Global deep dive: China well supplied

Downgrading seaborne alumina and bauxite price forecasts

China is the world’s largest alumina producer and largest consumer of third party seaborne bauxite importing around 40% of their bauxite needs. Our recent field trip to Henan province in China uncovered that alumina refineries began restarting at US$245-250/t (seaborne Eq price). Also, our seaborne bauxite SD model shows that China is well supplied until 2020. We are downgrading our alumina price forecasts by an average 15% with 2016 down to US$236/t (vs. spot at US$246/t) and lowering our bauxite price forecast from 2018 onwards. We are downgrading AWC to a HOLD. In our global alumina/bauxite coverage we prefer Hongqiao, Alcoa, and Rio Tinto (all BUYS).

Seaborne alumina: Chinese restarts and capacity growth weigh on price

Based on new capacity build and restarts we expect a 7% increase in Chinese alumina production in 2016 to 61.5Mt and then a further 6% growth to 65Mt in 2017. The recent recovery in the Chinese domestic alumina price to RMB1,950/t (US$250/t seaborne equivalent) has resulted in 4.5Mt of restarts. We see RMB1,900/t (US$245/t) as the critical price level. Above this, more idled capacity will restart and below this more capacity will be curtailed. However this “equilibrium price” level continues to decline as new low cost refineries are brought on-line. As such, this should weight on alumina imports and we have downgraded our seaborne alumina price forecasts by 6% in 2016 to US$236/t and by 13% in 2017 to US$245/t. We have also downgraded our long run price by 9% to US$290/t (real). We see this as the price required to incentivize restarts of high-cost curtailed refineries in the Atlantic.

Seaborne bauxite: oversupplied until 2020

Chinese bauxite imports have increased from 30Mt in 2010 to 56Mt in 2015, and are forecast to increase to 80Mtpa by 2020. China appears to be well supplied until the end of the decade however. Our Chinese bauxite SD model predicts a rising market surplus, increasing to 10Mt in 2018. This is mainly due to increasing exports from Australia and Guinea, which is offsetting a drop from Malaysia. We also see the risk that Indonesia resumes exports in 2017. In addition, we estimate that China has 34Mt or 40 weeks of supply of imported bauxite stocks. Over the long run, we see China’s bauxite deposits declining in quality, pushing the market into deficit by 2021, even with Rio Tinto’s 22Mtpa Amrun project. The bauxite price has declined from US$75/t in 2014 to US$46/t, and we expect prices to stay under pressure over the medium term.

Hongqiao, Rio Tinto, Alcoa/AWC best positioned

The largest sellers of third party alumina are AWC and Alcoa (AWAC JV) and Chalco while Rio Tinto is the largest seller of third-party bauxite. Chinese companies Hongqiao and Chalco are the largest third party buyers of bauxite to supply their domestic alumina refineries. The most integrated and lowest cost company is China Hongqiao. From a valuation and market position perspective, we prefer Hongqiao, Alcoa and Rio Tinto (all BUYS).

Valuation and sector risks

Our PTs are set broadly in-line with our DCF derived valuations. Company risks include adverse commodity and currency movements (pg. 28). This report changes price targets, recommendations and estimates for several companies under coverage; for details, please see Figure 10.

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Chinese alumina well supplied until 2020

Downgrading seaborne alumina and bauxite prices

The seaborne bauxite market is rapidly increasing in size due to the reliance of China’s domestic alumina refineries on imported bauxite. We have compiled a detailed Chinese bauxite supply demand model which includes both domestic and imported bauxite based on a contained aluminium unit basis. Our recent field trip to Henan province, in China helped us validate numerous data points and provided more real time data on Chinese alumina production growth, costs and the level of curtailments and restarts.

Starting with alumina, the recovery in the Chinese domestic alumina price to RMB1,950/t (US$250/t seaborne equivalent) has resulted in 4.5Mt of restarts. We see RMB1,900/t (US$245/t) as the critical price level. Above this, more idled capacity will restart and below this more capacity will be curtailed. However the Chinese cost curve continues to decline as new low cost refineries are brought on-line. With China adding new low-cost alumina capacity and with imports flat lining, we expect the seaborne alumina price to closely track the equilibrium price in China over the near to medium term. As such, we have downgraded our seaborne alumina price forecasts by 6% in 2016 to US$236/t and by 13% in 2017 to US$245/t. We have also downgraded our long run price by 9% to US$290/t (real). We see this as the price required to incentivize restarts of high-cost curtailed refineries in the Atlantic basin where market dynamics are dislocated from Chinese supply and demand.

China appears to be well supplied with bauxite until the end of the decade due to increasing domestic production and an increase in bauxite exports from Australia and Guinea. In addition, we estimate that China has around 34Mt of imported bauxite stocks or c. 40 weeks of supply. We forecast a 2Mt surplus in 2016 but a 10Mt surplus in 2018. However the market should move into deficit by around 2021 even with the ramp-up of Rio Tinto’s 20Mtpa Amrun. We have downgraded our bauxite price forecasts to reflect our views on future market balance and margins.

Figure 1: Alumina, bauxite and aluminium price forecasts

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Source: Deutsche Bank, Bloomberg Finance LP, CM Group
Company exposures

Earnings exposure to spot alumina and bauxite prices
Alumina and bauxite pricing structure varies widely between producer and customers. The largest sellers of third party bauxite and alumina are AWC and Alcoa (AWAC JV), Rio Tinto and Norsk Hydro. The AWAC JV is 60% owned by Alcoa and 40% owned by AWC. The largest buyers of third party bauxite and alumina are Chinese companies Xinfa and Chalco.

The major producers of alumina and seaborne bauxite
Global alumina production was around 115Mt in 2015 and is forecast to grow modestly in 2016. The Top 5 producers of alumina are Chalco, followed by Xinfa, then Rusal, Hongqiao and Rio Tinto.

Global bauxite production is around 260Mtpa but the contestable market is around half that at c. 140Mtpa. China imported 56Mt of bauxite in 2015 but consumes a total of around 130Mt. Looking at those companies that supply China, the world’s largest exporter to China is Rio Tinto (predominately from the Australian assets), followed by Malaysian companies, then and Guinea is now in the number 3 position.
Changes to our estimates and ratings: AWC down to Hold

Company earnings, valuation and recommendation changes for stocks in our global coverage universe with exposure to spot bauxite and alumina are shown in Figure 10 below. The largest cuts have been to our AWC and South32 estimates followed by Chalco then Rio Tinto. We have downgraded our AWC recommendation from BUY to HOLD.
Valuation metrics: we prefer Rio, Alcoa and Hongqiao

Key metrics for the global alumina and bauxite stocks under coverage are shown in Figure 11 below. We prefer the lower-cost integrated producers Rio, Alcoa and China Hongqiao. As shown below, those three stocks are trading below the peer group average 2017 PE multiple of 13.8x and Alcoa and Hongqiao offer higher than average 2017 FCF yields also. Rio (0.8x NPV) and Alcoa (0.72x) remain the most attractive stocks on a relative P/NPV basis.

Company summaries: Rio, Hongqiao best positioned

Alcoa

There are no changes to our Alcoa model or estimates at this stage. Alcoa is 85% spot alumina (12.8m tons for AWAC, 7.7m tons attributable to Alcoa), 100% bauxite (45Mt for AWAC, 27Mt attributable to Alcoa). Alcoa provides guidance indicating that each US$10 per ton change in underlying alumina prices will impact its net income by US$20m. Based on this guidance, the lower alumina prices would represent headwinds of US$14-100m (-3-7% to
both DBe net income and EPS) over 2016-2018 while EBITDA could be 1-5% lower over the same time frame. This is based on our estimates that Alcoa produces 13.2m tons of alumina in both 2017 and 2018 and most of this (8.9m tons or 68%) is sold to third parties.

**Alumina (AWC)**

The cut to our alumina and bauxite prices has reduced our AWC earnings by around 50% and our NPV by 16% from A$1.66 to A$1.39/sh. As the stock is trading within 10% of our revised NPV we are downgrading our recommendation from BUY to HOLD. AWC has a strong balance sheet (c. 5% gearing), low growth capex, and is paying out FCF in dividends on a six month trailing basis. The portfolio clean-up is almost complete with the high cost Point Comfort and Suriname refineries to be fully curtailed by the end of 2Q16. This should lower costs another US$15/t with the potential for costs to drop below US$180/t with further productivity gains.

Following the closure of the Atlantic refineries, Alcoa and AWC (AWAC JV) are in a position to increase third party bauxite exports to China from Brazil and Guinea. We already assume that AWAC increases bauxite exports from 2Mt in 2015 to 6Mtpa from 2018 onwards.

**Chalco**

Chalco produced 17.9mt of bauxite from its self-owned mines in 2015, accounting for 55% of total annual bauxite production. The company procures the rest (45%) of its bauxite supplies mainly from domestic suppliers and, to a lesser extent, international suppliers. Average cost per tonne was 251.6 RMB/t for self-produced bauxite and 383 RMB/t for bauxite supplied by third party in 2015. A decrease in seaborne bauxite price will lower the unit cost of bauxite in alumina production, but the effect is limited because Chalco will be procuring a larger percentage of its bauxite used for alumina production through self-owned mines currently under development in Laos and Indonesia.

In 2015, Chalco supplied approximately 5.3mt of alumina produced from their own refineries to their own aluminum smelters, accounting for roughly 40% of annual alumina production. The other 60% of alumina produced are sold to Chalco’s customers through Chalco Trading. The company’s alumina segment will be affected by the decrease in alumina price, but at the same time, Chalco has managed to lower its alumina unit cost substantially last quarter (DBe, 12%YoY decline in 2016E), we thus revise up the 2016E bottom line from RMB1.5bn losses to RMB1.3bn losses. Given the limited room for further cost reduction in 2017 and 2018, we cut the NPAT estimates by 10% and 7%, respectively.

**Hongqiao**

China Hongqiao mainly secures its bauxite by signing long-term contracts with Australia (10y, 6Mtpa), India (3y, 3Mtpa) and Malaysia at fixed rate. With the completion of its Guinean bauxite project in late 2015, the company expects 15mt and 30mt bauxite supply from Guinea in 2016 and 2017, respectively. However, we take a more conservative view on Guinean exports in our supply & demand analysis. In terms of alumina capacity, we expect another 2Mt new capacity to be ramped up this year which will bring its total alumina capacity to 9mt by 2016, indicating a 70%+ self-sufficient rate. With most of the bauxite secured at a fixed rate and most alumina feed its own smelters, the downgrade in seaborne bauxite and alumina price will have limited impact on Hongqiao’s bottom line in coming years.
Norsk Hydro
Our earnings estimates for Hydro drop by 7% in each of 2016 and 2017 and 4% in 2018, primarily due to the cut in our alumina price forecasts. Our NPV decreases by 5% to NOK33.5 per share and we reduce our target price to NOK31 as a result.

Hydro is a fully integrated aluminium producer, with interests in two low-cost bauxite mines which serve its one low-cost alumina refinery. In bauxite, Hydro has a 5% stake in the 18Mtpa MRN mine, and a 45% off-take agreement, and it owns 100% of the 10Mtpa Paragominas mine. In alumina, Hydro has a 92% stake in the low-cost Alunorte alumina refinery. With nameplate capacity of 6.3Mtpa, Alunorte is the world’s largest alumina refinery.

At present, Hydro is slightly long bauxite: its annual bauxite production is 18.1Mt (10Mt from Paragominas and 45% of MRN’s 18Mt output) and, at 2.6t of bauxite: 1t alumina, it can therefore produce 7Mt alumina compared with Alunorte’s 6.3Mt capacity. All of Paragominas’ bauxite goes to Alunorte, whilst 2.5-3.5Mt of MRN’s production – 14 to 19% of capacity - is sold to third-parties, at spot prices.

