

## Prices haven't hit bottom, but we could be closer than what it seems

### 1 This bear market has been the most powerful ever.

Aluminum prices are down 60% vs July's peak and are trading today at \$1,350 per mton (61 cent/lb), the lowest level in history in real terms. Prices have lost in six months (\$2,000 per mton) what it took five years to gain ('03-'08). and five years to lose in the previous big bear market ('88-'93).

### 2 Today's prices are unprecedented low under any metric.

According to our latest industry cost analysis, today's LME aluminum prices are 40% below the marginal operating cost (90th percentile of the cost curve) of the industry, and 50% below what consensus believes is the minimum sustainable price in the long run. Today's prices also imply that 90% of global aluminum capacity is losing money in a full cost basis and 62% in a cash cost basis even after considering the sharp fall in energy and raw material costs. The LME Fwd curve for '10 and '11 is even below the price forecast of the most bearish analyst we track.

### 3 Price have fallen much and quick as a result of the biggest oversupply ever.

Global visible inventory levels have doubled in the last six months from 3.7 to 7.8 weeks of consumption, which is historically consistent with prices of \$1,300-1,100 per mton (50-60 cent/lb). Visible commercial inventory levels have tripled in the last year to 3 million tons. Half of the increase has occurred just in the last two months. Visible oversupply in the US is by far the most intense (regional LME stocks are up 586,000 tons in last six months), followed by Europe with a 457,000 tons increase and then Japan where port stocks increased 113,000 tons. In the case of China, visible stocks are actually down (SHFE stocks are down 4,000 tons or 2%), which helps to explain why aluminum prices are trading \$400 per mton (18 cent/lb) higher in China vs LME. Today, annualized daily global aluminum output is 6.2 million tons higher than demand. This equals to an annual oversupply equivalent to a huge 22% of today's annual consumption.

### 4 The market is awash with metal simply because demand has imploded in a context of record fear.

Global daily aluminum demand has contracted 32% in the last six months, the sharpest contraction ever in the history of this industry. Contraction in daily global demand in November was 7% and in December an eye-opening 17%. In our best judgment, fear/risk aversion is the core factor behind demand's heavy and speedy contraction. Measured by the VIX index (traded in the CBOT), fear broke an important threshold the day Lehman Brothers announced its bankruptcy (Sept 15) as investors proved to no longer trust in the financial system. The Fear index/VIX exploded to levels of 90 by October from normal levels below 25, and a previous record of 50 (days after 9/11). Our research shows Fear/VIX movements hit aluminum demand fully with a two month lag. When fear governs, cash becomes king and a vicious cycle of demand contraction is unleashed.

### 5 Aluminum output cuts are not enough and will hardly do the job.

Aluminum producers have tried to adapt to plummeting demand by cutting output. Nevertheless, it has notoriously fallen short of what's needed. Output cuts have only been one third of what's needed in spite the fact that 90% of global output has been losing money in a full cost basis and 60% in cash cost basis. Some of the reasons why supply has been slow to adapt are: a) monetary costs associated with curtailing output, b) wishful thinking, c) slow management response, d) expectations that other producers will do the job, and e) government direct and indirect subsidies (China). Since August, producers have announced curtailments equivalent to 6.5 million tpy (17% of global output in '07). From these, only 54% were in place by the end of '08. We calculate that China has complied 100% with its announcements while the Western World only with 62% so far. If we assume that all announced cutbacks occur, we will still need another 6.2 million tpy of cuts for the oversupply to stop. We don't see this happening in the next three months. Supply will not do the job by itself; it needs a meaningful bounce in demand.

