Chinese Aluminium Production: Resilient & Adapting

Production still increasing, but smelter geography and bauxite sourcing changing

Over the past two months, aluminium producers have once again begun to respond to low prices by curtailing output, including announcements by Rusal, Century, and Ormet Corp. However, cutbacks by Chinese producers – either at the start of the year or in this latest round – have been notably scarce.

In fact, Chinese aluminium production continues to expand. This resilience has been driven by several factors:

- Power subsidies once again being granted by local governments;
- Vertical integration, both at the downstream fabrication level and upstream with captive power generation;
- Falling coal prices have improved margins for producers with captive thermal power plants;
- Surging hydroelectric generation has aided smelters in China’s southwest; and
- Local political pressure to maintain production in order to support employment, GDP growth, etc.

Nevertheless, China’s aluminium industry is undergoing important structural shifts.

- Large modern smelters are being built in China’s northwest, where energy costs are lower. However, other expenses erode this cost saving significantly.
- These new smelters are sourcing bauxite from Shanxi province, reducing reliance on imported bauxite refined in Shandong.
- Aluminium production is also growing in China’s southwest to take advantage of hydropower and bauxite resources.
- Indonesian bauxite export restrictions are forcing a shift in bauxite sourcing, including increasing efforts to exploit Chinese domestic resources, investment in Indonesia’s alumina industry, and turning to alternate overseas sources of bauxite and alumina.
With signs of a significant improvement in global demand still lacking, the prospect of aluminium production curtailments has garnered increased attention. However, while some Western producers have implemented cutbacks, there has been little response in China.

According to International Aluminium Institute data, ex-China aluminium production fell -1.7% year-on-year during the first seven months of the year. In contrast, Chinese production has continued to increase, as capacity additions have more than compensated for the only mild production cutbacks seen year-to-date. In fact, NBS data report a 10% YoY increase in production through July, with annualized run-rates now above 20 Mt/y – more than double China’s production in 2006.

Exhibit 1: China’s aluminium production remaining steady despite price declines

![Graph showing aluminium production trends from 2008 to 2012]

Source: CEIC, Credit Suisse

Production resilient in the face of low prices

Production decisions not simply a matter of operating margins

As we have pointed out on a number of occasions, to a greater degree than in the rest of the world, negative cash operating costs do not directly translate to smelter closures in China, and we have seen little in the way of production cutbacks this year despite the decline in aluminium prices.

One major reason for the lower price elasticity of Chinese production is the widespread vertical integration of the aluminium industry in China. Roughly 50% of smelters are integrated at the downstream fabrication stage, meaning that revenues are determined not by aluminium prices, but rather by prices of products such as window frames. Moreover, such firms generally do not actively monitor transfer pricing or look to shift purchases from in-house smelters to the open market.

On the other end, Chinese smelters are increasingly integrated to upstream power plants, with some conglomerates owning the entire supply chain from coal mines, to power plants, to smelters. Costs for producers with upstream integration have fallen considerably thanks to the large decline in coal prices (Qinhuangdao thermal coal prices are down -23% on the year) and a surge in hydroelectric power availability thanks to heavy rainfall.
Moreover, many of China's aluminium smelters are major pillars in their local economies, providing significant government tax revenues, employment, and benefits to local businesses. There is thus significant pressure from local officials for producers (particularly state-owned enterprises) to maintain production even in the face of operating losses.

Finally, as in the rest of the world, the decision to close production capacity is not simply a matter of short-run operating margins. Many costs are fixed and producers must weigh the cost of switching off (and switching back on) potlines against the benefits of avoiding operating losses.

**Power subsidies have returned**

Prior to this year, the Chinese government had increasingly sought to restrict what it saw as wasteful energy consumption by the aluminium industry. In 2011, industry-wide power subsidies were revoked as aluminium was removed from a list of preferred industries. In November, electricity tariffs were raised and the NDRC named aluminium as one of six power-intensive industries that must reduce power consumption. Moreover, local governments were banned from providing power subsidies without explicit central government permission and threatened with “severe punishment.”