Hydro is also long alumina. Its internal needs are around 4Mt each year for which it has production from Alunorte of around 6Mt in 2015 and it also sources 2.3Mt of alumina on long-term contracts. This leaves it in a long position of between 3 and 4Mt each year which it sells on spot to third parties.

Hydro is debottlenecking Paragominas to 11Mtpa by 2018. There is an option to expand the mine further, to 14.8Mt, but this would require an increase in the capacity of the 250km pipeline which connects the mine to the Alunorte refinery and management is not considering such an expansion at present. Hydro is also debottlenecking Alunorte to 6.6Mt by 2018.

South 32
Around two thirds of South 32’s 5.3Mtpa of alumina production is sold to third parties and close to 100% of all alumina is sold at spot. The cut to our alumina price forecasts has reduced our S32 earnings by around 20% and our NPV by 9% from A$1.73 to A$1.58/sh. Alumina remains S32’s largest earnings contributor, representing c. 20% of EBITDA and 31% of NPV.

South32 is on track to "significantly exceed" the original US$350m cost out target. Guidance on an asset by asset basis aligns very closely with our US$1b cost reduction estimate when including both controllable and uncontrollable costs. The Worsley alumina refinery in Western Australia is a significant part of the group wide cost out. The Alumar refinery in Brazil is already extremely low cost.

Rio Tinto
Our Rio Tinto earnings have reduced by 2-3% each year and our NPV by 4% (to A$54.2/sh) due to the impact of both the lower bauxite and alumina price forecasts. We now value the aluminium division at US$20.2b, of which US$7.9b is the bauxite and alumina assets. On our forecasts, bauxite exports will contribute around 10% of Rio’s earnings going forward.
Rio currently produces around 44Mtpa of bauxite from the Gove, Weipa, Boke and MRN mines, of which 27Mtpa is sold to external parties (mostly China), and the balance is consumed by Rio’s three large alumina refineries. The recent approval of the US$1.9b, 22.8Mtpa Amrun bauxite project (previously named South of Embley) near Weipa will lift Rio’s bauxite exports to 36Mtpa from late 2019 onwards. Around half of Amrun’s 22.8Mtpa of bauxite will offset depletion at the East Weipa deposit. Rio has designed Amrun to allow a further expansion to 50Mtpa. The closure of the Gove alumina refinery in 2014 reduced Rio’s third party alumina market position from 2.1Mt to 0.8Mtpa. Therefore our lower alumina price forecasts have only a minor impact on cash flow and earnings.

Despite our downgrades, the restructuring of Rio’s aluminium continues to improve free cash flow and returns. We continue to believe that Rio has a global best-in-class aluminium portfolio with significant bauxite resources, increasing third party sales, and low cost aluminium smelters which mostly use low cost hydro power. There are three parts to the transformation strategy; Part 1: Reducing costs (overheads, procurement) and capex (sustaining and Kitimat growth), Part 2: Shedding high cost assets (Gove, Sebree etc), and Part 3: Heading upstream (increasing bauxite exports).

**Rusal**

UC Rusal’s backward-integrated business model (~80% in bauxites, ~100% in alumina) implies that any changes to main input costs should be viewed along with the corresponding impact on aluminum prices. While reduced bauxite price forecasts for 2016-2020 bodes well for margins (all else being equal), the ramp up of Dian-Dian project in Guinea gradually should drive the company’s self-sufficiency in bauxites to 100% by 2020E.

**Vedanta**

As Vedanta’s bauxite and alumina production and usage is all captive/internal, feeding its two aluminium smelters (Korba and Jharsuguda), there is no impact on our forecasts from the changes in our bauxite and alumina assumptions.

Vedanta sources bauxite for its Lanjigarh alumina refinery from its own BALCO mines and from domestic and international imports. In FY16, Vedanta sourced its required 3.4Mt of bauxite from the three sources mentioned, split equally.

Lanjigarh is ramping up towards 2Mtpa capacity – extra bauxite will be sought from a mix of own mines and third parties – and the company recently secured approval to expand the refinery to 4Mt over time, although Vedanta is not actively pursuing this option at present.
Chinese Alumina market

Chinese alumina price driving seaborne alumina price

The seaborne alumina price rebounded from a low of US$197/t in early 2016 to reach US$261/t in mid May. It has since softened to US$246/t. The Chinese alumina price is mostly driven by i) the domestic aluminium price and ii) refining capacity shuts and restarts, in our view. The domestic alumina price is then driving the seaborne alumina price (Figures 12 and 13). The Chinese aluminium price has rallied since late 2015 from a low of RMB9,800/t to RMB12,700/t due to a sharp recovery in demand, combined with smelter curtailments and a lag on smelter restarts. This has resulted in a lift in Chinese domestic alumina pricing over the first few months of 2016, however pricing has softened more recently.

Domestic alumina prices in the North (NAX Index) and South (SAX Index) have rebounded with the NAX bouncing from a low of RMB1,596/t in early 2016 to reach a peak of RMB2,010/t in mid May, and is currently trading at RMB1,994/t. The implied linkage of Chinese alumina to aluminium is currently around 17%, up from a low of 13% in late 2015. Smelters monitor the linkage closely. The linkage is well down from the peak of 22% in late 2014, but there is now more idled alumina capacity.

The rebound in the Chinese aluminium price has incentivized smelter restarts. We understand that over 200kt of capacity has already resumed production. Furthermore, we estimate that around 3.8Mt of new smelting capacity will be brought on-line over the next two years with over 1Mt already being brought on-line by the end of May. Our analysis shows that c. 85% of Chinese smelters is now cash flow positive. As a result, the aluminium price has started to level out with the northern Chinese domestic aluminium price sitting at around RMB12,500/t.

Figure 12: Chinese alumina price (NAX and SAX) vs. the Chinese aluminium price (RMB/t)

Figure 13: Chinese domestic (NAX and SAX unadjusted in US$/t) and Australian (US$/t FOB) alumina price

Source: Deutsche Bank, Platts, CM Group, Platts. Note: NAX (Northern China), SAX (Southern China)
The seaborne alumina price is currently trading at a slight premium to the Chinese alumina price after adjusting for VAT (17.5%), shipping, port and inland freight (US$12-13/t combined) and quality differential (US$1-2/t). Chinese imports of alumina are sensitive to this price arbitrage, even on a monthly basis. China (likely traders rather than smelters) has even exported small quantities of alumina in times when the seaborne price is more expensive than the domestic price.

We think that the equilibrium alumina price in China is currently around RMB1,900/t. This is around the 80th percentile on the all-in cost curve and equates to a seaborne price of around US$245-250/t. When the alumina price climbed above RMB1,900/t during 1Q16, higher cost refineries began restarting. Below this level, capacity is likely to be curtailed.
Chinese Supply/Demand

We expect Chinese aluminium production to increase by around 6% to 32.3Mt in 2016. By 2020 we expect Chinese aluminium production to increase to 36.7Mt but think there is upside risk to this estimate based on proposed capacity additions. Over the medium term we expect China to continue to export over 2Mt of aluminum per annum (mostly in the form of semis).

China produced 57.7Mt of alumina in 2015, a 10% increase on 2014. Based on new capacity build and restarts we expect a 7% increase in production in 2016 to 61.5Mt and then a further 6% growth to 65Mt in 2017. A significant amount of new build is currently underway and many new large refineries are in the planning and approval stage. We forecast production to increase by 3-6% per annum (or 2.0-3.5Mtpa) until at least 2022. Alumina imports fell in 2015 due to high smelter stocks at the end of 2014 and sluggish aluminium demand.

Looking at the alumina market balance, we expect a tighter market in 2016, mainly due to timing and ramp-up of refinery restarts. From 2017 onwards, new lower cost refining capacity additions should keep pace with smelter additions, with alumina imports the balancing item. As a result, we forecast flat imports of around 3-4Mt for the next few years but then a drop in imports to 3Mt in 2021 as refining additions outpace new smelting capacity. Longer term, the level of imports will depend on the price arbitrage between the seaborne price and Chinese domestic price.

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**Figure 18: Chinese Alumina Supply Demand balance**

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</tr>
<tr>
<td>Production (% change)</td>
<td>11%</td>
<td>11%</td>
<td>6%</td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Alumina</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese demand (kt)</td>
<td>55,752</td>
<td>61,610</td>
<td>65,293</td>
<td>68,010</td>
<td>70,001</td>
<td>72,146</td>
<td>74,111</td>
<td>75,924</td>
<td>77,211</td>
</tr>
<tr>
<td>Chinese production (kt)</td>
<td>52,680</td>
<td>57,690</td>
<td>61,500</td>
<td>65,000</td>
<td>68,950</td>
<td>68,959</td>
<td>71,027</td>
<td>73,158</td>
<td>75,363</td>
</tr>
<tr>
<td>Production (% change)</td>
<td>7%</td>
<td>10%</td>
<td>7%</td>
<td>6%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Alumina imports (kt)</td>
<td>5,075</td>
<td>4,654</td>
<td>4,240</td>
<td>3,000</td>
<td>3,000</td>
<td>3,500</td>
<td>3,500</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Alumina exports (kt)</td>
<td>118</td>
<td>310</td>
<td>172</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Alumina consumption (kt)</td>
<td>57,637</td>
<td>62,033</td>
<td>65,568</td>
<td>67,800</td>
<td>69,750</td>
<td>72,259</td>
<td>74,327</td>
<td>75,958</td>
<td>78,163</td>
</tr>
<tr>
<td><strong>Market balance</strong> (kt)</td>
<td>1,885</td>
<td>423</td>
<td>275</td>
<td>-210</td>
<td>-251</td>
<td>113</td>
<td>217</td>
<td>34</td>
<td>942</td>
</tr>
</tbody>
</table>

Source: Deutsche Bank, Aladdiny, CM Group, Wood Mackenzie
Refinery restarts accelerating
Since 2014 there have been almost 19Mt of refining capacity curtailments. This has mostly occurred in Shandong, Henan and Shanxi provinces where refineries are more reliant on imported bauxite. The average utilization rate of the Chinese alumina fleet was around 75% in early 2016. This has since increased as refineries have restarted with the recovery in the alumina price.

We estimate that 9.8Mtpa of the 18.9Mt of curtailed refining capacity was actually closed during 4Q15 as the price declined to a low of RMB1,596/t. The largest refineries that were shut during 4Q15 are those owned by Chalco and Xinfa in Shandong, Shanxi and Henan provinces which rely on imported bauxite and are non-integrated.
The recovery in price during 1Q16 has incentivized alumina refineries to restart. We estimate that 5.7Mt of capacity is in the process of restarting including one of Xinfa’s 1.8-2Mtpa refineries in Shandong. We think that 4.5Mt of this has already restarted and will ramp-up over 2016. The remaining curtailed capacity requires prices well north of RMB2,100/t to justify restarting, in our view.