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**6 Demand is no longer falling and is expected to continue to recover if Fear levels keep falling.**

Although the Fear index still remains way above normal levels (above 25), it has come down by almost half in the last two months (from 90 in Oct, 80 in Nov, to 45 currently). This has been enough to stop the contraction in global aluminum demand. We estimate that global daily aluminum demand bounced in January between 1 and 3%. This is confirmed by anecdotal evidence and the bounce in the Baltic Dry index. Still, we need daily demand to bounce 20%, for the oversupply to end. But the most interesting thing here is that we should expect global daily aluminum demand to increase in the next two months between 10 to 14% given the notorious fall in the Fear index in Dec-Jan and its two-month lagged effect on aluminum demand. If indeed the Fear/VIX index continues to fall toward 25-30 in the next weeks, our models show the oversupply could be over by April-May.

**7 We expect prices to stay low and possibly fall further in the next month**

or so as commercial inventories keep growing given that output will continue to lack the flexibility and speed to adjust to demand. We see \$1,300 per mton (60 cent/lb) as a strong support level but do see potential enough bearish pressure to see \$1,200-100 per mton (55-50 cent/lb) before IQ '09 ends if Fear doesn't fall further before Feb ends.

**8 Nevertheless, it seems demand could be high enough for prices to bottom before IIQ '09 ends**

if Fear indeed keeps falling at current rates. We believe that then we will see the start of a some type of "V" bounce in demand and prices given the historical dislocation of demand vs its own long term trend, the sharp distortion of prices vs output costs, the unprecedented and aggressive stimulus authorities around the globe have planted in the fiscal, monetary and financial fronts, and the lagged but still significant aluminum output curtailments and expansion deferrals that have taken place. Consensus has a similar view as they expect a "V" bounce in prices starting in IIH '09. We see much higher prices for '10 and '11 under our three scenarios.

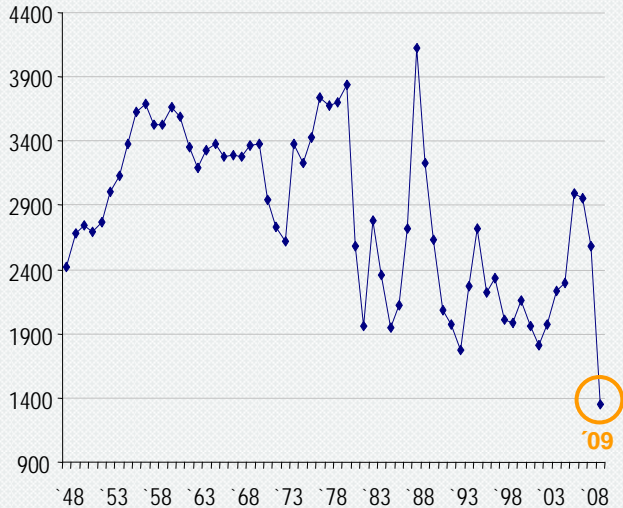
**9 The bottom line is:** Although we are much closer, conditions are not present yet for a sustainable price bounce (prices will stay low and trend down)...but conditions are already present for a potential violent upward move later in '09 and in '10. Have your hand in the trigger, but don't pull yet.

**10 Please see next two slides >>**

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1 In real terms, aluminum prices have fallen to their lowest level ever...

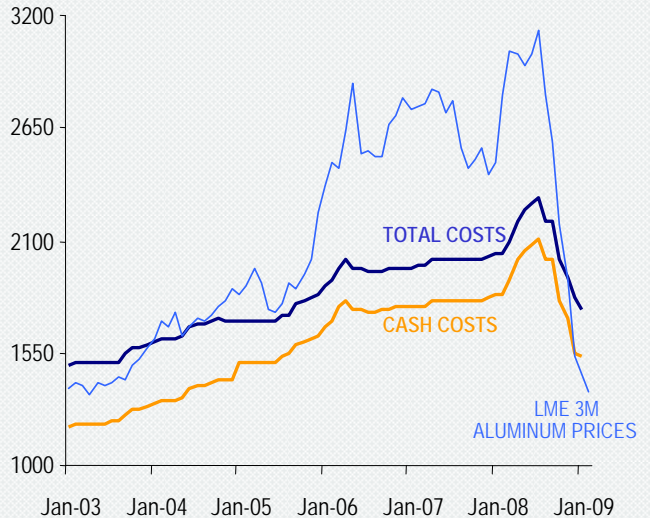
**LME 3M Aluminum Prices in Real Terms**  
(\$ per mton; in terms of 2008 prices)



Source: HARBOR intelligence with LME data

2 ...90% of global aluminum output is unprofitable in a full cost basis and 62% in cash basis...

