

# National Aluminium Co Ltd

Peaking out

- **Initiate with Underweight:** We initiate coverage on Nalco with an Underweight rating and a December 2007 price target of Rs210.
- **Sedate outlook for alumina and aluminum underpins our recommendation:** Our Underweight recommendation is premised on a sedate outlook for both businesses—alumina and aluminum. Alumina realizations are forecasted to decline 39% Y/Y in FY08 on global oversupply concerns. The pricing outlook is also weak for aluminum. JPMorgan's global commodities strategist has forecast that LME prices would decline 11% Y/Y in 2007 and 17% Y/Y in 2008.
- **Key drivers of prices, earnings:** The extended cycle in base metals has challenged the orthodoxy of many fundamental sector drivers. The most unique factor of this extended cycle has been the dramatic expansion of the flow of investment funds in metal futures. In case there is no significant outflow of funds from commodities, there would be a risk of a sharp upward revision to our earnings forecasts and valuation estimates.
- **Price target, key risks to our view:** Our price target of Rs210 is based on 8.7x FY08 P/E—at the mid point of Nalco's trading range. The timing of a directional shift in prices remains critical to our recommendation. A scenario of rising and then stable LME aluminum prices remains the key risk to our price target and our Underweight rating.

Reuters: NALU.BO; Bloomberg: NACL IN

Rs in millions, year-end March

	FY06	FY07E	FY08E	FY09E				
Net sales	48,604	61,708	50,737	50,487	52-week range (Rs)	335-185		
Net profit (pre-exceptional)	15,326	22,280	15,531	13,143	Market cap (Rs MM)	134,950		
EPS (pre-exceptional) (Rs)	24	35	24	20	Market cap (US\$ MM)	2,940		
Net sales growth (%)	17	27	-18	0	Shares outstanding (MM)	644		
EPS growth (%)	24	45	-30	-15	Avg daily value (Rs MM)	166.0		
ROE (%)	29	33	19	14	Avg daily value (US\$ MM)	3.70		
ROCE (%)	45	49	26	20	Avg daily volume (MM shares)	0.7		
P/E (x)	8.8	6.1	8.7	10.3	Sensex	13495		
EV/EBITDA (x)	4.4	2.9	4.7	5.3				
Dividend yield (%)	2	3	3	3				
BVPS (Rs)	91.5	119.3	136.3	149.4				
P/B (x)	2.3	1.8	1.5	1.4				
					<b>Performance</b>	<b>1 mth</b> <b>3 mths</b> <b>12 mths</b>		
					Absolute * (%)	-4	4.3	-6
					Relative * (%)	-4.1	-8.4	-53.1

Source: JPMorgan, Bloomberg. \*The absolute and relative performance is against BSE-30.

Initiation  
**Underweight**

**Rs209.45**

15 December 2006  
Price Target: Rs210.00

India  
**India Metals & Mining**

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One-year share price performance



Source: Datastream.

**J.P. Morgan India Private Limited**

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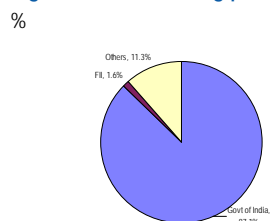
## Investment thesis

### Company description

Nalco is India's second largest aluminum producer and largest alumina producer

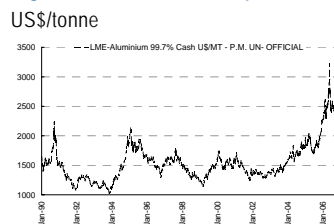
Nalco is also one of the world's lowest cost aluminum and alumina producers. The low cost advantage is driven by its high-quality captive bauxite mines and power plant

Figure 1: Shareholding profile



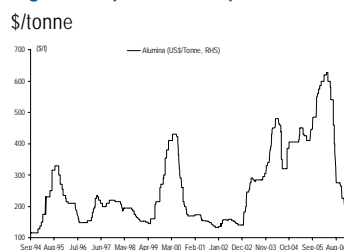
Source: Company.

Figure 2: LME aluminum price



Source: Datastream.

Figure 3: Spot alumina price



Source: Datastream.

### Nalco is an integrated aluminum producer and not just an alumina producer and exporter...

In the past 15 months—which has seen historic alumina prices—Nalco's stock has shown a higher correlation to alumina spot prices and has taken its direction from key developments in the alumina market, breaking from its long term tradition of taking direction from LME aluminum prices. During the aforementioned period, investors have come to regard Nalco as an alumina producer. We estimate that in FY07 the company will generate close to 29% of its sales from alumina and 71% from aluminum. We also estimate that the EBITDA composition between alumina and aluminum will be a ratio of 0.35:1. With alumina prices reverting back to a long range average, we expect that over our forecast period the sales breakup between alumina and aluminum will move back to a ratio of 2.3:1, which is in line with its past five year average.

### ...but pricing environment for both business segments is moderating

Following the commissioning of large alumina refining capacity in China, alumina spot prices have declined by 64%, since touching a historic high of US\$620/tonne in March 2006. Contract prices for 2007 are likely to take a cue from the weak spot market and could well come down to a range of 9.5-11% of LME aluminum prices versus a range of 18-22% of LME aluminum prices last year. (Contract prices have traditionally been based on a negotiated percentage basis of LME aluminum prices). While we do not expect any significant weakening of alumina spot prices from current levels, Y/Y comparisons in FY08E would still look weak, given the historic high prices in 1HFY07. Our global commodity analyst, Jon Bergtheil, also expects LME aluminum prices to decline 11% Y/Y to US\$2,280/tonne. From current levels (US\$2,800/tonne), the decline appears far sharper at 18%.

### Expansion pipeline not large enough to offset negative impact of lower prices

While Nalco has a strong pipeline of capacity growth in both its businesses—alumina and aluminum—the expansions are not large enough to offset the negative impact of a softening pricing bias in both commodities. Also, these expansions will be commissioned only in FY09E and FY2010E. Consequently, we forecast Y/Y earnings growth to turn negative in FY08 after a five-year period of 66% average annual growth in earnings.

### Timing and extent of directional shift in aluminum prices remains key risk to our Sell recommendation

The extended cycle in base metals has challenged the orthodoxy of many fundamental sector drivers, such as durability and amplitude, making comparisons with previous cycles non-meaningful. One of the most unique factors of the extended cycle in base metals has been the dramatic expansion of the flow of investment funds in metal futures. This inflow has occurred against a fundamentally robust macro global environment. Any cessation of the positive flow or a move out of commodities could lead to sharp price declines in all base metals. This is, therefore, critical to the timing of the directional shift in aluminum prices. In case there is no

significant outflow of funds from commodities, and prices remain at the current elevated levels into CY07, there would be a risk of sharp upward revision to our earnings forecasts and price target.

Our global commodities team believes that, in the short term, aluminum should continue to benefit from a generalized rally in commodities. Over the medium term, however, moderating demand drivers and rising alumina surpluses will act as a drag on the aluminum price. Our global commodities strategist, Jon Bergtheil, has forecast a price of US\$2,280/tonne for aluminum in CY07, which is 11% lower than the average price forecast for the current calendar year. Over the longer term, our team estimates that structural demand issues (sharp substitution from copper) should prop up the aluminum price to US\$1,900/tonne.