**New capacity additions**

There is also a significant amount of new low cost refining capacity being commissioned in 2016. The majority of this new capacity will be supplied by seaborne bauxite rather than domestic Chinese bauxite production. In total, we estimate that 6.4Mt of new capacity will be commissioned during 2016 with 2.9Mt operating by the end of 1H16.
## Figure 23: Chinese refining capacity additions in 2016

<table>
<thead>
<tr>
<th>Refinery</th>
<th>New Capacity (kt)</th>
<th>Comment</th>
<th>Operational Capacity H1 (kt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shanxi Fusheng</td>
<td>800</td>
<td>Process slow, pipes and equipment settled, likely to operate in H2 when the market recovers</td>
<td></td>
</tr>
<tr>
<td>Shanxi Huaxing</td>
<td>1,000</td>
<td>Running smoothly, anticipate a trial run in Q2</td>
<td>1,000</td>
</tr>
<tr>
<td>Jinzhong Chemical</td>
<td>1,600</td>
<td>Plan to start in end April, phase II operate in Q4</td>
<td>800</td>
</tr>
<tr>
<td>Xinfa Chemical</td>
<td>200</td>
<td>Technology innovation, may complete in the middle of the year</td>
<td>200</td>
</tr>
<tr>
<td>Xinghua Technology</td>
<td>350</td>
<td>Equipment based on Phase I, product type and the market restricted operation, anticipate the preliminary start in the middle of the year</td>
<td></td>
</tr>
<tr>
<td>Senze Coal and Aluminium</td>
<td>700</td>
<td>Trial run in May, fully operation in Q3 according to the market</td>
<td>500</td>
</tr>
<tr>
<td>Zouping Gaoxin</td>
<td>500</td>
<td>Involve many projects, partial capacities converted to 2015, the other calculated into 2016</td>
<td>200</td>
</tr>
<tr>
<td>Yunnan Wenshan</td>
<td>1,000</td>
<td>Increased by 200ktpa from technology innovation 2015, Phase III of 800 ktpa plan to complete end 2016, with uncertainties</td>
<td>200</td>
</tr>
<tr>
<td>Guangxi Huayin</td>
<td>200</td>
<td>200 ktpa from technology innovation</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,350</strong></td>
<td></td>
<td><strong>2,900</strong></td>
</tr>
</tbody>
</table>

Source: Deutsche Bank, Aladdiny, CM Group

The majority of new refining capacity in China is still being added in the central provinces (Shanxi, Shaanxi, Henan provinces) and Shandong (see Figure 23). Close to 5Mtpa of new capacity could come on-line in 2018 alone. There are also numerous new “super sized” 4Mtpa refineries being proposed. The first is Chalco and Shenhua’s recent JV announcement to study a new 4Mtpa refinery on the coast in Hebei. If approved, first production from the new refinery is likely in 2018. The refinery would likely consume up to 8-10Mtpa of seaborne bauxite (ratio of 2.6-2.7:1) through Huanghua Port and the alumina produced will likely be sold to central and western China, such as Inner Mongolia and Xinjiang. The second is Hunan-based Zengshi Group’s plans to build a 4Mtpa alumina project. The project is to include a 1Mtpa primary aluminium smelter and an associated thermal power plant.

There is also one large scale coastal alumina capacity expansion currently taking place by Xinfa in Shandong. Production is expected to reach 4Mtpa in 2017 and 5Mtpa by 2020. This is a low and high temperature Bayer process refinery, with c. 50% of capacity operating at high temperature. Hongqiao also plans to expand one of their Shandong refineries by 2Mtpa. The Eastern coast (Shandong) refineries are expected to remain reliant on low temperature imported bauxite and are not configured to process higher temperature domestic bauxite. There are seven large alumina refineries which use imported bauxite for production, which we estimate have a total capacity of around 20Mtpa.

Reviewing the major Chinese alumina producers, Hongqiao, Xinfa and Chalco remain the largest producers (Figure 25).
The Chinese cost curve

The Chinese domestic cost curve continues to fall with the addition of new larger, low-cost more efficient refining capacity. Industry experts suggest that average all-in costs (50th percentile) have fallen 13% YoY from RMB2,236/t in 2015 to RMB1,954/t in 2016. This includes sustaining capex, VAT and financing costs. In seaborne alumina terms, this translates to a fall from US$289/t to US$253/t when adjusting for VAT. Our all-in Chinese cost curve (shown in Figure 26) based on just C1 costs + sustaining capex shows a lower average cost, with the RMB1,950/t level representing the 80th percentile, however on the ground evidence shows that a price of around RMB1,900/t is the trigger point for restarts. The highest cost refineries are in Shandong and Henan and the lowest cost refineries are located in the south in Guizhou and Guangxi provinces. During early 1Q16 we estimate that over 50% of Chinese refineries were unprofitable.

With the recent drop in energy and bauxite costs in China and the level of integration increasing, we expect the equilibrium price to continue to move lower in 2017. The seaborne alumina price should continue to be priced around the Chinese domestic alumina equilibrium price. At prices below US$240-250/t (FOB ex Australia) we think higher cost refineries will curtail production and above this level we think refineries will restart.

The majority of new greenfield and brownfield refineries are integrated with smelter and power plants and hence are lowering the Chinese cost curve further. Over the long run we expect costs to move higher in RMB terms as labour and power costs rise and as refineries become more reliant on imported bauxite. However we only see this pressure occurring early next decade; we expect imported bauxite to exceed domestic production from 2020.
Figure 26: Chinese 2016 domestic all-in alumina cost curve (RMB/t)

Source: Deutsche Bank, Wood Mackenzie, CM Group

Figure 27: Chinese 2016 domestic all-in alumina cost curve (US$/t)

Source: Deutsche Bank, Wood Mackenzie, CM Group
The Global cost curve

On a global level, we see the average cost on a C1 basis (50th percentile) at around US$235/t (Figure 28). A number of high cost refineries were curtailed in 2015 with the fall in the seaborne price including Alcoa’s Point Comfort and Suriname refineries, and other Atlantic basin refineries.

We think that costs will continue to decline in 2016, but over the medium term (from 2018) we expect the Atlantic basin alumina market to tighten on increased aluminium demand and expect the seaborne alumina price to rise to incentivize higher cost refinery restarts.

Figure 28: Global 2016 alumina cost curve (C1), FOB (US$/t)
Seaborne Bauxite market

China well supplied until 2020

The global contestable seaborne bauxite market has grown significantly over the past five years with the rise in Chinese alumina production. China has increased bauxite imports from just 30Mt in 2010 to 56Mt in 2015 and we expect imports to increase to 81Mtpa by 2020. China produces around 75Mt of its own bauxite and therefore imports around 40% of their bauxite requirements. The total global bauxite market is around 260Mt.

Our Chinese seaborne bauxite supply & demand model shows that China is currently well supplied due to increasing domestic production and rising imports from Australia and Guinea. In addition, we estimate that China has around 34Mt of imported bauxite stocks or c. 40 weeks of supply. Also we believe that it is probable that Indonesia resumes exports sometime in 2017 if China Hongqiao receives an export license for their completed 1Mtpa alumina refinery in Indonesia.

We forecast a 2Mt surplus in 2016 but a 10Mt surplus in 2018. Over the long run, anecdotal evidence suggests that China’s northern bauxite deposits will start to decline in quality around 2020 both in tonnage and grade (alumina to silica ratio or AS ratio). The market should move into deficit by around 2021 even with the ramp-up of Rio Tinto’s 22Mtpa Amrun project in Australia.

**Figure 29: Chinese Bauxite Supply Demand model**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Alumina</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese production (kt)</td>
<td>52,680</td>
<td>57,690</td>
<td>61,500</td>
<td>65,000</td>
<td>66,950</td>
<td>68,959</td>
<td>71,027</td>
<td>73,158</td>
<td>75,383</td>
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<td><strong>Bauxite</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese demand (kt)</td>
<td>78,233</td>
<td>70,241</td>
<td>77,352</td>
<td>76,206</td>
<td>74,193</td>
<td>78,929</td>
<td>78,144</td>
<td>83,075</td>
<td>97,948</td>
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<td>Domestic Bauxite grade %</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Domestic Production</strong> (kt)</td>
<td>70,000</td>
<td>74,000</td>
<td>79,180</td>
<td>80,764</td>
<td>82,379</td>
<td>79,908</td>
<td>77,510</td>
<td>75,185</td>
<td>72,929</td>
</tr>
<tr>
<td>Domestic alumina units (kt)</td>
<td>33,106</td>
<td>35,359</td>
<td>37,834</td>
<td>38,591</td>
<td>39,363</td>
<td>34,711</td>
<td>33,669</td>
<td>32,659</td>
<td>28,512</td>
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<tr>
<td><strong>Imported Bauxite (kt)</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia (kt)</td>
<td>8,790</td>
<td>0</td>
<td>0</td>
<td>5,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
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</tr>
<tr>
<td>Australia (kt)</td>
<td>15,652</td>
<td>19,581</td>
<td>21,240</td>
<td>23,000</td>
<td>23,000</td>
<td>29,250</td>
<td>34,000</td>
<td>34,000</td>
<td>34,000</td>
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<tr>
<td>India (kt)</td>
<td>5,146</td>
<td>7,845</td>
<td>8,361</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
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<tr>
<td>Malaysia (kt)</td>
<td>3,266</td>
<td>24,187</td>
<td>10,263</td>
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<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
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<tr>
<td>Dominican Republic (kt)</td>
<td>1,596</td>
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<td>1,184</td>
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<td>Ghana (kt)</td>
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<td>825</td>
<td>800</td>
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<td>Brazil (kt)</td>
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<td>2,400</td>
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<td>Fiji (kt)</td>
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<td>172</td>
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<td>0</td>
<td>0</td>
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<td>Guinea (kt)</td>
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<td>20,000</td>
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<td>Others (kt)</td>
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<td>474</td>
<td>204</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong> (kt)</td>
<td>36,531</td>
<td>56,101</td>
<td>54,634</td>
<td>63,600</td>
<td>70,400</td>
<td>76,650</td>
<td>81,400</td>
<td>81,400</td>
<td>81,400</td>
</tr>
<tr>
<td>Average imported bauxite %</td>
<td>45%</td>
<td>44%</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
<td>46%</td>
<td>46%</td>
<td>46%</td>
<td>46%</td>
</tr>
<tr>
<td><strong>Market balance</strong> (kt)</td>
<td>-10,029</td>
<td>-4,749</td>
<td>2,210</td>
<td>5,513</td>
<td>9,956</td>
<td>1,071</td>
<td>-689</td>
<td>-8,575</td>
<td>-24,474</td>
</tr>
<tr>
<td>Imported Bauxite stockpiles (kt)</td>
<td>18,000</td>
<td>32,000</td>
<td>34,210</td>
<td>39,722</td>
<td>49,677</td>
<td>50,748</td>
<td>50,069</td>
<td>41,484</td>
<td>17,010</td>
</tr>
</tbody>
</table>

Source: Deutsche Bank, China customs, Bloomberg Finance LP, CIM Group, Aladdiny
**Imports by country**

Chinese imports of bauxite have been variable over the past five years mostly due to issues securing supply. Bauxite quality, security and costs are all key issues that will impact China’s level of bauxite imports and price going forward. The monthly imports by country since 2008 are shown in Figure 31.

Indonesian exports fell dramatically in May 2012 when the government imposed a temporary export ban. The ban was subsequently relaxed but then put permanently in place in early 2014. China used the relaxation period in 2014 to build a significant stockpile of imported bauxite. After the ban was imposed Chinese major alumina producers such as Chalco, Xinfa and Hongqiao looked for new sources of supply and have supported mine developments in Malaysia, Fiji, the Dominican Republic, and have developed mining operations in Guinea.

Malaysian exports filled the gap left by the Indonesians in 2014 with exports reaching a rate of 25-30Mtpa by late 2015. However in early 2016, Malaysia imposed a mining ban for 3 months in order to improve environmental standards. The ban has since been extended to July 15, but shipment of port stockpiles have continued. Some of the larger producers are pushing for mining to resume before the July expiry date if they can demonstrate a commitment to meeting new regulations. We understand that key requirements for exports to resume are; 1. Dedicated stockyards for bauxite at the port, and 2. The construction of dedicated haulage roads from the mines to port away from residential zones and villages.
Our key base case assumptions for bauxite exports by country are as follows;

- **Australia**: exports to China increased from 15.6Mt to 2014 to 19.6Mt in 2015 with the ramp-up of Rio’s Gove mine and increased productivity at Weipa. Exports should increase to 34Mtpa by 2020 with the ramp-up of Rio’s 22Mtpa Amrun mine south of Weipa. Roughly half of Amrun is replacing depletion at the East Weipa deposit. Amrun has the potential to be expanded to 50Mtpa and therefore can fill the deficit from 2020 onwards.

- **Malaysia**: we expect the current mining ban to be lifted in the next 3-6 months and for exports to remain steady at around 8-10Mtpa. However there might be upside risk to this number (recall exports reached 25-30Mtpa in 2015). There is about 3.7Mt of bauxite inventory in Kuantan including that at Kuantan Port, which is subject to many export restrictions.