However, with aluminium prices declining and broader economic activity considerably weaker, the political environment has shifted dramatically. Policies aimed at increasing energy efficiency have been set aside in favor of supporting economic growth, and a number of local governments have granted power subsidies to smelters (presumably with the central government’s at least tacit approval).

Among the more notable examples, Henan implemented power price discounts of RMB0.08/kWh (US$0.013/kWh) for five large smelters, allowing the restarting of idled potlines and preventing further closures. Similar initiatives have seen smelter restarts and expansions in Guangxi province, where producers are also being aided by abundant hydro power.
Producers reacting to margin pressure

Chalco, China’s largest aluminium producer (total capacity of 4.3 Mt/y, roughly 23% of China’s total), is a good example of how Chinese smelters are reacting. The producer’s margins have been squeezed, with the company reporting net profits of around RMB 110M on revenue topping RMB 23B in 2011. Chalco already operates a relatively integrated business, with alumina refineries and bauxite mines accounting for about 64% and 49% of internal needs, respectively, as well as fabrication businesses that have the capacity to absorb almost 40% of Chalco’s primary aluminium production (utilization rates at the fabrication level were relatively low last year).

In August, the company announced the acquisition of a 35.3% stake in provincial power generator, Ningxia Electric Power, with the intention of taking a controlling interest. Ningxia Electric is the largest power generator in the northwestern province, and the acquisition will allow Chalco to increase its integration on the energy side to protect margins, as well as bolster the company’s presence in China’s northwest, where energy is cheaper.

Structural shift westwards

Aluminium production marching westward

The Chinese aluminium industry is undergoing a fundamental realignment, largely in response to rising cost pressures. Smelters in China’s traditional aluminium heartland in Henan, along with those in other central and eastern provinces, are under pressure from rising costs across the board. The most notable of these is electricity costs, which have risen considerably in recent years on the back of tariff hikes, including two in 2011. But smelters also face rising labor costs as well as rising prices for other industrial and raw material inputs.

As a result, producers are investing in major expansions in China’s northwestern provinces, especially in Xinjiang. These locales offer far lower energy costs thanks primarily to plentiful coal resources (though better oil and gas availability also play a lesser role). The new smelters being built are mostly very large, modern facilities intended to be integrated with captive coal power plants, and in some cases, captive coal mines as well.
Even beyond this integration, electricity prices and availability are far better in China’s northwest than in the central and eastern provinces. Xinjiang alone among China’s provinces was exempted from the November power tariff hike, while other western provinces were generally less impacted than the rest of the country.

Moreover, while China’s eastern provinces have faced repeated power shortages in recent peak summer and winter seasons, northwestern provinces have remained in surplus. A study by China’s State Grid estimated that last summer China’s central and eastern provinces experienced a 30 GW deficit, while northwestern and northeastern provinces experienced a combined 27 GW surplus (35 GW when electricity lost through the use of high voltage transformers to supply lightly populated regions is accounted for).

The result is that the distribution of China’s aluminum production is shifting rapidly to Xinjiang and other northwestern provinces (Gansu, Ningxia, Inner Mongolia, Qinghai, and Shaanxi). While these regions accounted for only 28% of total Chinese production as recently as 2007, they now represent roughly 40%, with this share expected to grow to 55% by 2015.

However, examining the cost structures of these new smelters reveals a more mixed picture than simple lower power costs would imply. On the positive side, these smelters enjoy among the lowest energy costs in the country, as well as low labor costs and considerable government incentives as part of the government’s western development initiative.

Producers expanding in the northwest to take advantage of lower energy prices
However, these smelters’ remote interior location (Xinjiang is literally the farthest place on the planet from an ocean) pose considerable transportation challenges. While an increasing share of China’s aluminium industry has been fed on imported bauxite and alumina (most notably the smelters in Shandong province), the new smelters being built in the northwest will rely on bauxite mined and refined into alumina in Shanxi province (to minimize transportation costs rather than building alumina refineries in Xinjiang as well).
Moreover, aluminum produced in Xinjiang is subject to considerable post-production transportation charges, reflecting the costs of transporting the material 3,000+ km by rail to the major consumption centers on the eastern seaboard.