Table 1: Aluminum—Medley of immediate to longer term views

Immediate term	Aluminum remains our most preferred metal. Fund flows to determine short-term prices. The short-term consensus view indicates price touching US\$3,000/tonne before retracting.
Medium term	Extreme pressure on the industry caused by alumina shortages has eased. Demand drivers also expected to moderate. Market will move into surplus. JPMorgan's forecast for CY07 is US\$2,280/t, down 11% Y/Y.
Long term	Structural demand benefit from substitution and rapid acceleration in power cost induced closures in Western Europe underpin longer term positive view. The long-term price to average US\$1900/t.

Source: JPMorgan.

## Investment negatives

### Aluminum price forecast to decline by 18% Y/Y in CY07

#### Aluminum price forecast to decline in 2007

Our global commodities strategist, Jon Bergtheil, expects LME aluminum prices to decline by 11% Y/Y in CY07 on the back of moderating demand and increasing supply. JPMorgan expects the aluminum market to move into surplus after a near three-year deficit. With the aluminum business likely to constitute 65% of Nalco's EBIT in FY07, the moderating impact of aluminum prices will offset positive benefits of volume growth in FY09. In FY08, there will be no moderating impact in the absence of any projects being commissioned. In addition, with strong correlation between LME prices and stock performance, a negative outlook will remain a key overhang on the stock price.

In case our global commodity team makes any upward revision to aluminum price estimates, there would be an upside bias to our earnings estimates and price target.

### Alumina prices to stay weak

#### Alumina contract prices set to weaken on rising Chinese supply

##### China to emerge as world's largest alumina producer in 2007

Following the brisk commissioning of new refining capacity, over past few months, China's alumina production has increased by 57% Y/Y to 9.4MT (million tonnes). In September—the month indicating highest growth in any month—total alumina production was 1.17 MT. Chinese alumina production in the current year is likely to rise by 60% Y/Y to 13.5MT. Beijing Antaika further estimates that in 2007 this will rise by an additional 40% to 18 MT, increasing China's backward integration to alumina to almost 85% of its total requirement.

##### Increasing production could put pressure on alumina contract prices in 2007

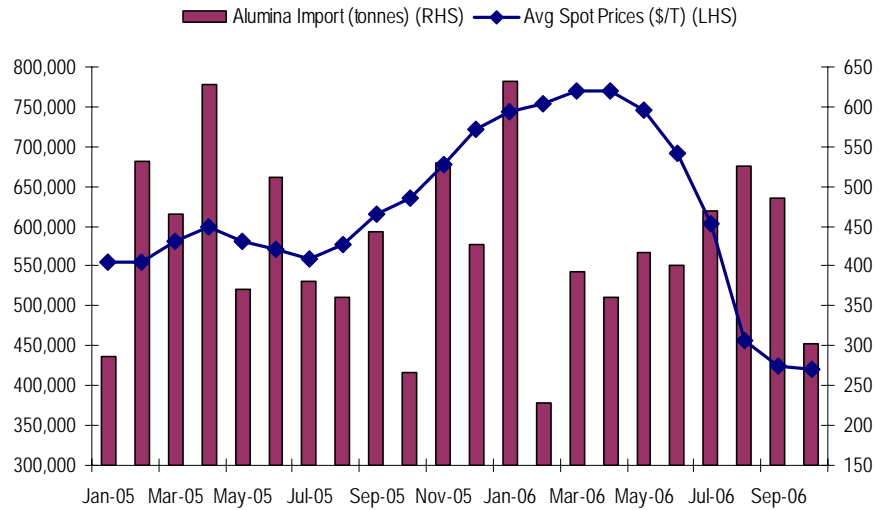
Increasing domestic alumina production has reduced China's appetite for imported alumina (in the January-October period of current year, alumina imports have declined by 1% Y/Y). This has led to a decline in spot and contract alumina prices. Spot alumina prices (FOB, China) have now corrected to US\$200-220/tonne—down 60% Y/Y. Contract prices have also declined to a band of 9-10% of LME aluminum prices, down from a range of 18-22% of LME aluminum prices last year. (Until last year, the historical band was 11-14% of LME aluminum prices). Nalco recently signed a one-year contract to sell 240,000 tonnes at 9.6% of LME aluminum prices in 2007.

We believe that this trend is likely to put pressure on annual alumina contracts where negotiations are likely to begin soon. It is likely that 2007 annual contracts could mirror Nalco's recent annual contract which was set at 9.6% of LME aluminum prices.

##### Spot prices unlikely to decline from current levels

Spot alumina prices, however, are unlikely to come off too much from current levels, but China's reduced appetite could make the market highly illiquid. Current spot prices are now below the average cash cost of many Chinese alumina refineries.

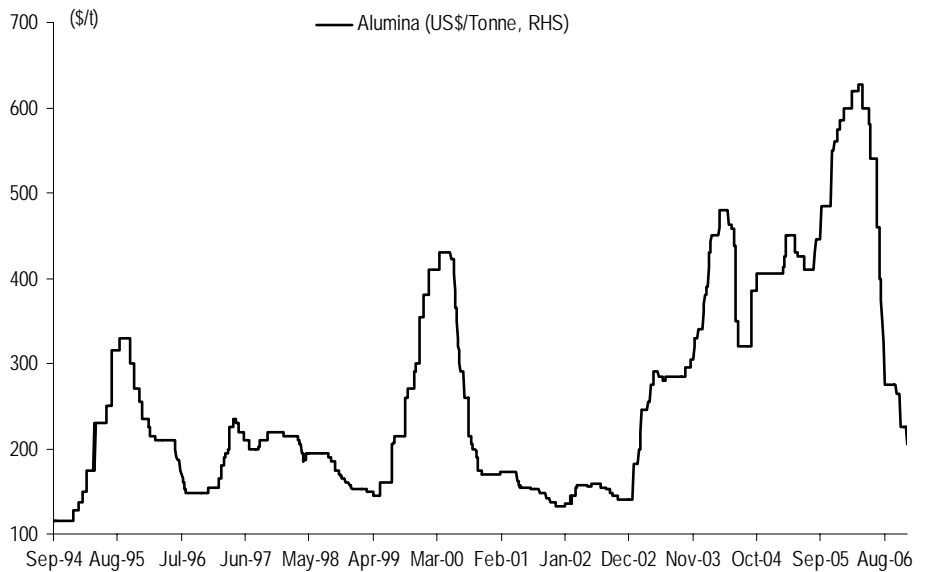
Figure 4: Chinese monthly alumina import and spot prices



Source: Datastream, Bloomberg, JPMorgan.

At the beginning of 2006, with many of its long term contracts coming to a close, Nalco broke from tradition by selling only about 30-33% of its alumina on annual contracts (against its traditional policy of 80-85% of sales). The balance was sold in the spot market, through the tender process. While this policy was highly beneficial in 1HFY07, on the back of surging alumina spot prices, in 2H07, we see EBITDA in the alumina business come off sharply on the back of lower spot prices (currently at about US\$220-230/tonne). In FY08, we expect Nalco to increase its long term (one-year) sale of alumina to 70-80% of its total sales.

Figure 5: Spot alumina prices (\$/tonne)



Source: Datastream.