- **Guinea**: Hongqiao completed the construction of its Guinean bauxite project in October 2015. The company is currently loading 2-3 cape size vessels per week and is targeting exports of 15Mt in 2016 and 30Mt in 2017. Rio Tinto and Alcoa are also looking at increasing exports to third parties after the closure of the Point Comfort refinery. Rusal is also seeking to develop a 6Mtpa export bauxite mine with the first shipment targeted for 2018. We model peak exports of 20Mtpa but believe Guinean exports have the potential to exceed 30Mtpa.

- **India**: exports have been steadily increasing over the past few years. We assume 8Mtpa of exports from 2017 onwards.

- **Indonesia**: we are taking the conservative line and assume that Indonesia resumes exports sometime in 2017 with China Hongqiao possibly gaining an export license for their completed 1Mtpa alumina refinery.
The seaborne bauxite price

The bauxite market is largely a producer-to-customer market with varying terms for both volume and price. For example, we believe that Rio Tinto sells the majority of its third party bauxite to China via contracts with three years duration on volume and three months to one year on price. Over the past three years, Rio Tinto’s realised third party bauxite price has been steady at US$47/wmt.

In China though, over 50% of domestic bauxite is traded on the spot or third-party market. The seaborne spot market is still in the early stages of formation. CM Group developed a “Bauxite Index” several years ago and this Index is starting to gain traction. Their Value-In-Use (VIU) Index price shows that seaborne bauxite is still priced mostly on a linkage basis to alumina on a 3-6 month lag.

The CM Group “Bauxite Index” price (VIU adjusted basis) rallied in 2014, increasing by c. 50% to US$75/t CIF due to the impact of the Indonesian ban. The price then fell as Malaysian exports began and has since dropped to US$46/t. We expect the bauxite price to stay under pressure over the next few years as the market moves into oversupply based on our forecasts.

We expect the market to tighten around 2020, unless additional projects come to market. This is a highly probable outcome as numerous companies, such as Alcoa and Rio Tinto have mentioned exporting to third parties out of Guinea and Brazil, to provide just one example. Over the long run, we see the marginal producer being the Atlantic basin exporters such as Ghana and Guinea. This is mostly based on our view of increasing freight rates with a recovering oil price. Our long run price of US$50/dmt is set at our estimate for long run delivered cost from Guinea to China.

Figure 32: Seaborne bauxite price (US$/t CFR, VIU adjusted, delivered to China)

Source: Deutsche Bank, CM Group
The Value in Use (VIU) equation
The CM Group reference price is based on bauxite grading 50% Al2O3, 5% silica and 10% moisture delivered to China (CIF basis). Figure 33 below shows the impact on price on varying Al2O3 and silica grades and moisture.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Price adjustment</th>
<th>Grade</th>
<th>Price adjustment</th>
<th>Moisture</th>
<th>Price adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>32%</td>
<td>-32</td>
<td>0.0%</td>
<td>21</td>
<td>0%</td>
<td>1</td>
</tr>
<tr>
<td>34%</td>
<td>-28</td>
<td>1.0%</td>
<td>17</td>
<td>2%</td>
<td>1</td>
</tr>
<tr>
<td>36%</td>
<td>-24</td>
<td>2.0%</td>
<td>12</td>
<td>4%</td>
<td>1</td>
</tr>
<tr>
<td>38%</td>
<td>-20</td>
<td>3.0%</td>
<td>8</td>
<td>6%</td>
<td>0</td>
</tr>
<tr>
<td>40%</td>
<td>-16</td>
<td>4.0%</td>
<td>4</td>
<td>8%</td>
<td>0</td>
</tr>
<tr>
<td>42%</td>
<td>-13</td>
<td>5.0%</td>
<td>0</td>
<td>10%</td>
<td>0</td>
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<tr>
<td>44%</td>
<td>-10</td>
<td>6.0%</td>
<td>-5</td>
<td>12%</td>
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</tr>
<tr>
<td>46%</td>
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<td>7.0%</td>
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Source: Deutsche Bank, CM Group

Global seaborne (China bound) bauxite costs and margins

We have compiled a global seaborne (China bound) bauxite margin curve and C1 cost curve based on 2016 forecast data using the VIU equation to adjust for different quality bauxites, current global freight rates and C1 cash cost data. This is based on published data or information obtained by industry contacts. We have also incorporated China’s domestic production. Therefore the curves show our forecasts for China’s total bauxite consumption for 2016. The data for both charts is shown in Figure 36. The VIU CIF realised price is based off the current Index price of c. US$46/t and we have adjusted Chinese production for VAT.

Starting with the margin curve, we estimate that around 85Mt of China’s 130Mt of consumed bauxite is generating positive margins at the current Index price. The high grades and close proximity to refineries of China’s southern bauxite means that margins are high. We believe Rio’s Gove and Weipa mines are generating strong margins at around US$15-20/t. At the current low freight rates, Hongqiao’s Guinea mine should generate positive margins. It quickly falls away thereafter. We think most of China’s northern based domestic bauxite is operating at a loss due to the lower grades. However, a lot of this production is integrated with alumina refineries and smelters. Northern Chinese bauxite prices are currently around RMB250/t and have started climbing in recent weeks.
Over the long run, we think depletion levels in Northern China and rising freight rates will determine the long run marginal cost and therefore the long run price.

Figure 34: Global seaborne (China bound) bauxite margin curve (2016)

Looking at costs, our recent trip to Henan province uncovered that Northern bauxite is being delivered to local refineries at a cost of around RMB260/t (US$40/t) and Southern bauxite at just RMB170/t (US$26/t). We think that Indian exports are the lowest cost.
Figure 35: Global seaborne (China bound) bauxite cost curve (2016)

Source: Deutsche Bank, company data, CM Group
### Figure 36: Global seaborne bauxite supply to China and Chinese domestic production (2016 estimate)

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<th>Freight Price</th>
<th>FOB Price</th>
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</table>

Source: Deutsche Bank, company data, China Customs, CM Group, Aladdiny
Company Financials

Our detailed company financial estimates are shown from Page 28 onwards.

Valuation and risks

For the mining sector, our company valuations are based on DCF-derived NPVs over the life of the operations and projects. An NPV multiple is applied in some cases when setting the share price target. Multiples applied to DB stocks are dependent on the company’s product types, exposure to commodity prices, earnings growth and upside potential, and risks associated with the development of projects. Forward multiples are also taken into consideration at times when setting price targets. Typically though, PTs are set broadly in-line with NPVs.

Risks associated with the mining sector include deviations in the commodity and currency prices away from DB forecast assumptions. Other risks specific to the sector are potential variations to capex budgets and schedules associated with project development. For those operations in production, operations can be affected by mechanical and technical challenges as well as inclement weather. The operating costs can vary over time as the price of labour, consumables and fuels change.

Alumina: We have set our PT broadly in line with our life-of-mine derived DCF NPV, which assumes a LT Al price of US$88c/lb (real), Index alumina of US$290/t (real), US$350/t caustic soda, 0.75 AUDUSD and 10% nominal WACC (in-line with the sector). We calculate our AWC valuation by discounting AWC’s operating cash flows from the alumina and aluminium production. Key downside risks include; a drop in both the aluminium and alumina price, alumina supply to emerge from inland China and aluminium supply to emerge from Western China, the threat of China subsidizing loss-making refineries, currency price strength and cost pressure from rising caustic soda, labour, and energy (natural gas). Key upside risks include higher commodity prices, lower operating currencies along with further efficiency gains from assets.
Rio Tinto is a global diversified mining company with interests in aluminum, borax, coal, copper, diamonds, gold, iron ore, titanium dioxide feedstock, uranium and zinc. Rio Tinto’s key mining operations are located in Australia, New Zealand, South Africa, South America, the United States, Europe, and Canada. Rio Tinto’s management structure is based primarily on six principal global products businesses: aluminium, diamonds, copper, energy (coal and uranium), industrial minerals, and iron ore supported by worldwide exploration and technology groups.

**Company Profile**

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**Price Performance**

- Rio Tinto (ALL ORDINARIES) vs. BHP Billiton (ALL ORDINARIES) vs. ALL ORDINARIES (Rebased)
- Sales, EBITDA, Cash Flow from operations, and ROE comparison

**Margin Trends**

- Comparison of EBITDA Margin and EBIT Margin

**Growth & Profitability**

- Comparison of Sales growth (LHS) and ROE (RHS)

**Solvency**

- Comparison of Net debt/equity ratio and Net interest cover ratio

---

**Key Company Metrics**

- **Sales growth (%)**
- **DB EPS growth (%)**
- **Payout ratio (%)**
- **EBITDA Margin (%)**
- **EBIT Margin (%)**
- **ROE (%)**
- **Net debt/equity ratio (%)**
- **Net interest cover (%)**

**DuPont Analysis**

- **EBIT margin (%)**
- **Asset turnover (x)**
- **Financial cost ratio (x)**
- **Tax and other effects (x)**
- **ROA (post tax) (%)**
- **Financial leverage (x)**
- **ROE (%)**
- **annual growth (%)**
- **NI Tax share (avg) (%)**
- **Reported EPS (%)**
- **annual growth (%)**

**Source:** Company data, Deutsche Bank estimates

---

**Income Statement (USDm)**

- **Sales**: 51,171, 47,664, 34,829, 30,760, 33,242, 34,762
- **EBITDA**: 16,613, 19,775, 13,460, 9,374, 11,897, 12,142
- **EBIT**: 11,822, 14,915, 8,815, 4,785, 7,085, 7,085
- **Pre-tax profit**: 3,506, 9,552, -726, 3,891, 6,254, 6,380
- **Net income**: 3,665, 6,527, -866, 2,814, 4,430, 4,528

**Cash Flow (USDm)**

- **Cash flow from operations**: 15,078, 14,286, 7,089, 8,187, 9,292, 9,792
- **Net Capex**: -10,946, -6,503, -4,600, -3,503, -4,807, -5,067
- **Free cash flow**: 4,132, 7,783, 2,489, 4,684, 4,485, 4,125
- **Equity raised (bought back)**: -18,000, -2,028, -2,028, -2,028, -2,028, -2,028
- **Dividends paid**: -3,322, -3,710, -4,076, -2,662, -2,209, -2,456
- **Net inc/(dec) in borrowings**: -3,322, -3,710, -4,076, -2,662, -2,209, -2,456
- **Other investing/financing cash flows**: 202, 1,168, 2,239, 0, 0, 0
- **Net cash flow**: 2,914, 2,191, -5,340, -662, 536, 392
- **Change in working capital**: 207, 1,468, 1,219, 231, -466, -230

**Balance Sheet (USDm)**

- **Cash and cash equivalents**: 10,216, 12,423, 9,386, 8,704, 9,240, 8,848
- **Property, plant & equipment**: 70,827, 68,663, 61,067, 59,070, 59,966, 60,589
- **Goodwill**: 1,349, 1,228, 892, 892, 892, 892
- **Other assets**: 26,833, 25,483, 20,249, 19,177, 19,974, 19,780
- **Total assets**: 111,025, 107,827, 91,564, 89,283, 90,071, 90,109
- **Debt**: 26,271, 24,818, 23,149, 20,466, 18,720, 16,687
- **Other liabilities**: 29,425, 28,315, 24,373, 26,946, 29,724, 32,254
- **Total liabilities**: 57,696, 53,233, 47,522, 47,412, 48,450, 48,921
- **Total shareholders’ equity**: 53,502, 54,594, 44,128, 41,871, 41,021, 41,189
- **Net debt**: 18,055, 12,495, 13,782, 11,762, 9,486, 7,819

---

**Key Figures:**

- **Balance Sheet (USDm)**: Sales, Cash and cash equivalents, Property, plant & equipment, Goodwill, Other assets, Total assets, Debt, Other liabilities, Total liabilities, Total shareholders’ equity, Net debt.
- **Income Statement (USDm)**: Sales, EBITDA, EBIT, Pre-tax profit, Net income.
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---

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---

**Price Performance**

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- Sales, EBITDA, Cash Flow from operations, and ROE comparison.