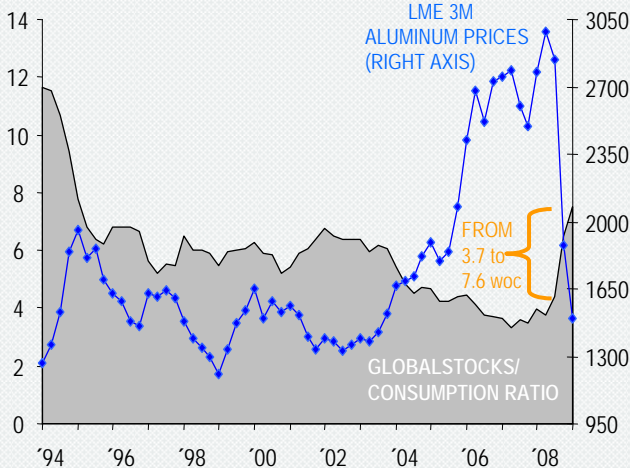
**LME 3M Aluminum Prices vs Output Full and Cash Costs**  
(\$ per mton)



Source: HARBOR intelligence

3 ...as a result of the biggest oversupply ever that has doubled inventories in the last six months

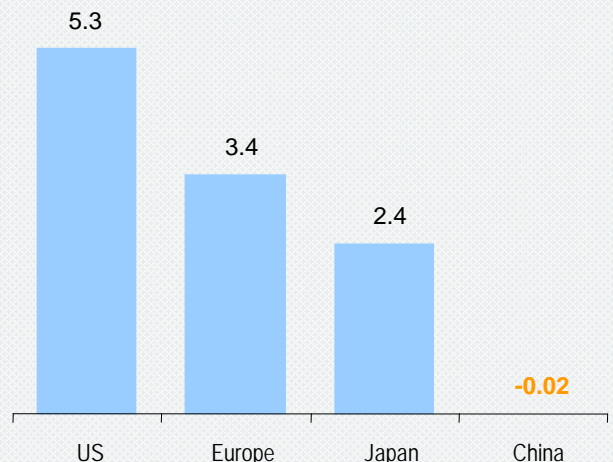
**Global Visible Aluminum Stocks vs LME 3M Prices**  
(weeks of consumption (woc); \$ per mton)



Source: HARBOR intelligence with IAI, LME, Comex, Shanghai and Japanese ports data

4 The biggest visible oversupply is registered in the US, followed by Europe and Japan...

**Regional Visible Commercial Inventory Build**  
(weeks of consumption; Jul '08-Jan '09)

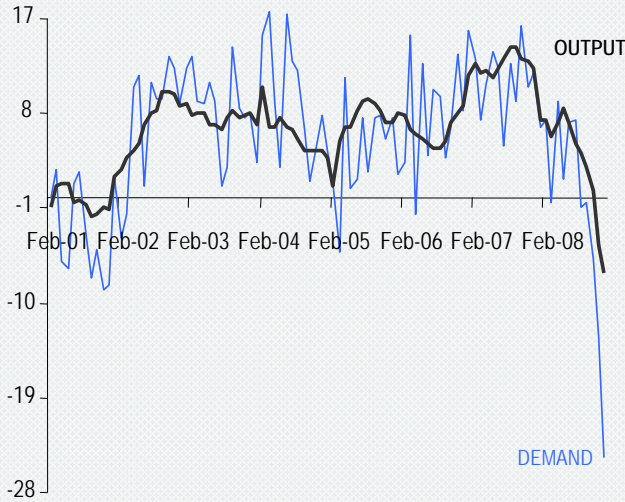


Source: HARBOR intelligence with LME, Shanghai and Japanese ports data

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5 ...as demand has contracted at the sharpest rate ever, while output has failed to quickly adapt