## Risks to rating

### Brownfield expansions in alumina and aluminum...

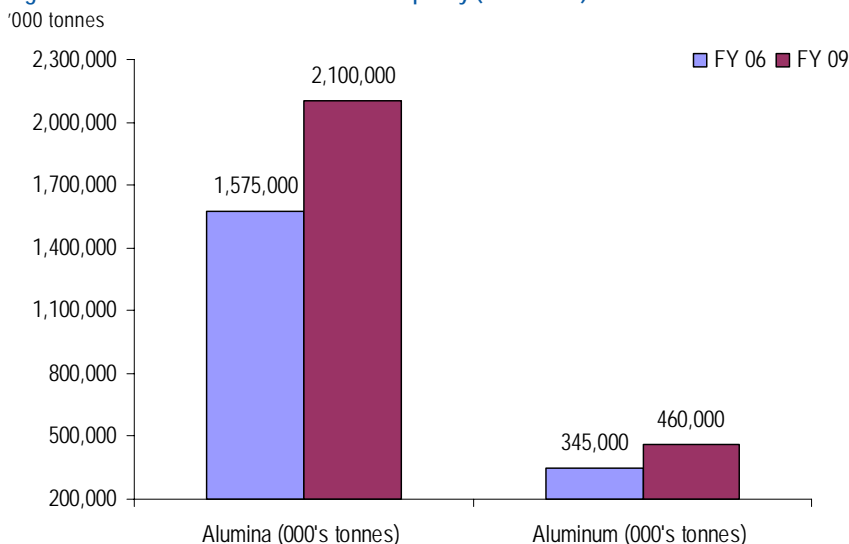
**Brownfield expansion does not face the problems of land acquisitions and clearances**

Nalco is currently implementing its brownfield expansions in both alumina and aluminum. The expansions also include associated increases in bauxite and captive power capacity to maintain the level of full vertical integration.

Under the Rs41 billion expansion program, bauxite mine capacity will be raised by 31% to 6.3 million tonnes, alumina refining capacity by 33% to 2.1 million tonnes and smelting capacity by 33% to 460,000 tonnes. To maintain its low cost advantage, captive power capacity will also be raised to 1200MW at the Angul power plant.

We do not expect the traditional delays of land acquisition and resettlement and rehabilitation, for Nalco as the projects are brownfield expansions only at existing locations. Land acquisition and resettlement issues have been some of the biggest problems confronting greenfield expansions in India, not only in alumina and aluminum but also in the steel sector.

Figure 6: Nalco—Alumina and aluminum capacity (brownfield)



Source: Company, JPMorgan estimates.

### ...to allow company to expand its low cost advantage in both commodities

The brownfield expansions will allow the company to widen its low cost advantage in both alumina and aluminum. By virtue of its captive access to some of the world's best bauxite reserves, *in situ* refining capacity and captive access to power, Nalco is the world's lowest cost alumina producer and among the lowest cost aluminum producers.

#### Inside Nalco's engine room: Exploring the low cost advantage

Nalco's alumina refinery at Damanjodi in Orissa is among some of the world's lowest cost alumina refineries. We estimate Nalco's operating cost of alumina in FY06 at US\$130/tonne, which has risen to a level of about US\$150/tonne in the current fiscal year on account of rising raw material and fuel costs. This is in line

with world alumina cash costs which are estimated to have risen by about 20-25%. We estimate that the company's operating cost of aluminum has also risen to about US\$1,100–1,150/tonne from a level of US\$900–1,000/tonne two years ago. Even at this level, we estimate Nalco's smelter and refinery to be in the bottom quartile of the global cost curve.

### **Captive access to high grade bauxite...**

Bauxite is the key building block in the alumina production process. It is converted into alumina in alumina refineries. Refining costs are therefore dictated by bauxite mineralogy. Alumina is present in bauxite as either trihydrate or monohydrate. While monohydrate alumina minerals are higher in alumina they require processing at higher temperatures, which increases production costs. Conversely, trihydrate alumina minerals can be processed at lower temperatures. Nalco's entire reserve at Damanjodi constitutes trihydrate bauxite; Nalco's low cost advantage therefore starts at the bauxite stage itself. In addition to the quality of the reserve, the distance between the bauxite mine and the alumina refinery is the other determinant of alumina refining costs. Nalco's refinery is an *in situ* refinery, with the refinery being in very close proximity to bauxite reserves. The refinery is situated in the foothills while the bauxite is mined on the hilltop. The bauxite is transported to the refinery through conveyors, saving the company freight costs.

### **...and low cost power**

Nalco's bauxite advantage is further strengthened through low cost power, generated at its 960MW captive power plant. Aluminum production is highly power-intensive and requires steady and uninterrupted power supply. Power costs—constituting 38% of Nalco's total operating costs—are the most important determinants of a smelter's cost position. We estimate Nalco's power cost/tonne at Rs1.35/unit, which is almost 60% lower than the rate charged by Gridco, the local power supplier in Orissa, from industrial consumers. Power costs could decline meaningfully from current levels, widening Nalco's low cost advantage even further, if the company decides to enter captive coal mining and is awarded any blocks which are in close vicinity to its Angul power plant. The availability of captive coal blocks at a larger distance than the current coalfields from where Nalco currently procures coal (belonging to Coal India, another government company) would not have any meaningful impact on costs.

## **Expansions funded through internal accruals**

Nalco's entire brownfield expansion amounting to Rs41 billion is likely to be funded through internal accruals. The ongoing super-cycle in commodities has allowed resource companies to generate strong cash flows, which have been robust enough to allow internal funding of large expansions, which would otherwise have required external funding. This will allow Nalco to maintain its near zero debt status (debt equity ratio likely at 0.03 in FY07E and 0.02 in FY08E). However increasing cash flows will result in pressure on RoE.

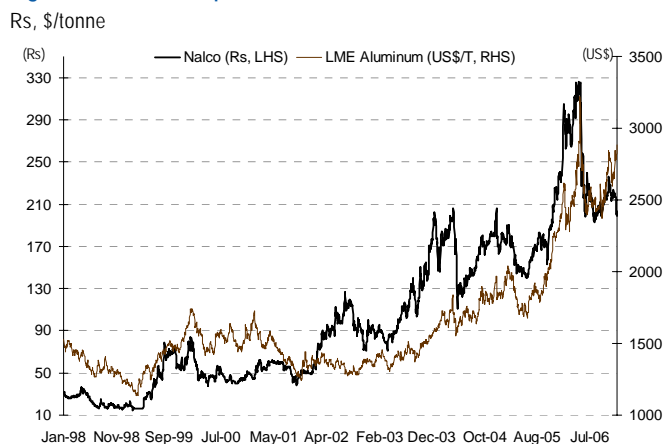


## Valuation and share price analysis

### Stock correlation with alumina spot price rose over past one year

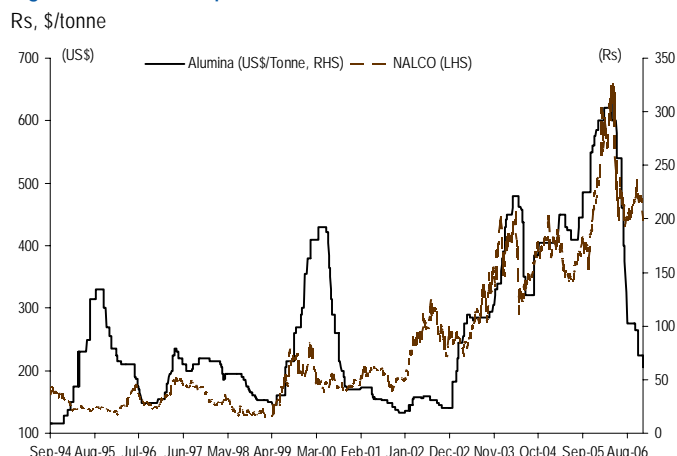
The outlook on aluminum has traditionally been the largest determinant of Nalco's stock price. Despite the fact that traditionally alumina has constituted 30% of sales, the stock has shown an overwhelming correlation with aluminum prices. We attribute this to Nalco selling almost 80-85% of alumina on long term contracts, which limited the impact of spot pricing swings on company's profitability. However, in FY07E, the stock broke tradition, with the direction coming more from spot alumina prices than aluminum prices. We believe that this was a manifestation of the company reducing its contract sales to a level of 30-33% increasing its reliance on spot prices.