---

**Margin Trends**

- Comparison of EBITDA Margin and EBIT Margin

---

**Growth & Profitability**

- Comparison of Sales growth (LHS) and ROE (RHS)

---

**Solvency**

- Comparison of Net debt/equity ratio (LHS) and Net interest cover (RHS)

---

**Key Figures:**

- **Balance Sheet (USDm)**: Sales, Cash and cash equivalents, Property, plant & equipment, Goodwill, Other assets, Total assets, Debt, Other liabilities, Total liabilities, Total shareholders’ equity, Net debt.
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- **Balance Sheet (USDm)**: Cash and cash equivalents, Property, plant & equipment, Goodwill, Other assets, Total assets, Debt, Other liabilities, Total liabilities, Total shareholders’ equity, Net debt.
### RIO TINTO OPERATIONAL AND FINANCIAL SUMMARY

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#### UNDERLYING EARNINGS (US$M)

- Operating Cash Flow: 7,402
- Earnings Before Interest, Taxes, Depreciation, and Amortization: 7,402
- Cash Flow from Operations: 7,402
- Free Cash Flow: 7,402
- Dividends Declared: 7,402
- Free Cash Flow per Share: 7,402

#### KEY FINANCIAL METRICS

- Revenue: 14,246
- EBITDA: 11,898
- Net Income: 1,172
- EPS: 12
- ROE: 11.89

#### BALANCE SHEET AND RETURNS

- Net Debt (US$M): 12,495
- Gearing (ND/ND+): 1.31
- ROE (US$M): 1,172
- ROA (US$M): 12

#### PRODUCTION

- Copper (M t): 2,474
- Aluminium (M t): 5,346
- Coal (M t): 7,089
- Uranium (M t): 49
- RUTile (M t): 794
- Zircon (M t): 1,050

#### CONSOLIDATED CAPEX (US$M)

- Growth: 1,528
- Minerals: 525
- Energy: 315
- Iron Ore: 21,966
- Total: 23,501

#### EBITDA (US$M)

- Copper: 2,336
- Aluminium: 2,356
- Minerals: 829
- Energy: 356
- Iron Ore: 14,447
- Total: 23,501

#### EBITDA split (2015F)

- Copper: 40%
- Aluminium: 49%
- Minerals: 1%
- Energy: 9%
- Iron Ore: 2%
Model updated: 06 June 2016

Running the numbers

Australasia
Australia
M&M - Other Metals

Alumina
Reuters: AWC.AX  Bloomberg: AWC AU
Hold

Price (15 Jun 16)  AUD 1.37
Target Price  AUD 1.40
52 Week range  AUD 0.99 - 1.62
Market Cap (m)  AUD$m 3,830
USD$m 2,818

Company Profile
Alumina Limited (Alumina) is an alumina producer, with investments in bauxite mining, alumina refining and select aluminium smelting operations. The company holds a 40% stake in the Alcoa World Alumina and Chemicals (AWAC) joint venture, and Alcoa holds the remaining share. Approximately 50% of the alumina produced by AWAC is used as feed for smelters producing aluminium.

Price Performance

Marginal Trends

Growth & Profitability

Solvency

Fiscal year end 31-Dec

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<tr>
<td>Other assets</td>
<td>2,940</td>
<td>2,518</td>
<td>2,101</td>
<td>2,110</td>
<td>2,110</td>
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<tr>
<td>Total assets</td>
<td>2,964</td>
<td>2,543</td>
<td>2,111</td>
<td>2,120</td>
<td>2,178</td>
<td>2,195</td>
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<tr>
<td>Net debt</td>
<td>159</td>
<td>113</td>
<td>111</td>
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<td>1,963</td>
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<tr>
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<td>2,964</td>
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<td>Total liabilities</td>
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<td>Total shareholders' equity</td>
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<td>Net debt/equity (%)</td>
<td>33.4</td>
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Key Company Metrics

Sales growth (%)  96.1 % -3,418.4 % na -45.5 % 173.3 % 33.4 %
DB EPS growth (%)  -3.0 % -1.8 % 12.8 % 8.0 % 14.2 % 17.3 %
EBITDA Margin (%)  -0.1 % -3.6 % 3.9 % 2.4 % 6.5 % 8.5 %
EBIT Margin (%)  -3.0 % -1.8 % 12.8 % 8.0 % 14.2 % 17.3 %
ROE (%)  -3.0 % -1.8 % 12.8 % 8.0 % 14.2 % 17.3 %
Net debt/equity (%)  4.8 % 3.7 % 5.1 % 5.0 % 1.6 % 0.8 %
Net interest cover (x)  0.9 % 7.9 % 14.4 % 9.6 % 50.5 % 248.6 %

DuPont Analysis

EBIT margin (%)  -3.0 % -1.8 % 12.8 % 8.0 % 14.2 % 17.3 %
x Asset turnover (x)  0.0 % 0.0 % 0.0 % 0.0 % 0.0 % 0.0 %
x Financial cost ratio (x)  -0.1 % 1.1 % 0.9 % 0.9 % 1.0 % 1.0 %
x Tax and other effects (x)  0.2 % 1.0 % 1.0 % 1.0 % 1.0 % 1.0 %
x ROA (post tax) (%)  0.0 % -3.4 % 3.7 % 2.3 % 6.1 % 8.0 %
x Financial leverage (x)  1.1 % 1.1 % 1.1 % 1.1 % 1.1 % 1.1 %
x ROE (%)  0.0 % -3.8 % 3.9 % 2.4 % 6.5 % 8.5 %
annual growth (%)  na na na -38.6 % 168.1 % 30.9 %
x NTA/share (avg) (x)  1.0 % 1.0 % 0.8 % 0.7 % 0.7 % 0.7 %
x Reported EPS  0.00 % -0.03 % 0.03 % 0.02 % 0.06 % 0.08 %
annual growth (%)  na na na -45.5 % 173.3 % 33.4 %

Source: Company data, Deutsche Bank estimates

Paul Young
+61 2 8258-2587  paul-d.young@db.com

Deutsche Bank AG/Sydney
Figure 38: AWC financial and operating summary

### ALUMINA LTD OPERATIONAL AND FINANCIAL SUMMARY DATA

#### FX/COMMODITY ASSUMPTIONS

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<td>70</td>
<td>72</td>
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<td>87</td>
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<td>Aluminum sales on Index (%)</td>
<td>53%</td>
<td>68%</td>
<td>75%</td>
<td>85%</td>
<td>90%</td>
<td>95%</td>
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<td>Alumina index (US$/t)</td>
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<td>299</td>
<td>238</td>
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<td>Alumina intersegment (-US$/t)</td>
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<td>279</td>
<td>241</td>
<td>222</td>
<td>231</td>
<td>247</td>
<td>262</td>
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<td>Average alumina price - (US$/t)</td>
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<td>304</td>
<td>297</td>
<td>237</td>
<td>246</td>
<td>259</td>
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<td>Contract Alumina Linkage (%)</td>
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<td>14.5%</td>
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<td>14.5%</td>
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<td>18.0%</td>
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<td>Achieved Alumina Linkage (%)</td>
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<td>16.5%</td>
<td>15.5%</td>
<td>15.6%</td>
<td>15.4%</td>
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<td>93</td>
<td>49</td>
<td>41</td>
<td>52</td>
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<td>Caustic Soda (US$/t)</td>
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<td>320</td>
<td>301</td>
<td>290</td>
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<td>320</td>
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<td>Bauxite price (US$/t CIF)</td>
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<td>68</td>
<td>48</td>
<td>40</td>
<td>50</td>
<td>40</td>
<td>50</td>
<td>85</td>
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<td>AWAC (40%) Corporation (30%) (0.07)</td>
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<td>Shares (m) 102</td>
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<td>WACC (nominal) 10.0% WACC (real) 8.4%</td>
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</tbody>
</table>

#### KEY FINANCIAL METRICS

| AWAC EBITDA (US$m) | 269  | 301  | 989  | 610  | 836  | 996  | 988  | 1082  | 1207  |
| EBIT cash flow: post capex & tax (US$m) | -145 | -94  | 451  | 371  | 471  | 585  | 578  | 645  | 732  |

AWAC

- **Dividend Received from AWAC (US$m)**: 107
- **AWC - FY growth capex (US$m)**: 56
- **Underlying Earnings (US$m)**: -3
- **Net Debt (US$m)**: 135
- **Gearing (IND-%)**: 5%
- **ROA (%)**: 1%
- **EPS (USd)**: 0.0
- **EPS (Ac)**: 0.0
- **ROE (%)**: 0.0
- **EGS (USd)**: 0.0
- **EPS (Ac)**: 0.0
- **DPS (Ac)**: 0.0
- **Payout ratio (%)**: 0%
- **CFPS (Ac)/- post growth capex**:
- **CFPS (Ac) - post growth capex**:

**MARGINS**

- **EBITDA (US$/t) - Alumina and Bauxite**
- **D&A (US$m)**
- **Ebit (US$/t)**
- **EBITDA (%)**
- **EBIT (%)**
- **Ebit (US$/t)**

**PRODUCTION (tkt)**

- **Alumina**
- **Pinjarra**
- **Wagerup**
- **Paint Comfort**
- **Sunstate (Panaman)**
- **Jamalo (5%)**
- **Alumar (Sao Lus) (39%)**
- **San Ciprian**
- **Raz Az Zair (Maladen, JV) (25%)**
- **Alumina**
- **Paint Henry (99%)**
- **Portland (55%)**
- **Aluminium**

**Bauxite sales (Mt)**

**CASH COSTS**

- **Bauxite costs (US$/t CIF)**
- **Alumina (US$/t FOI)**

**CAPEX (US$m)**

- **AWC - Expansionary**
- **AWAC - Sustaining**
- **AWC - Completion sustaining**

### Production split (2018)

- **Kwinana 19%**
- **Pinjarra 39%**
- **Bauxite 20%**
- **Wagerup 20%**
- **Alumar (Sao Lus) (20%)**
- **San Ciprian 12%**
- **Point Comfort 2%**

Source: Deutsche Bank estimates, company data

Source: Deutsche Bank, company data
**Running the numbers**

**Australasia**

**Canada**

**M&G - Diversified Resources**

**South32**

Reuter: S32.AX  Bloomberg: S32 AU

**Hold**

Price (15 Jun 16)  AUD 1.57

Target Price  AUD 1.60

52 Week range  AUD 0.89 - 2.08

Market Cap (m)  AUD$m 8,359

USD$m 6,149

**Company Profile**

South32 will be a mid cap diversified miner. The company’s asset portfolio includes Illawarra met coal, the Cannington silver/lead/zinc mine, the Cerro Matoso nickel mine, The Groote Eylandt manganese mine, Samancor manganese (Hotazel and Metalloys), the Worsley and Alumar aluminium refineries, the Hillside, Mzol, Bayside and Alumar aluminium smelters and Energy coal South Africa. Operations are located in Australia (along with head office), South Africa, Mozambique, Brazil and Columbia.

