ex works cost curve, with Shaanxi producers in the first quartile and Shanxi producers in the second, third and forth quartiles.
- Non-China producers are located in the second, third and forth quartiles.
- C&M consider it is likely that many Chinese producers are operating with a degree of cost compression. We forecast prices to trend upwards as demand recovers, although these increases will be capped by over-capacity in China.

- The recovery of demand and future uptake of magnesium in many applications is dependent on the relative price between magnesium and aluminium, due to the potential for magnesium to displace aluminium, and vice versa, in many applications.
- At magnesium : aluminium ratios below 1.8, the inherent fundamental properties of magnesium can be exploited during the redesign of existing automotive components.
- At ratios below 1.2, Chinese die-casters have indicated that they will substitute magnesium for aluminium wherever possible.
- Due in part to trade duties and tariffs, the magnesium : aluminium price ratio varies significantly between countries.
- In the USA, the magnesium : aluminium ratio is above 2.5, with future uptake of magnesium likely to be limited by these levels.
- In China, the current price ratio is around 1. At this level, magnesium is an attractive alternative to aluminium for China’s die-casting industry.

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