Figure 7: Nalco stock price vs. LME Aluminum



Source: Datastream, Bloomberg. Note: Price as of 13 December 2006.

Figure 8: Nalco stock price vs. Alumina

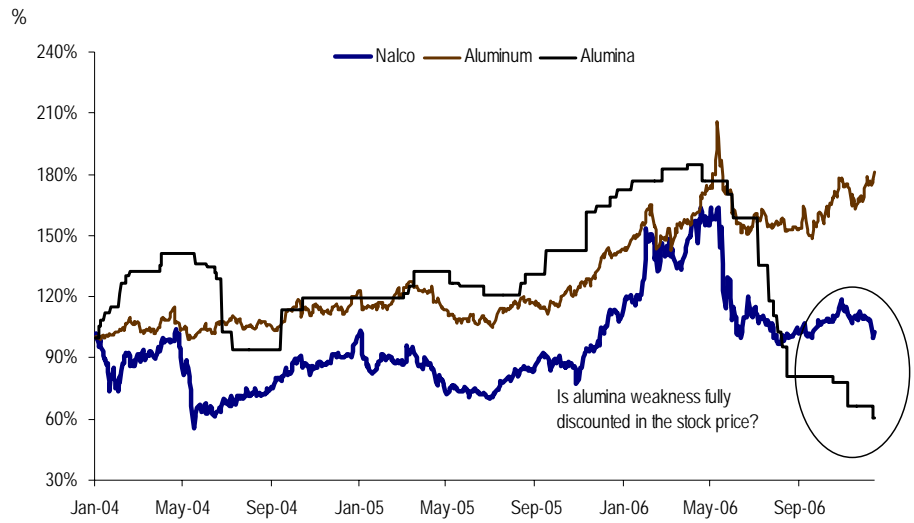


Source: Datastream, Bloomberg. Note: Price as of 13 December 2006.

### ...but investor focus is shifting back to aluminum

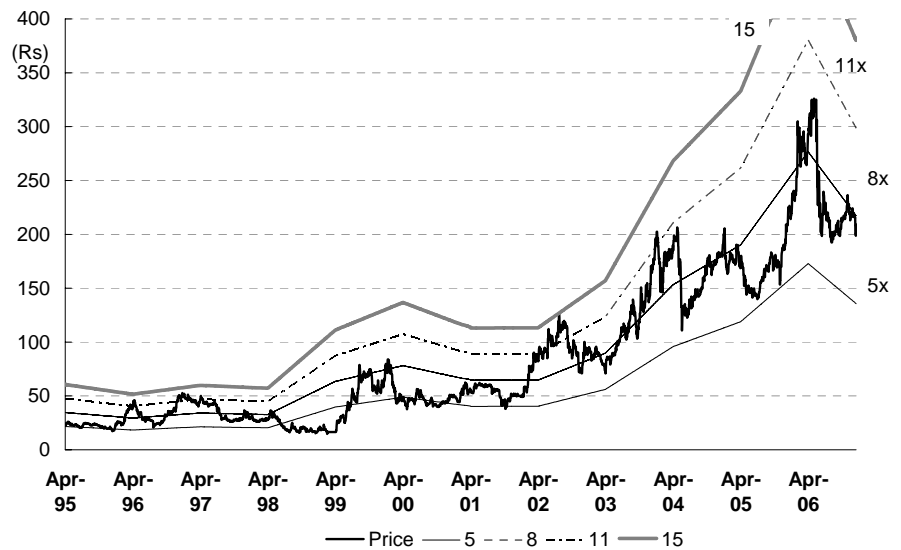
We see investor focus shifting back to aluminum. This is illustrated in Figure 9 which shows that since September 2006, the stock has begun taking direction from aluminum prices and not alumina, despite a sharp reduction in alumina prices. We expect this trend to continue with the company once again, increasing its share of contract sales of alumina.

Figure 9: Nalco, alumina and aluminum price (Rebased to 1 January 2004)



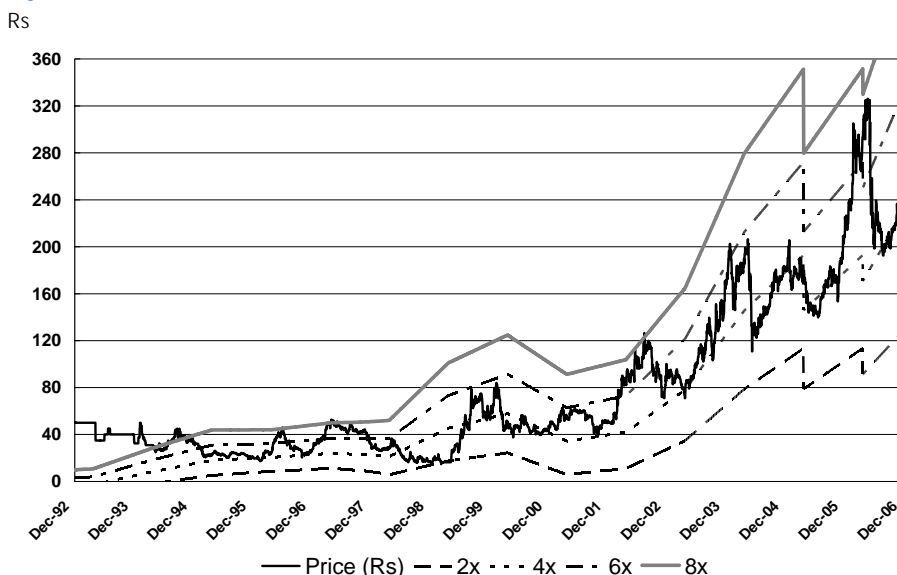
Source: Datastream. Note: Share price as of 14 December 2006.

Figure 10: Nalco—P/E band chart



Source: Company, Datastream, Bloomberg, JPMorgan. Note: Share price as of 14 December 2006.

Figure 11: Nalco—EV/EBITDA band chart



Source: Company Datastream, Bloomberg, JPMorgan. Note: Share price as of 14 December 2006.

## Valuation methodology

### DCF: Not a good guide to share prices

We have chosen not to use the conventional DCF approach to valuation, given our view that a DCF-based valuation does not capture the current dynamics of the commodities market.

Table 2: Aluminum global valuation

	Rating	Ticker (Bloomberg)	Ticker (Reuters)	EV/EBITDA CY06E	EV/EBITDA CY07E	Recurring P/E CY06E	Recurring P/E CY07E
Alcan Inc	OW	AL	AL	6.2	5.5	9.5	9.1
Alcoa	OW	AA	AA.N	6.4	6.6	10.7	11.6
Chalco	OW	2600 HK	2600.HK	5.4	7.0	6.2	8.0
Hindalco	N	HNDL IN	HACL BO	5.3	4.8	7.5	8.5
Nalco	U	NACL IN	NALU BO	2.8	4.5	5.9	8.4

Source: Bloomberg, JPMorgan estimates. Note: Share price and valuations as of 13 December 2006. For Hindalco and Nalco, CY06 is FY07 and CY07 is FY08.