**Price Performance**

**Margin Trends**

**Growth & Profitability**

**Solvency**

Paul Young  
+61 2 8258-2587  paul-d.young@db.com

**Fiscal year end 30-Jun**

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<td><strong>Financial Summary</strong></td>
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<td>DB EPS (USD)</td>
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<td>1.1</td>
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<td>0.6</td>
<td>0.7</td>
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<tr>
<td>x Tax and other effects (x)</td>
<td>0.2</td>
<td>0.0</td>
<td>-8.2</td>
<td>0.6</td>
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<tr>
<td>= ROA (post tax) (%)</td>
<td>1.2</td>
<td>0.2</td>
<td>-11.9</td>
<td>1.5</td>
</tr>
<tr>
<td>x Financial leverage (x)</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
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<tr>
<td>= ROE (%)</td>
<td>1.6</td>
<td>0.2</td>
<td>-16.6</td>
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<td>annual growth (%)</td>
<td>na</td>
<td>-85.3</td>
<td>na</td>
<td>na</td>
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<tr>
<td>x NTA/share (avg) (x)</td>
<td>1.2</td>
<td>2.3</td>
<td>1.9</td>
<td>1.8</td>
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<tr>
<td>= Reported EPS</td>
<td>0.02</td>
<td>0.01</td>
<td>-0.32</td>
<td>0.04</td>
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<td>annual growth (%)</td>
<td>na</td>
<td>-72.7</td>
<td>na</td>
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Source: Company data, Deutsche Bank estimates

Deutsche Bank AG/Sydney
<table>
<thead>
<tr>
<th>KEY FINANCIAL METRICS</th>
<th>FY14A</th>
<th>FY15A</th>
<th>FY16F</th>
<th>FY17F</th>
<th>FY18F</th>
<th>FY19F</th>
<th>FY20F</th>
<th>FY21F</th>
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<tr>
<td>Underlying Earnings (US$M)</td>
<td>446</td>
<td>575</td>
<td>85</td>
<td>195</td>
<td>348</td>
<td>286</td>
<td>296</td>
<td>495</td>
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<td>EPS (US$)</td>
<td>6</td>
<td>11</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>9</td>
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<td>EPS Change (%)</td>
<td>29%</td>
<td>-45%</td>
<td>13%</td>
<td>78%</td>
<td>78%</td>
<td>78%</td>
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<tr>
<td>DPS (US$)</td>
<td>0</td>
<td>0.2</td>
<td>0.4</td>
<td>1.5</td>
<td>2.6</td>
<td>2.1</td>
<td>2.2</td>
<td>3.7</td>
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<td>EPS payout ratio (%)</td>
<td>0%</td>
<td>0%</td>
<td>28%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
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<td>BALANCE SHEET AND RETURNS</td>
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<tr>
<td>Free Cash Flow (US$M)</td>
<td>1,419</td>
<td>1,838</td>
<td>915</td>
<td>1,011</td>
<td>1,164</td>
<td>1,063</td>
<td>1,066</td>
<td>1,270</td>
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<td>Cash and cash equivalents (US$M)</td>
<td>-384</td>
<td>-157</td>
<td>-485</td>
<td>-467</td>
<td>-542</td>
<td>-446</td>
<td>-434</td>
<td>-475</td>
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<td>Free Cash Flow (FY18F)</td>
<td>362</td>
<td>1,023</td>
<td>420</td>
<td>492</td>
<td>511</td>
<td>477</td>
<td>518</td>
<td>677</td>
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<td>Free Cash Flow yield (%)</td>
<td>18%</td>
<td>3%</td>
<td>10%</td>
<td>13%</td>
<td>15%</td>
<td>14%</td>
<td>14%</td>
<td>18%</td>
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<tr>
<td>ROA (%)</td>
<td>0%</td>
<td>2%</td>
<td>4%</td>
<td>5%</td>
<td>5%</td>
<td>8%</td>
<td>8%</td>
<td>11%</td>
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</table>

**PRODUCTION**
- Alumina (kt) - total: 5,178, 5,147, 5,270, 5,265, 5,292, 5,318, 5,345, 5,345, 5,345
- Alumina (kt) - third party sales: 2,830, 2,330, 3,333, 3,340, 3,366, 3,399, 3,399, 3,400, 3,400
- Alumina (kt) - total: 11,174, 2,004, 984, 976, 976, 976, 976, 976, 976
- Manganese Ore (Mt): 4,431, 4,624, 4,274, 4,408, 4,408, 4,468, 4,468, 4,468, 4,468
- Nickel (kt): 44, 40, 37, 36, 31, 27, 27, 27, 27
- Coal (Mt): 7,5, 8, 5, 8, 9, 9, 9, 9, 9
- Total Coal: 30,4, 34, 32, 30, 31, 30, 23, 23, 23

**COSTS**
- Absolute (US$M) - excludes Manganese: 6,504, 6,049, 7,497, 4,397, 4,397, 4,824, 4,731, 4,866, 4,640
- Unit costs (US$/tonne Cu Eq) - incl. royalties: 2,2, 1,9, 1,6, 1,5, 1,5, 1,7, 1,8, 1,9, 1,9
- Change in unit costs (%): -22% -12% -16% -9% -6% -4% -5% 7% 7% 7%
- Unit costs by segments:
  - Cerdá Mataco (US$/tonne): 5,1, 5,1, 3,9, 3,5, 3,9, 4,6, 4,8, 4,9, 5,1
  - SAscoal exports (US$/tonne): 60, 42, 34, 33, 35, 41, 45, 46, 41
  - SAscoal domestic (US$/tonne): 3,9, 3,9, 3,9, 3,9, 3,9, 3,9, 3,9, 3,9, 3,9
  - Alumina (US$/tonne): 0,4, 0,5, 0,6, 0,6, 0,7, 0,8, 0,9, 0,7, 0,7
  - Met Coal: 0,7, 0,8, 0,9, 0,9, 0,9, 0,9, 0,9, 0,9, 0,9

**EBITDA (US$M)**
- Aluminium: 315, 564, 250, 255, 374, 189, 100, 238, 387
- Manganese (30%): 2,700, 1,050, 151, 169, 209, 204, 245, 245, 245
- Nickel: 3,700, 5,300, 5,300, 5,300, 5,300, 5,300, 5,300, 5,300, 5,300
- Total (adjusted for EAUs): 1,428, 1,849, 1,086, 1,198, 1,369, 1,191, 1,169, 1,412, 1,648

**CAPEX (US$M)**
- Alumina: 56, 62, 67, 68, 68, 70, 71, 71, 114, 116
- Aluminium: 44, 56, 57, 69, 74, 78, 78, 78, 78, 78
- Manganese (30%): 130, 139, 90, 78, 138, 58, 56, 57, 57
- Nickel: 56, 56, 20, 15, 15, 16, 16, 16, 16, 16
- Total Capital: 305, 311, 212, 114, 101, 105, 107, 109, 110, 110
- Total Capital: 66, 98, 82, 82, 87, 73, 56, 50, 49, 49
- Total Capital: 66, 98, 82, 82, 87, 73, 56, 50, 49, 49
- Total Capital: 720, 768, 550, 467, 542, 446, 434, 475, 446
- Sustaining Capex: 420, 620, 498, 467, 446, 446, 446, 446, 446, 446
- Growth Capex: 291, 159, 54, 60, 60, 0, 0, 0, 0, 0
- Consolidated Capex (excludes Manganese): 590, 629, 461, 389, 403, 388, 378, 418, 389

Source: Company data, DB estimates
Source: Deutsche Bank, company data
Hydro is a fully integrated aluminium producer with power generating, alumina refining, aluminium smelting and aluminium processing operations. Its recent acquisition of the Brazilian aluminium, alumina and bauxite assets from Vale has shifted its balance from naturally short alumina (neutral when including long-term offtake agreements) to naturally long. With the transfer of the assets only just complete, the company is in the process of integrating them into its business. Once done, the bauxite and alumina assets offer significant growth options to Hydro. The company is in the process of commissioning its major greenfield smelter in Qatar.

Company Profile

EBITDA Margin (%)

Cash Flow (NOKm)

Key Company Metrics

Sales growth (%) 1.2 21.0 12.1 -1.7 12.4 5.4

DB EPS growth (%) 277.0 96.0 79.8 -42.3 24.3 108.6

EBITDA Margin (%) 9.3 13.2 15.0 15.6 14.8 16.0

EBIT Margin (%) 2.6 7.2 9.3 9.5 9.1 11.4

Payout ratio (%) nm 255.0 109.9 23.8 33.3 53.7

ROE (%) -1.3 1.1 2.7 8.4 8.8 8.0

Capex/sales (%) 4.1 4.2 5.9 9.3 4.3 3.6

Capex/depreciation (%) 0.6 0.7 1.0 1.5 0.6 0.7

Net debt/equity (%) -0.9 0.2 -6.5 -2.4 -6.4 -12.2

Net interest cover (x) 0.7 1.6 1.7 nm 17.5 22.9

Source: Company data, Deutsche Bank estimates

Valuation Metrics

P/E (DB) (x) 27.8 18.6 10.8 16.4 13.2 6.3

P/E (Reported) (x) nm 86.9 35.9 9.8 11.0 8.5

P/BV (x) 0.79 1.17 0.91 0.79 0.72 0.64

FCF Yield (%) 4.6 4.0 12.7 nm 7.9 13.6

Dividend Yield (%) 2.9 2.9 2.8 2.4 3.0 6.3

EV/Sales (x) 0.6 0.8 0.6 0.6 0.5 0.4

EVEBITDA (x) 6.5 5.9 4.3 3.9 3.4 2.5

EVEBIT (x) 23.4 10.8 6.9 6.4 5.6 3.6

Income Statement (NOKm)

Sales revenue 65,369 79,076 88,642 87,115 97,907 103,232

Gross profit 6,006 10,444 13,282 13,599 14,445 17,293

EBITDA 4,392 4,770 5,023 5,282 5,525 5,503

Depreciation 153 892 1,092 2,163 2,387 3,190

Amortisation 0 0 0 0 0 0

EBIT 1,674 5,674 8,259 8,317 8,920 11,790

Net interest income/(expense) -2,550 -3,553 -4,833 656 -608 -515

Associates/affiliates 0 0 0 0 0 0

Exceptions/extraordinarys 0 0 0 0 0 0

Other pre-tax income/(expense) 0 0 0 0 0 0

Profit before tax -876 2,121 3,426 8,973 8,411 11,279

Income tax expense 183 892 1,092 2,163 2,387 3,190

Minorities 82 431 312 315 249 603

Other post-tax income/(expense) 189 0 0 0 0 0

Net profit -922 798 2,022 6,495 5,775 7,482

DB adjustments (including dilution) 2,823 2,930 4,687 -2,824 -664 2,556

DB Net profit 1,901 3,728 6,709 3,871 4,812 10,038

Cash Flow (NOKm)

Cash flow from operations 5,074 5,965 14,373 5,758 9,252 12,298

Net Capex -2,637 -3,181 -5,132 -8,070 -4,198 -3,671

Free cash flow 2,437 2,784 9,241 -2,312 5,054 8,627

Equity raised/bought back 56 21 35 10 0 0

Dividends paid -1,528 -1,943 -2,370 -2,042 -1,548 -1,925

Net inc/(dec) in borrowings -511 -1,346 -4,841 1,146 1,000 0

Other investing/financing cash flows 1,309 1,463 -4,296 -1,362 -2,578 -5,637

Net cash flow 1,823 1,451 -2,931 -4,694 1,927 1,069

Change in working capital 0 0 0 0 0 0

Balance Sheet (NOKm)

Cash and other liquid assets 10,892 11,039 12,649 11,624 17,339 22,192

Tangible fixed assets 50,670 55,719 51,174 58,223 60,684 62,639

Goodwill/intangible assets 23,767 24,042 25,271 23,730 23,246 23,262

Associates/affiliates 39,906 35,472 33,430 37,913 41,481 43,093

Other assets 115,236 126,272 122,544 131,490 142,749 151,205

Interest bearing debt 10,181 11,167 7,531 9,547 11,272 9,459

Other liabilities 29,790 35,164 36,683 36,020 37,290 37,612

Total liabilities 39,971 46,331 43,214 45,067 48,562 47,071

Shareholders’ equity 69,981 74,030 74,171 80,699 88,963 98,911

Minority 5,269 5,911 5,159 5,224 5,224 5,224

Total shareholders’ equity 75,264 79,941 79,330 85,923 94,187 104,135

Net debt -711 128 -5,138 -2,077 -6,067 -12,732

Source: Company data, Deutsche Bank estimates
Model updated: 13 April 2016

Running the numbers

North America
United States
Metals & Mining

Alcoa

Reuter: AA.N
Bloomberg: AA UN

Buy

Price (14 Jun 16)
USD 9.10
Target Price
USD 13.00
52 Week range
USD 6.74 - 12.02
Market Cap (m)
USDm 12,447
EERm 11,102

Company Profile

Alcoa is a global leader in aluminum with a capacity of ~6% of world supply. It operates an integrated mine-to-metal model with aluminum and related products accounting for ~70% of sales. Performance of the upstream commodities business is primarily dependent on the LME aluminum and alumina price. Over the past five years, Alcoa’s mid- and downstream businesses have gained significance due to acquisitions and leverage to foster-growing end markets such as Auto and Aerospace. Alcoa has announced its intention to split itself into two entities by YE16.