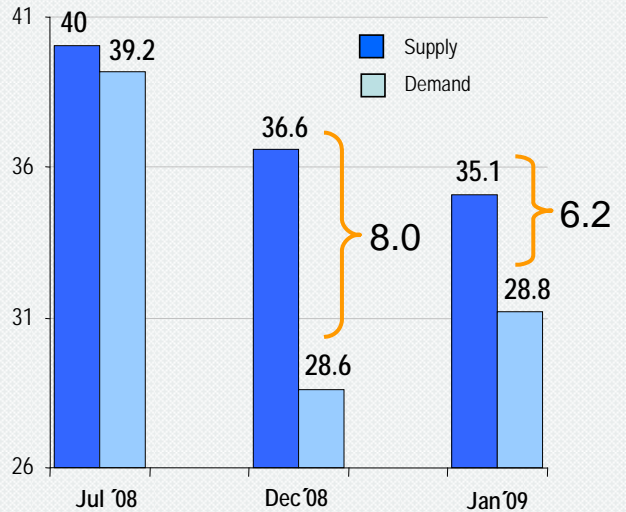
**Global Aluminum Output and Demand**  
(annual % change)



Source: HARBOR intelligence with IAI data

6 The gap between supply and demand is still enormous...demand needs to bounce to close it

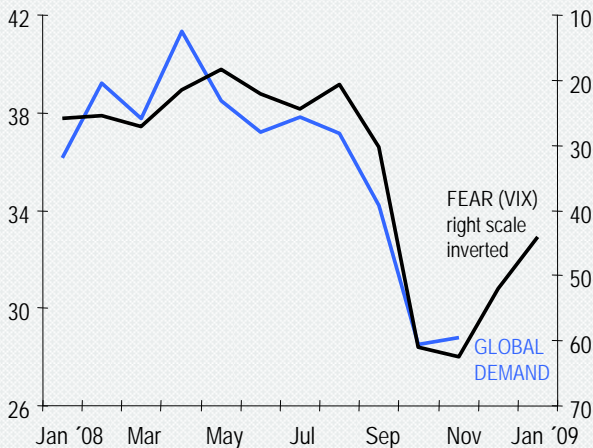
**Global Aluminum Output and Demand**  
(annualized million tons)



Source: HARBOR intelligence with IAI data

7 Demand has stabilized, and improved readings in the Fear index suggest growth for next two months

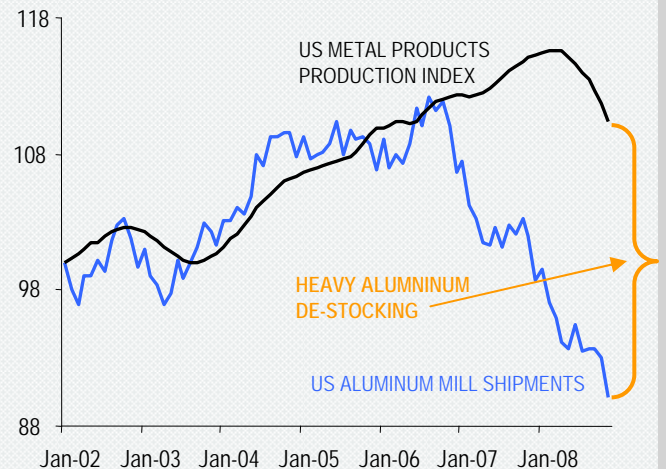
**Global Daily Aluminum Demand vs Fear Index**  
(annualized daily demand in million tons; 2 months lagged)



Source: HARBOR intelligence with CBOT and IAI data

8 Once demand enters into a sustainable growth trend, it will be intense rather than gradual

**US Aluminum Shipments vs Production of Metal Products**  
(index Jan '02=100)



Source: HARBOR intelligence with Aluminum Association and Federal Reserve data

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USA

Europe

Japan

China