### Relative P/E view

Given Nalco's strong cash generation and robust balance sheet, we believe that earnings-based valuations are a preferred valuation parameter relative to asset based valuations. Our price target is therefore based on a P/E-based parameter. Our price target is based on a mid-level P/E multiple of 8.7x FY08E earnings. We have raised our mid level P/E range to 8.5-8.8x from a historical level of 7.5-8x following our global commodity team's recent increase in the long term average aluminum price to US\$1,900/tonne. With increasing uncertainty over global growth, difficulty in predicting the timing of the directional shift in aluminum prices and a near two-year forecast period of declining profits, we rate the stock as Underweight.

### Relative EV/EBITDA view

Our price target translates into 4.7x FY08E EV/EBITDA, which is closer to the mid range of its previous trading bands. We believe that this is justified considering the revised long-term aluminum price, which is now estimated to be US\$1,900/tonne, against the earlier expected level of US\$1,700/tonne.

## Industry analysis

### The global aluminum market<sup>1</sup>

**Fund flow into metals futures has been the key reason for extended cycle in commodities**

#### Robust flows into commodities have superseded traditional catalysts

One of the most unique factors of the extended cycle in commodities has been the dramatic expansion of the flow of investment funds in metal futures. Following the surge of financial inflows into commodity markets in the past two years, the analysis of demand/supply and inventory trends has diminished in importance as an input into expected price trends. Heavy fund activity has supplanted physical industry purchases and sales as the key driver of price. Mr Bergtheil believes that “price trends are now based on the interpretation of demand and supply rather than the physical ebb and flow of metal surplus and shortfall in the market<sup>1</sup>.”

**Aluminum still in shortfall but we see surplus building up over the next few months**

#### Aluminum to move into surplus

The immediate demand drivers for aluminum are, at the moment, moderating because of trends in global order books, global IP, and in specific metal-intensive sectors, such as the rapidly weakening US housing market. Therefore, we expect the near-term demand trends to act as a drag on the aluminum price. The aluminum industry is still in shortfall at the moment but the expanded alumina capacity and strong growth in aluminum smelter capacity in China (along with sharply increasing semi-fabricated exports) should see a surplus beginning to build up globally from 4Q06. We expect the industry to move into its first annual surplus in four years during 2007, and to remain in surplus until the end of the decade, albeit with fairly moderate surpluses in relation to past experience.

While we expect inventory levels to rise, JPMorgan’s forecasted inventory levels do not reach the levels above eight weeks, which occurred at the start of the current bull market, and which kept the aluminum price pinned below US\$1,400/tonne for two years. Conversely, the levels to which we expect inventory to rise were more typically associated with price levels of US\$1,700–1,800/tonne in the past than with recent levels above US\$3,200/tonne. Again, much depends on the interpretation and mood as we progress into easier conditions as demand levels moderate globally.

**Table 3: Aluminum demand-supply forecast**

’000 tonnes

	2004	2005	2006E	2007E	2008E	2009E
Aluminum production	29,961	31,997	33,431	35,730	37,338	38,813
Consumption	30,377	32,092	33,623	35,287	37,110	38,920
Market balance	-416	-95	-192	443	228	-107
Inventory (weeks)	6.59	6.36	6.13	6.71	7.02	6.13
Price forecast (\$/t)	1729	1895	2570	2280	1900	1900

Source: JPMorgan estimates.

<sup>1</sup> For details please see industry report on Aluminum—‘Stealing market share from copper’ by Jon Bergtheil, dated 25 September 2006.

### **Aluminum price to decline for the next 18 months...**

On the basis of the above demand and supply trends, we expect aluminum prices to decline for the next 18 months, and then begin rising once more as power-cost issues prop up the price.

We expect an average price of US\$2,280/tonne in 2007 and US\$1,900/tonne in 2008 and 2009. Our long-term average real price was raised earlier to US\$1,900/tonne, up from US\$1,700/tonne.

**Price ratio between copper and aluminum is currently at a 30-year low**

### **...but substitution from copper to provide longer term support**

Following the stratospheric rise in copper prices, the price ratio between aluminum and copper has dropped to its lowest level in 30 years, and leaves copper facing serious substitution threats from aluminum. Copper and aluminum prices were trading close to parity just four years ago but aluminum now trades at less than one-third of the price of copper. Moreover, aluminum threatens to steal up to 600,000 tonnes of demand per annum (3.3% per annum of current demand) in the future from copper due to substitution in a wide range of products. There is already some evidence of substitution that we estimate to be in the order of 200,000 tonnes, but R&D and re-tooling is in place to possibly take this up to 600,000 tonnes per annum in the years ahead.

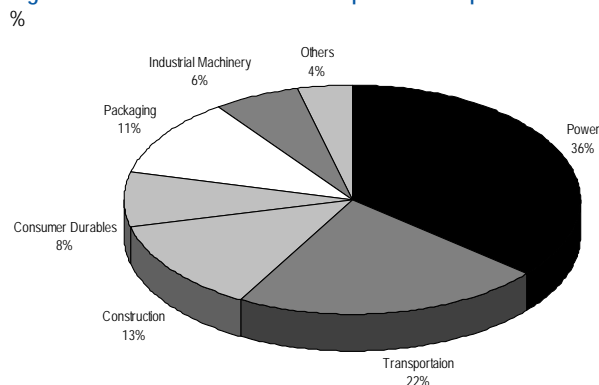
The switching from copper to aluminum will take time and our increased concern has caused us to change the longer term price relationship between the two metals rather than assuming that this substitution effect will stop the aluminum price from declining further in the next two years. Of all the base metals, however, JPMorgan believes that aluminum has the least price downside because of the substitution advantage and the structural power problem that the industry faces.

## **The domestic aluminum industry**

### **India is at the cusp of a sustainable boom in aluminum consumption**

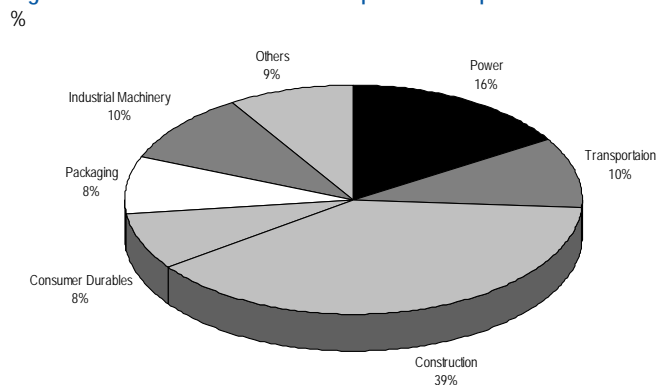
The intensity of aluminum consumption in India remains low by both developed as well as emerging market standards. With low intensity of use in both construction and packaging, the power and auto sectors remain the main drivers. In contrast to China, where demand from the construction sector has been the key driver of aluminum demand, in India the key driver has been the power sector.

Figure 12: India—Aluminum consumption breakup



Source: CRIS INFAC, JPMorgan.

Figure 13: China—Aluminum consumption breakup



Source: CRIS INFAC, JPMorgan.

The aluminum sector—similar to steel and cement—will be the key beneficiary of India’s move to its strongest ever phase of materials-intensive growth. Over the past two years, Indian consumption has already shown a CAGR of 19% on the back of strong demand from the power and transportation sectors. In the construction segment, where India consumes far less aluminum relative to other emerging markets, we see considerable growth as India increases focus on organized retail.