As a result, while new smelters coming online in China’s northwest are generally lower cost than traditional smelting capacity (and certainly lower cost than the alternative of building new smelters in the traditional heartland), the cost savings are not as great as might be initially anticipated. In fact, we estimate that most of this new capacity is concentrated in the 20th to 70th percentile of Chinese aluminium production.

**Southwestern producers benefitting from hydro generation**

Outside of Xinjiang and other northwestern provinces, the second biggest area of aluminium production growth is China’s southwest. Producers in this region depend on hydroelectric power to a far greater degree than those in the rest of the country, both through electricity purchased from local grids, and in certain instances, via captive hydroelectric power plants.

Aluminium production in this region is growing rapidly as smelters seek to take advantage of abundant hydroelectric generation potential, the second largest concentration of domestic bauxite reserves (outside Shanxi and Henan), as well as government incentives granted as part of the western development initiative. As a result, smelter capacity has risen by roughly 1 Mt over the past five years, and is expected to increase by an additional 800 kt over the next three years.

Moreover, while smelters in China’s southwest came under pressure last year as a result of droughts, which resulted in announced capacity closures by Guangxi Yinhai in response to hydro power shortages, this year the story has been reversed as heavy rains have led to a surge in hydro power generation.

**Exhibit 8: Chinese bauxite imports had grown rapidly but now face restrictions from Indonesia**

![Chart showing Chinese bauxite imports growth from 2008 to 2012 with Indonesia dominance](chart)

**Exhibit 9: … which has been the primary supplier**

![Pie chart showing bauxite import sources in 2011 with Indonesia at 80%](chart)

**Indonesian export restrictions helping to reshape Chinese industry**

In 2011, China imported 45.2 Mt of bauxite and 1.9 Mt of alumina, enough to supply over half of the raw material needed for the 19.1 Mt of aluminium that it produced. During the first half of 2012, China imported 25.6 Mt of bauxite and 2.5 Mt of alumina, rising imports' share to close to two-thirds of domestic requirements.
This large reliance on imported raw materials has been fueled by several factors, including the poor quality of domestic bauxite reserves and increasing extraction and processing costs. The biggest area of growth in recent years has been the importation of Indonesian bauxite into Shandong province, where alumina refining capacity has nearly doubled over the past five years.

However, this growth model is now under pressure from new restrictions on Indonesian raw material exports. The Indonesian government has sought to pressure metals companies to invest in refining facilities in Indonesia, and in recent weeks, this policy has shown some important signs of success, with announcements by Bosai Minerals Group (China’s largest bauxite producer), Chalco (the largest aluminium producer), and Beijing Shuang Zhong Li Investment Management (a shell company) that each would invest in building alumina refineries in Indonesia.

The imposition of Indonesia’s new raw materials export regime and 20% export tax hit bauxite harder than any other material due to the industry’s heavy dependence on small-scale producers. While shipments appear to be rebounding as new procedures are sorted out, and producers and traders adapt, bauxite shipments are not expected to resume their former upward growth trajectory and the Indonesian government has stated that it is seeking to maintain exports at the 2010-11 levels.

While this will not cause immediate distress for China’s aluminium industry, and although we do not expect that a hard ban on Indonesian exports will be implemented in 2014 (despite government threats), stagnant volumes will be insufficient to keep pace with the needs of growing Chinese aluminium capacity and aluminium demand.

This disconnect is likely to spur increased investment in extraction and refining technology to exploit China’s complex domestic bauxite resources, which also dovetails with the move of China’s aluminium capacity from the eastern provinces, which can more easily source imported material, to western provinces which depend on domestic supplies (Shanxi for northwestern smelters, Guizhou and Guangxi for southwestern smelters).

Additional Chinese investment in the Indonesian alumina industry is also likely, as are increased imports of bauxite and alumina from other international sources (and Chinese investment to boost bauxite production growth to meet these needs), with Australia, Vietnam, and Guinea the most likely targets.
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