Price Performance

Margin Trends

Growth & Profitability

Solvency

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>EBIT Margin</td>
<td>0.32</td>
<td>0.91</td>
<td>0.58</td>
<td>0.41</td>
<td>0.73</td>
<td>0.91</td>
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<tr>
<td>Reported EPS (USD)</td>
<td>-2.09</td>
<td>0.23</td>
<td>-0.14</td>
<td>0.34</td>
<td>0.73</td>
<td>0.91</td>
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<tr>
<td>DPS (USD)</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
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<td>BVPX (USD)</td>
<td>9.89</td>
<td>10.46</td>
<td>9.64</td>
<td>9.19</td>
<td>9.68</td>
<td>10.47</td>
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Financial Summary

Valuation Metrics

Price/Sales (x) 8.4
P/E (DB) (x) 26.5
P/E (Reported) (x) 63.5
P/BV (x) 1.1
FCF yield (%) 8.3
Dividend yield (%) 1.4
EV/Sales 0.8
EV/EBITDA 6.8
EV/EBIT 15.4
Price (14 Jun 16)
USD 9.10

Income Statement (USDm)

Sales 23,032 23,306 22,534 20,847 23,028 24,420
EBITDA 2,546 3,556 3,248 2,714 3,472 3,820
EBIT 1,25,2,185 1,968 1,499 2,256 2,612
Pre-tax profit 682 1,665 1,443 968 1,806 2,177
Net income -2,286 268 -172 463 1,006 1,261

Cash Flow (USDm)

Cash flow from operations 1,972 2,668 1,834 1,451 2,215 2,556
Net Capex -1,193 -1,219 -1,180 -1,400 -1,066 -1,166
Free cash flow 779 1,449 654 51 1,149 1,390
Equity raised/(bought back) 0 500 0 0 0 0
Dividends paid -128 -139 -191 -188 -158 -166
Net inc/(dec) in borrowings -510 504 259 0 0 0
Other investing/financing cash flows -45 -2,752 -1,615 9 -69 -2
Net cash flow 96 -438 -853 -97 922 1,222
Change in working capital -297 -49 -444 -426 -229 -172

Balance Sheet (USDm)

Cash and cash equivalents 1,437 1,877 1,919 1,832 2,703 3,863
Property, plant & equipment 17,639 16,426 14,815 15,259 15,109 15,068
Goodwill 3,415 5,247 5,406 5,402 5,402 5,402
Other assets 13,251 13,861 14,597 13,985 14,527 14,871
Total assets 35,742 37,411 36,737 36,478 37,741 39,203
Debt 8,319 8,823 9,082 9,069 9,069 9,069
Other liabilities 13,901 13,775 13,326 12,646 12,907 13,058
Total liabilities 22,220 22,598 22,408 21,715 21,976 22,127
Total shareholders’ equity 13,522 14,813 14,329 14,764 15,764 17,076
Net debt 6,882 6,946 7,163 7,207 6,936 5,960

Key Company Metrics

Sales growth (%) -2.8 3.8 -5.7 -7.5 10.5 6.0
DB EPS growth (%) 33.1 179.6 -36.1 -29.5 77.4 25.5
Payout ratio (%) nn 52.7 56.9 35.4 16.5 13.2
EBITDA Margin (%) 11.1 14.9 14.4 13.0 15.1 15.6
EBIT Margin (%) 4.9 9.1 8.7 7.2 9.8 10.7
ROE (%) -19.2 2.3 1.4 3.7 7.7 9.0
Net debt/equity (%) 50.9 46.9 50.0 49.0 40.4 30.5
Net interest cover (x) 2.5 4.6 4.0 2.9 4.3 5.0

DuPont Analysis

EBIT margin (%) 4.9 9.1 8.7 7.2 9.8 10.7
x Asset turnover (x) 0.6 0.7 0.6 0.6 0.6 0.6
x Financial cost ratio (%) 0.6 0.8 0.7 0.7 0.8 0.8
x Tax and other effects (x) -3.4 0.2 -0.1 0.5 0.6 0.6
= ROA (post tax) (%) -6.0 0.7 -0.5 1.3 2.7 3.3
x Financial leverage (x) 3.2 3.2 3.0 3.0 2.9 2.9
= ROE (%) -19.2 2.3 -1.4 3.7 7.7 9.0
annual growth (%) na na na na 107.2 168.6
x NTAshare (av) (x) 10.9 9.7 9.7 9.1 9.4 10.1
= Reported EPS -2.09 0.23 -0.14 0.34 0.73 0.91
annual growth (%) na na na na 114.2 25.5

Source: Company data, Deutsche Bank estimates

Jorge Beristain, CFA
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Running the numbers

Asia
China
Metals & Mining

Chalco
Reuters: 2600.HK  Bloomberg: 2600 HK

Hold
Price (14 Jun 16)  HKD 2.36
Target Price  HKD 2.80
52 Week range  HKD 2.16 - 4.35
Market Cap (m)  HKDm 31,918  US$Dm 4,113

Company Profile
Aluminum Corporation of China Limited is a producer of alumina and primary aluminum in China. The Company refines bauxite into alumina and smelts alumina to produce primary aluminum.

Price Performance

Jun 14Sep 14Dec 14Jan 15Feb 15Mar 15Apr 15May 15Jun 15
Chalco  HANG SENG INDEX (Rebased)

Margin Trends

Growth & Profitability

Solvency

Fiscal year end 31-Dec

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<td>Sales revenue</td>
<td>169,421</td>
<td>141,772</td>
<td>123,446</td>
<td>121,715</td>
<td>127,107</td>
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<td>Gross profit</td>
<td>9,866</td>
<td>7,876</td>
<td>9,643</td>
<td>12,913</td>
<td>16,954</td>
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<td>EBITDA</td>
<td>12,600</td>
<td>-3,502</td>
<td>12,147</td>
<td>9,886</td>
<td>13,557</td>
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<td>Depreciation</td>
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<td>6,955</td>
<td>6,869</td>
<td>6,796</td>
<td>6,811</td>
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<td>Amortisation</td>
<td>278</td>
<td>257</td>
<td>255</td>
<td>265</td>
<td>265</td>
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<td>EBIT</td>
<td>5,456</td>
<td>-14,440</td>
<td>5,023</td>
<td>2,834</td>
<td>6,491</td>
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<td>Net interest income/expense</td>
<td>-5,233</td>
<td>-5,670</td>
<td>-5,138</td>
<td>-4,089</td>
<td>-4,338</td>
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<td>Net profit</td>
<td>883</td>
<td>-15,675</td>
<td>193</td>
<td>-1,416</td>
<td>2,869</td>
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<td>Income tax expense</td>
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<td>1,075</td>
<td>-230</td>
<td>0</td>
<td>0</td>
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<td>Net profit</td>
<td>975</td>
<td>-16,217</td>
<td>206</td>
<td>-1,274</td>
<td>2,402</td>
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<td>Cash flow from operations</td>
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<td>13,773</td>
<td>7,231</td>
<td>12,529</td>
<td>10,466</td>
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<td>Net Capex</td>
<td>-8,557</td>
<td>-8,220</td>
<td>-8,058</td>
<td>-9,000</td>
<td>-5,000</td>
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<tr>
<td>Free cash flow</td>
<td>-305</td>
<td>5,553</td>
<td>-827</td>
<td>3,529</td>
<td>5,466</td>
</tr>
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<td>Equity raised/(bought back)</td>
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<td>7,887</td>
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<td>Dividends paid</td>
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<td>0</td>
<td>0</td>
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<td>Net income/(loss) in borrowings</td>
<td>8,555</td>
<td>829</td>
<td>-12,752</td>
<td>-3,529</td>
<td>-8,338</td>
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<td>Net cash flow</td>
<td>-7,166</td>
<td>-8,555</td>
<td>3,374</td>
<td>-4,089</td>
<td>-8,338</td>
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<td>Change in working capital</td>
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<td>11,237</td>
<td>163</td>
<td>2,120</td>
<td>-3,689</td>
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<td>Cash and other liquid assets</td>
<td>12,426</td>
<td>17,932</td>
<td>22,488</td>
<td>17,798</td>
<td>10,587</td>
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<td>Tangible fixed assets</td>
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<td>94,032</td>
<td>89,875</td>
<td>92,079</td>
<td>90,268</td>
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<tr>
<td>Goodwill/intangible assets</td>
<td>10,852</td>
<td>10,978</td>
<td>10,439</td>
<td>10,184</td>
<td>9,929</td>
</tr>
<tr>
<td>Associate/investments</td>
<td>20,446</td>
<td>20,042</td>
<td>20,718</td>
<td>20,718</td>
<td>20,718</td>
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<tr>
<td>Other assets</td>
<td>55,177</td>
<td>49,648</td>
<td>45,750</td>
<td>42,701</td>
<td>46,470</td>
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<tr>
<td>Total assets</td>
<td>199,507</td>
<td>192,632</td>
<td>189,269</td>
<td>183,479</td>
<td>177,971</td>
</tr>
<tr>
<td>Interest bearing debt</td>
<td>119,643</td>
<td>119,536</td>
<td>108,149</td>
<td>104,019</td>
<td>96,281</td>
</tr>
<tr>
<td>Other liabilities</td>
<td>26,162</td>
<td>33,067</td>
<td>30,823</td>
<td>29,970</td>
<td>30,140</td>
</tr>
<tr>
<td>Total liabilities</td>
<td>145,805</td>
<td>153,003</td>
<td>138,972</td>
<td>134,959</td>
<td>126,421</td>
</tr>
<tr>
<td>Shareholders’ equity</td>
<td>44,382</td>
<td>49,629</td>
<td>50,297</td>
<td>48,882</td>
<td>51,531</td>
</tr>
<tr>
<td>Net debt</td>
<td>107,217</td>
<td>102,004</td>
<td>85,681</td>
<td>86,821</td>
<td>85,694</td>
</tr>
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</table>

Key Company Metrics

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Sales growth (%)</td>
<td>-1.20</td>
<td>-1.20</td>
<td>-0.99</td>
<td>0.06</td>
<td>0.16</td>
</tr>
<tr>
<td>EBIT growth (%)</td>
<td>2.70</td>
<td>2.70</td>
<td>2.70</td>
<td>2.70</td>
<td>2.70</td>
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<tr>
<td>Net debt/equity (%)</td>
<td>107.0</td>
<td>107.0</td>
<td>107.0</td>
<td>107.0</td>
<td>107.0</td>
</tr>
<tr>
<td>Payout ratio (%)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>ROE (%)</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Capex/sales (%)</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Capex/depreciation (%)</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Sharon Ding  sharon.ding@db.com

Deutsche Bank AG/Sydney
Model updated: 28 April 2016

Running the numbers

Asia

China

Metals & Mining

China Hongqiao Group Ltd.