Table 4: Indian aluminum demand-supply

'000 tonnes

	2004	2005	2006	2007E	2008E	2009E	2010E
Aluminum consumption							
Total domestic consumption	819	934	1,148	1,320	1,479	1,656	1,855
% change	21	14	23	15	12	12	12
Production							
Hindalco	366	409	429	435	450	510	510
Nalco	290	340	358	358	358	400	450
Balco	97	100	174	290	350	350	400
Malco	30	30	37	35	35	35	35
Total production	784	879	997	1,118	1,193	1,295	1,395
% change	14	12	13	12	7	9	8
Domestic surplus (deficit)	(35)	(55)	(151)	(202)	(286)	(361)	(460)

Source: Company, JPMorgan estimates.

**Power sector has traditionally been the largest consumer of aluminum in India**

Due to the legacy of the old aluminum control order, India has traditionally preferred using aluminum relative to copper in the power sector. The power sector has been the largest consumer of aluminum in India. It now accounts for about 36% of the total aluminum consumed in the country. Aluminum is used in conductor wire rods and transformer motor wiring.

India’s inadequacy in power could well become its Achilles’ heel as the country aspires to move into a 9-10% GDP growth trajectory. Its power infrastructure—both generation as well as distribution—is woefully inadequate to meet its future growth needs.

**Infrastructure constraints—  
 India’s Achilles’ heel**

According to Gautam Chhaocharia, our Utility Sector analyst, investments in the transmission and distribution (T&D) network in India have been historically inadequate due to the focus on generation investments. Against a global standard of a 1:1 (matching investment in T&D with generation), in India it has been 0.4:1. This has led to high technical losses and also accentuated the shortages. The government plans to correct this ratio going forward. In fact, it plans to match an investment of

Rs4,000 billion in generation over FY02-FY12 with an equal amount in T&D. There is a plan to increase the capacity of the national grid (30,000 MW by 2010) substantially. The increase in power generation capacities will accentuate the trend. Low investment in transmission and distribution has contributed to line losses and inability to dispatch available power.

**Automobile sector constitutes 22% of total aluminum demand in India**

**Share of transportation in total demand has moved up sharply**

The auto sector is the second largest consumer of aluminum in India and last year accounted for 22% of total aluminum consumed in the country. The share of the auto sector has risen sharply in the past three years (it had averaged about 17-20% in the 1990s), and now constitutes 22% of the total aluminum demand. The increase is attributed to the rising intensity of aluminum use in Indian automobiles coupled with the Indian auto sector's robust growth (past three-year CAGR for passenger cars has been 19% and that for two wheelers 14.5%).

Aluminum is light and strong, making it an ideal material for transportation applications. Importantly, fuel saving and environmental friendliness also make aluminum the preferred metal for auto applications. For example, every 1kg increase in aluminum content would lead to a corresponding reduction of about 20kgs of carbon dioxide emissions over the lifetime of the vehicle.

Given its attractive strength-to-weight ratio, fuel efficiency and environmental friendliness, aluminum usage in the global industry has been on the rise in the past three to four years. According to the International Aluminum Association, passenger vehicles in North America now consume an average of 145kgs of aluminum, representing a 16% increase over the past three years. According to the International Aluminum Association, aluminum intensity in the automobile sector will continue to rise as industry is compelled to innovate to meet increasing demands from the consumer as well as the government.

Currently, Indian automobiles consume considerably less aluminum relative to automobiles abroad. We estimate that the average use of aluminum in Indian cars is about 60kgs/vehicle. This is expected to rise as global models are introduced in India and as the country becomes a production hub for production of small-sized cars.

Our automobile team estimates that the Indian transportation sector will show a CAGR of 12-14 % over the next few years. Robust demand growth coupled with increasing intensity of aluminum use is likely to result in impressive growth for aluminum.

**Table 5: India automobile volume growth and implied aluminum consumption**

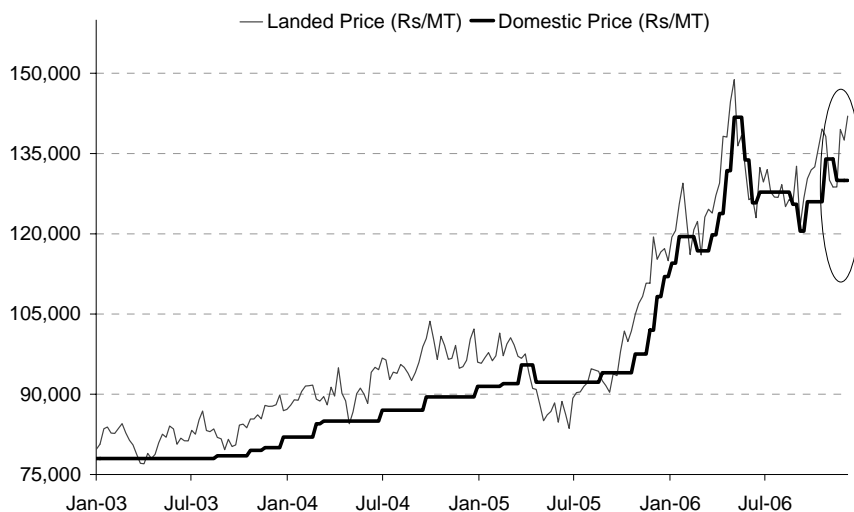
	FY01	FY02	FY03	FY04	FY05	FY06	FY07E	FY08E	FY09E
<b>Two-wheelers</b>									
Sales volume (MM units)	3.75	4.32	5.06	5.63	6.53	7.57	8.71	9.92	11.21
% Y/Y		15	17	11	16	18	15	14	13
Aluminum consumption/vehicle (kg)	20	20	20	20	20	22	25	30	30
Implied annual aluminum consumption ('000 tonnes)	75	86	101	113	131	167	218	298	336
<b>Passenger cars + MUVs</b>									
Sales volume (MM units)	0.72	0.73	0.78	1.03	1.23	1.32	1.56	1.74	1.88
% Y/Y		1.0	7.4	32.2	19.2	7.3	18.0	12.0	8.0
Aluminum consumption/vehicle (kg)	35	35	35	35	35	65	85	100	100
Implied annual aluminum consumption ('000 tonnes)	25.1	25.4	27.3	36.1	43.0	85.7	132.2	174.2	188.2

Source: Company, JPMorgan estimates.

**Synchronization of global pricing strength with domestic demand growth**

Synchronization of global pricing strength with robust domestic demand growth has allowed Indian aluminum producers to pass on the global pricing strength into the domestic market. This has resulted in the gap between landed and domestic prices narrowing significantly. We believe that this is a strong positive for the domestic industry.

Figure 14: Aluminum landed vs. domestic prices



Source: Bloomberg, JPMorgan.

**The alumina market**

**Chinese production growth in alumina has risen exponentially**

Chinese alumina production rose to 9.4MT in September 2006, up 57% year-on-year. The sharp increases in alumina production resulted in sharp falls in price in the past few months. These falls were more pronounced outside of China, while within China Chalco lowered its spot price twice in August from the July price of \$604/tonne to \$524/tonne (down 13.3%), and later to \$396/tonne (down 24%). However, that price was equivalent to an fob Australia price of \$344/tonne, still well above the then market price, setting the platform for more price decreases. Current spot alumina prices are in the \$230-260/tonne range fob Australia. Chalco's current selling price is \$260/tonne.

**Numerous new Chinese alumina projects are now building up to full production**

As with many other raw materials, bauxite mining and alumina smelting capacity were caught on the back foot when metal demand in China took off exponentially. Aluminum is in the fortunate position that new and expanded bauxite mines have not been the challenge that new and expanded copper mines have been. China's rapid alumina capacity expansions initially raised concerns as to whether Chinese bauxite reserves have the capability of delivering the bauxite feed. However, as is so often the case, increased investment in exploration delivers increased reserves and Antaiko recently estimated proven reserves in Guizhou province at 370MT versus 206MT in 2003 with reserves in Guangxi province at 800MT compared to 375MT in 2003. The bauxite, alumina and iron ore markets demonstrate more than any other markets that with the right financial incentive, the mining community is able to respond with adequate supply to meet demand.



Production from other global regions is also set to grow rapidly. Latin America increased output by almost 15% in 2Q06 versus 2Q05 due mainly to the 1.8MT Alunorte expansion. For the most part, the western companies that approved new alumina projects believed Chinese imports would continue to grow at the same pace as past years, providing a market for a substantial portion of this new output. However, rapid growth in Chinese alumina production means that very little of this alumina will be required by the Chinese. The outcome is likely to be significant inventory accumulation outside China.

Table 6: Alumina demand-supply

'000 tonnes	2005	2006E	2007E	2008E
Total alumina production	66,727	74,350	82,500	87,500
Less: non-metallurgical production	5,570	6,110	6,510	6,750
Alumina available for smelting	61,157	68,240	75,990	80,750
% growth in supply	5.50	11.60	11.40	6.30
Aluminum production	31,997	33,431	35,730	37,338
Alumina required by smelters	62,650	65,458	69,959	73,108
Smelter grade alumina balance	(1,493)	2,782	6,031	7,642

Source: Brooke Hunt, JPMorgan estimates.

The above table put out by our global commodities team shows how the significant growth in alumina supply in 2006 transforms the market very quickly from a shortfall to a surplus, with that surplus growing quite sharply through 2007 and 2008.

Increasing alumina production is likely to put additional pressure on contract negotiations for 2007. For Nalco, we have estimated that its average contract price on alumina in 2007 will decline to a level of 9.8% of LME aluminum price. With a near 11% decline in the LME price, the corresponding contract realization of alumina will decline to US\$225/tonne, 61% lower Y/Y.

## Company background

### India's second largest aluminum producer

**Nalco is India's largest exporter of alumina**

Nalco is India's second largest aluminum producer, after Hindalco, and the largest alumina producer. All its facilities are in Orissa, which has one of the world's best quality bauxite reserves. Nalco's production of alumina exceeds its requirement, making it the largest exporter of alumina in India.

### Captive access to bauxite and power

**A fully vertically-integrated producer with captive power**

Nalco is a fully vertically-integrated producer with operations ranging from captive bauxite mining, power generation and production of aluminum metal. Nalco's bauxite reserves are on the Pachpatmali hills in Orissa, 7km from its refinery. Operating costs at Nalco's only alumina refinery at Damanjodi are among the lowest in the world, and explain Nalco's low-cost status in alumina and aluminum. Operating costs at Nalco's only alumina refinery at Damanjodi are among the lowest in the world and are the primary factors explaining Nalco's low-cost status in alumina and aluminum.

The company's power plant and smelter are located at Angul at a distance of about 400kms from the refinery. The refinery is strategically located between the smelter and Vishakhapatnam port from where alumina is exported. We estimate Nalco's operating cost of alumina at US\$150/tonne. This has risen recently on the back of higher caustic soda prices. The company produces 1.6 MT of alumina and is a net seller of 0.9MT.

Table 7: Nalco facilities and expansion

Facility	Location	Current capacity	Capacity post expansion
Bauxite Mines	Panchpatmali hills, Orissa	4.8MT	6.3MT
Alumina Refinery	Damanjodi	1.575MT	2.1MT
Aluminum Smelter	Angul	0.345MT	0.460MT
Captive power plant	Near Angul	960MW	1200MW

Source: Company, JPMorgan.

The bauxite available at Nalco's mines is of the high grade gibbsitic variety, containing 45% alumina. The gibbsitic bauxite variety is digested at lower temperatures and is a key factor in the company's low costs

## Financial statements

### Return ratios to trend down

#### RoE to decline sharply on increasing cash generation and moderating commodity prices

A ‘stronger for longer’ commodity cycle is likely to result in Nalco’s ROE, rising to an all-time high in the current fiscal year. We estimate ROE to rise to 33% in FY07. The key determinant of the record ROE is likely to be high capital productivity, which has been driven by two key factors—historic aluminum and alumina prices coupled with low capex. Capex on the expansion programs is likely to be heavy in FY08 and FY09. Consequently, we see RoE coming off sharply with peaking capex combining with moderating aluminum and alumina prices. We see capital productivity slowing considerably by FY09. Increasing cash surpluses are likely to exaggerate the impact of slowing capital productivity.

Table 8: Nalco—RoE breakdown

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007E	2008E	2009E
%												
PAT/Sales	32	19	26	28	23	20	23	30	32	36	31	26
Sales/Total assets	42	34	48	48	40	42	51	69	71	71	49	44
Total Assets/equity	129	132	137	138	162	187	171	142	129	128	126	125
RoE	17	8	17	19	15	16	20	29	29	33	19	14

Source: Company data, JPMorgan estimates.

**Table 9: Nalco income statement**

Rs in millions, %

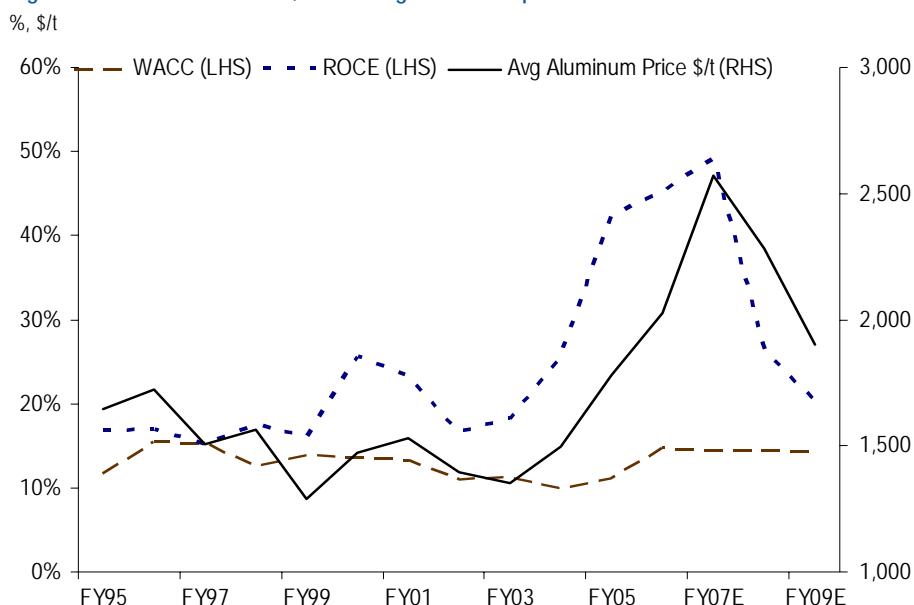
Year-end March	FY06	FY07	FY08	FY09
Gross sales	52,959	66,477	54,241	53,746
less: excise duty	4,355	4,769	3,504	3,259
<b>Net sales</b>	<b>48,604</b>	<b>61,708</b>	<b>50,737</b>	<b>50,487</b>
Expenditure				
Raw materials	5,211	6,049	6,158	6,413
Power & electricity	9,378	9,891	10,549	12,483
Other manufacturing expenses	3,319	3,949	4,110	4,089
Employees	3,315	3,613	3,703	3,814
Selling & admin expenses	2,366	2,715	2,791	2,651
(Inc) dec in stocks	(539)	(350)	(400)	(400)
Total	23,054	25,866	26,911	29,050
<b>EBITDA</b>	<b>25,550</b>	<b>35,842</b>	<b>23,826</b>	<b>21,437</b>
Interest payable	0	75	150	188
Depreciation	3,772	4,132	4,320	5,175
Other income	2,222	2,200	2,728	3,000
Pre tax profit	24,000	33,835	22,084	19,075
Tax	8,674	11,556	6,553	5,932
<b>Recurring profit</b>	<b>15,326</b>	<b>22,280</b>	<b>15,531</b>	<b>13,143</b>
Provision for deferred tax	(107)	400	600	601
less (add) prior period adjustments	0	0	0	0
Reported profit	15,326	22,280	15,531	13,143
<b>EPS - recurring</b>	<b>23.79</b>	<b>34.58</b>	<b>24.11</b>	<b>20.40</b>
CFPS (Wtd avg)	29.64	40.99	30.81	28.43
DPS	5.00	6.00	6.40	6.50
EBITDA margin (%)	53	58	47	42
Net Profit margin (%)	32	36	31	26
Growth in:				
Net sales (%)	17	27	-18	0
EBITDA (%)	18	40	-34	-10
Net profit (%)	24	45	-30	-15
EPS (fully diluted) (%)	24	45	-30	-15