Reuters: 1378.HK  Bloomberg: 1378 HK

Buy

Price (14 Jun 16)  HKD 5.18

Target Price  HKD 6.30

52 Week range  HKD 3.16 - 7.58

Market Cap (m)  HKDm 31,913 USDm 4,112

Company Profile

China Hongqiao, based in Shandong, China, is the world’s largest primary aluminium producer. The company has six production bases with a designed aluminium capacity of 5m+ by 2015, 60% self-sufficient ratio in alumina and 80%+ self-supplied power by 2015. China Hongqiao was listed in HKEQ in March 2011.

Fiscal year end  31-Dec

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DB EPS (CNY)</td>
<td>0.92</td>
<td>0.86</td>
<td>0.57</td>
<td>0.73</td>
</tr>
<tr>
<td>Reported EPS (CNY)</td>
<td>0.92</td>
<td>0.86</td>
<td>0.57</td>
<td>0.73</td>
</tr>
<tr>
<td>DPS (CNY)</td>
<td>0.27</td>
<td>0.28</td>
<td>0.16</td>
<td>0.16</td>
</tr>
<tr>
<td>BVPS (CNY)</td>
<td>4.5</td>
<td>5.2</td>
<td>4.9</td>
<td>5.0</td>
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</tbody>
</table>

Weighted average shares (m)  5,885

Average market cap (CNYm)  19,995

Enterprise value (CNYm)  44,359

Valuation Metrics

P/E (DB) (x)  3.7

P/EBITDA (x)  3.7

P/VA (x)  0.93

FCF Yield (%)  nm

Dividend Yield (%)  8.0

EV/Sales (x)  1.5

EVEBITDA (x)  4.2

EVEBIT (x)  5.2

Income Statement (CNYm)

Sales revenue  29,404

Gross profit  10,229

EBITDA  10,589

Depreciation  2,086

Amortisation  0

EBIT  8,503

Profit before tax  7,379

Income tax expense  7,703

Minorities  6

Net profit  5,580

DB adjustments (including dilution)  0

DB Net profit  5,580

Cash Flow (CNYm)

Cash flow from operations  252

Free cash flow  -13,730

Equity raised/bought back  0

Dividends paid  -1,218

Net income in/deducted from operating activities  13,961

Other investing/financing cash flows  -1,816

Net cash flow  -3,813

Change in working capital  -8,479

Balance Sheet (CNYm)

Cash and other liquid assets  6,362

Tangible fixed assets  39,997

Goodwill/intangible assets  0

Other assets  18,820

Total assets  65,179

Interest bearing debt  30,558

Other liabilities  7,738

Total liabilities  38,296

Shareholders’ equity  26,674

Minorities  208

Total shareholders’ equity  26,883

Net debt/equity (%)  24,196

Sales growth (%)  35

DB EPS growth (%)  -6.1

EBITDA Margin (%)  36.0

EBIT Margin (%)  28.9

Payout ratio (%)  28.6

ROE (%)  22.8

Capex/sales (%)  47.6

Capex/dividends (x)  6.7

Net debt/equity (%)  90.0

Net interest cover (x)  6.6

Key Company Metrics

Source: Company data, Deutsche Bank estimates

Sharon Ding

sharon.ding@db.com
### Company Profile

United Company RUSAL Plc is one of the world’s biggest producers of primary aluminum. It is a global vertically integrated industry leader with 8 bauxite mines, 12 alumina refineries and 16 aluminium smelters in 20 countries. UC Rusal also runs a downstream foil and packaging segment and owns substantial coal assets in Kazakhstan. During the year ended December 31, 2013, the company produced 4.2 million tons of aluminium and 7.0 million tons of alumina. Rusal owns a 27.8% equity stake in Norilsk Nickel.

### Price Performance

![Price Performance Graph](Image)

### Margin Trends

![Margin Trends Graph](Image)

### Growth & Profitability

![Growth & Profitability Graph](Image)

### Key Company Metrics

#### Sales growth (%)  
- 10.4  
- 8.4  
- 6.7  
- 5.7  
- 4.0  
- 2.0  
- 1.0  
- 0.0  

#### DB EPS growth (%)  
- 7.8  
- 2.7  
- 1.7  
- 0.7  
- 0.0  
- 0.0  
- 0.0  
- 0.0  

#### EBITDA Margin (%)  
- 6.7  
- 6.3  
- 6.0  
- 5.9  
- 2.2  
- 1.7  
- 1.3  
- 0.8  

#### EBIT Margin (%)  
- 5.7  
- 5.3  
- 5.0  
- 4.9  
- 1.7  
- 1.1  
- 0.5  
- 0.0  

#### Net debt/equity (LHS)  
- 4.7  
- 4.2  
- 3.8  
- 2.8  
- 1.8  
- 0.8  
- 0.3  
- 0.0  

#### Net interest cover (LHS)  
- 3.5  
- 2.9  
- 2.5  
- 2.0  
- 1.5  
- 1.0  
- 0.5  
- 0.0  

Source: Company data, Deutsche Bank estimates
Model updated: 13 May 2016

Running the numbers

Europe
United Kingdom
Metals & Mining

Vedanta Resources

Reuters: VED.L
Bloomberg: VED LN

Hold
Price (14 Jun 16) GBP 373.00
Target Price GBP 376.00
52 Week range GBP 205.80 - 603.50
Market Cap (m) GBPm 1,029
USDm 1,453

Company Profile

Vedanta Resources Ltd. mines and processes a variety of metals (copper, zinc and aluminium), with its core operations being domiciled in India. Since its listing in London in late 2003, the company has diversified its exposure by both metal and geography mostly via acquisition; iron ore, power and oil in India, copper in Zambia and zinc in Southern Africa and Ireland.

Price Performance

Margin Trends

Growth & Profitability

Solvency

Fiscal year end 31-Mar

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<tbody>
<tr>
<td>Sales revenue</td>
<td>14,990</td>
<td>12,945</td>
<td>12,879</td>
<td>10,738</td>
<td>10,922</td>
</tr>
<tr>
<td>Gross profit</td>
<td>4,888</td>
<td>4,491</td>
<td>3,741</td>
<td>2,336</td>
<td>2,348</td>
</tr>
<tr>
<td>EBITDA</td>
<td>4,888</td>
<td>4,491</td>
<td>3,741</td>
<td>2,336</td>
<td>2,348</td>
</tr>
<tr>
<td>Depreciation</td>
<td>2,323</td>
<td>2,203</td>
<td>2,006</td>
<td>1,455</td>
<td>1,540</td>
</tr>
<tr>
<td>Amortisation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EBIT</td>
<td>2,565</td>
<td>2,288</td>
<td>1,736</td>
<td>882</td>
<td>808</td>
</tr>
<tr>
<td>Other expenses</td>
<td>-806</td>
<td>-752</td>
<td>-555</td>
<td>-583</td>
<td>-293</td>
</tr>
<tr>
<td>Operating margin</td>
<td>460</td>
<td>465</td>
<td>685</td>
<td>318</td>
<td>159</td>
</tr>
<tr>
<td>Net income</td>
<td>1,508</td>
<td>1,185</td>
<td>1,899</td>
<td>1,665</td>
<td>634</td>
</tr>
<tr>
<td>Net profit</td>
<td>169</td>
<td>169</td>
<td>1,837</td>
<td>278</td>
<td>767</td>
</tr>
<tr>
<td>EPS (USD)</td>
<td>10.2</td>
<td>11.1</td>
<td>14.5</td>
<td>21.1</td>
<td>26.8</td>
</tr>
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Valuation Metrics

- P/E (DB) x 12.4
- P/E (Reported) x 27.5
- P/BV x 0.95
- FCF Yield (%) 15.4
- Dividend Yield (%) 3.4
- EV/Sales (x) 1.7
- EV/EBITDA (x) 5.4
- EV/EBIT (x) 10.2

Income Statement (USDm)

Cash Flow (USDm)

Cash flow from operations 2,946
Net Capex -2,233
Free cash flow 713
Equity raised/boughtback -784
Dividends paid -411
Net inc/(dec) in borrowings 115
Other investing/financing cash flows 210
Net cash flow -156
Change in working capital 10
Net cash flow 375

Balance Sheet (USDm)

Cash and other liquid assets 7,982
Tangible fixed assets 33,121
Goodwill/intangible assets 17
Associates/affiliates 1,046
Other assets 3,786
Total assets 45,950
Interest bearing debt 16,593
Other liabilities 10,406
Total liabilities 27,089
Shareholders’ equity 4,398
Minorities 14,403
Total debt 6,811
Net debt 8,611

Key Company Metrics

- Sales growth (%) 7.0
- DB EPS growth (%) -1.8
- EBITDA Margin (%) 32.6
- EBIT Margin (%) 17.1
- Payout ratio (%) 93.9
- ROE (%) 3.7
- Capex/sales (%) 14.9
- Capex/depreciation (%) 1.0
- Net debt/equity (%) 45.7
- Net interest cover (x) 3.2

Source: Company data, Deutsche Bank estimates

Anna Mulholland, CFA
+44 20 754-18172
anna.mulholland@db.com
## Appendix 1

### Important Disclosures
Additional information available upon request

<table>
<thead>
<tr>
<th>Disclosure checklist</th>
<th>Company</th>
<th>Ticker</th>
<th>Recent price*</th>
<th>Disclosure</th>
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<td></td>
<td>United Company RUSAL</td>
<td>0486.HK</td>
<td>2.33 (HKD) 14 Jun 16</td>
<td>14</td>
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*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Other information is sourced from Deutsche Bank, subject companies, and other sources. For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at http://gm.db.com/ger/disclosure/DisclosureDirectory.eqsr.

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Historical recommendations and target price: United Company RUSAL (0486.HK)
(as of 6/14/2016)

<table>
<thead>
<tr>
<th>Date</th>
<th>Security Price</th>
<th>Previous Recommendations</th>
<th>Current Recommendations</th>
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</thead>
<tbody>
<tr>
<td>5/2013</td>
<td></td>
<td>Strong Buy</td>
<td>Buy</td>
</tr>
<tr>
<td>2/2014</td>
<td></td>
<td>Buy</td>
<td>Market Perform</td>
</tr>
<tr>
<td>3/2015</td>
<td></td>
<td>Underperform</td>
<td>Not Rated</td>
</tr>
<tr>
<td>4/2015</td>
<td></td>
<td>Not Rated</td>
<td>Suspended Rating</td>
</tr>
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</table>

*New Recommendation Structure as of September 9, 2002*
**Analyst is no longer at Deutsche Bank**

1. 25/06/2013: Hold, Target Price Change HKD3.40 George Buzhenitsa
2. 04/10/2013: Hold, Target Price Change HKD2.77 George Buzhenitsa
3. 21/01/2014: Hold, Target Price Change HKD2.35 George Buzhenitsa
4. 04/04/2014: Hold, Target Price Change HKD3.18 George Buzhenitsa
5. 11/07/2014: Hold, Target Price Change HKD3.79 George Buzhenitsa
6. 17/09/2014: Hold, Target Price Change HKD4.82 George Buzhenitsa
7. 30/09/2014: Upgrade to Buy, Target Price Change HKD5.50 George Buzhenitsa
8. 02/12/2014: Downgrade to Hold, Target Price Change HKD6.34 George Buzhenitsa
9. 16/12/2014: Hold, Target Price Change HKD6.51 George Buzhenitsa
10. 04/03/2015: Hold, Target Price Change HKD5.73 Grant Sporre
11. 31/03/2015: Hold, Target Price Change HKD5.18 George Buzhenitsa
12. 30/06/2015: Hold, Target Price Change HKD3.91 George Buzhenitsa
13. 15/12/2015: Hold, Target Price Change HKD2.55 George Buzhenitsa

Equity rating key

Buy: Based on a current 12-month view of total share-holder return (TSR = percentage change in share price from current price to projected target price plus projected dividend yield), we recommend that investors buy the stock.

Sell: Based on a current 12-month view of total share-holder return, we recommend that investors sell the stock.

Hold: We take a neutral view on the stock 12-months out and, based on this time horizon, do not recommend either a Buy or Sell.

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