Source: Company reports and JPMorgan estimates.

**Commodity supercycle has ensured that despite large expansion return ratios stay above cost of capital**

The commodity supercycle will also ensure that despite the forecast of a 30% decline in LME aluminum prices over the FY07-FY09 period, Nalco's RoCE will remain above its weighted average cost of capital. We would also attribute this to Nalco's low cost status which will insulate the company, far more than its peers, from a declining commodity pricing environment. While operating costs at Nalco have also risen over past two years, its costs remain in the bottom quartile of the global cost curve for both alumina and aluminum.

Figure 15: Nalco ROCE-WACC, and average aluminum price



Source: Company, JPMorgan estimates.

Table 10: EBITDA margins 2004-2008E

%

	2003	2004	2005	2006E	2007E
Nalco	45	52	53	58	47
Hindalco	24	24	23	22	21
Alcan	19.1	10.2	12.6	17.0	18.6
Alcoa	14.7	15.5	14.8	18.8	18.8
Chalco	31	35	35	40	32

Source: JPMorgan estimates. Nalco's and Hindalco's year-ends are March and, therefore, 2003 is FY04, 2004 is FY05 and so on.

## Robust operating cash flows

Nalco will continue to generate robust cash flows on the back of 40%+ EBITDA margins. The company will meet its capex requirement out of its operating cash.

Table 11: Nalco—Cash flows

Rs in millions	FY 2006	FY 2007E	FY 2008E	FY 2009E
Net Income (pre-exceptional)	15,326	22,280	15,531	13,143
Add: depreciation	3,772	4,132	4,320	5,175
Working capital movement	980	1,208	1,551	(143)
<b>Operational cash flow</b>	<b>20,079</b>	<b>27,619</b>	<b>21,402</b>	<b>18,175</b>
Capital expenditure	(2,083)	(14,878)	(24,188)	(16,000)
<b>Free cash flow</b>	<b>17,996</b>	<b>12,741</b>	<b>(2,785)</b>	<b>2,175</b>
Dividends Paid	(3,673)	(4,330)	(4,618)	(4,691)
(Inc) Dec in investments	0	(1,500)	500	0
Equity raised	296	0	(0)	1
(Dec) Inc in debt	0	2,000	0	1,000
(Inc) Dec in loans and advances	(126)	126	0	20
Inc (Dec) in def tax liability	(107)	400	600	601
Others	0	0	0	0
<b>Total</b>	<b>14,385</b>	<b>9,436</b>	<b>(6,304)</b>	<b>(894)</b>

Source: Company reports and JPMorgan estimates.

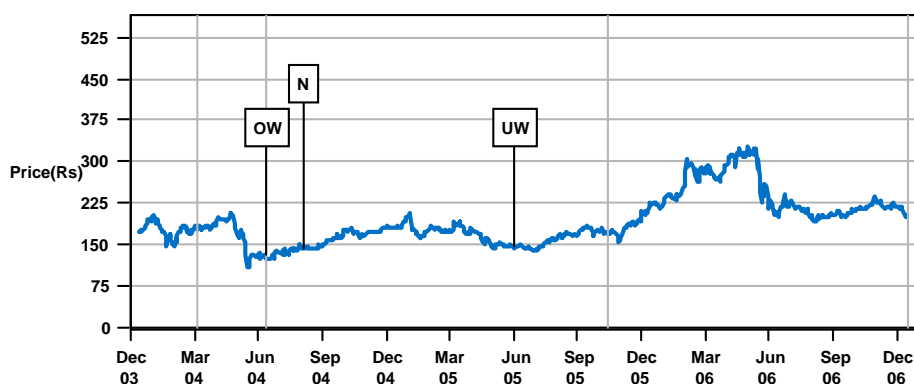
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Date	Rating	Share Price (Rs)	Price Target (Rs)
11-Jun-04	OW	130.65	-
05-Aug-04	N	142.60	-
01-Jun-05	UW	146.15	-

Source: Reuters and JPMorgan; price data adjusted for stock splits and dividends.

Break in coverage Sep 25, 2002 - Jan 07, 2003, and Mar 04, 2004 - Jun 11, 2004, and Oct 14, 2005 - Dec 15, 2006. This chart shows JPMorgan's continuing coverage of this stock; the current analyst may or may not have covered it over the entire period. As of Aug. 30, 2002, the firm discontinued price targets in all markets where they were used. They were reinstated at JPMSI as of May 19th, 2003, for Focus List (FL) and selected Latin stocks. For non-JPMSI covered stocks, price targets are required for regional FL stocks and may be set for other stocks at analysts' discretion. JPMorgan ratings: OW = Overweight, N = Neutral, UW = Underweight.

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Revised December 11, 2006.

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## National Aluminium Co. Ltd.: Summary of financials

Rs in millions, year-end March

Profit and loss statement				
Rs in millions, year-end Mar	FY06	FY07E	FY08E	FY09E
Revenues	48,604	61,708	50,737	50,487
% change Y/Y	17	27	-18	0
EBITDA	25,550	35,842	23,826	21,437
% change Y/Y	18%	40%	-34%	-10%
EBITDA margin (%)	53	58	47	42
EBIT	21,778	31,710	19,506	16,262
% change Y/Y	28	46	-38	-17
EBIT margin (%)	45	51	38	32
Net interest	0	75	150	188
Earnings before tax	24,000	33,835	22,084	19,075
% change Y/Y	28	41	-35	-14
Tax	(8,674)	(11,556)	(6,553)	(5,932)
as % of EBT	-36	-34	-30	-31
Net income (pre-exceptional)	15,326	22,280	15,531	13,143
% change Y/Y	24	45	-30	-15
Shares outstanding (MM)	644	644	644	644
EPS (pre-exceptional) (Rs)	24	35	24	20
% change Y/Y	24	45	-30	-15

Balance sheet				
Rs in millions, year-end Mar	FY06	FY07E	FY08E	FY09E
Inventories	5,916	7,911	5,969	6,311
Debtors	294	411	338	505
Other current assets	1,186	1,180	1,074	1,075
Cash and bank balances	21,937	31,373	25,070	24,176
Loans and deposits	3,646	3,520	3,520	3,500
Investments	0	1,500	1,000	1,000
Net fixed assets	41,767	52,514	72,381	83,206
Total assets	74,746	98,409	109,35	119,77
			2	3
Liabilities				
Sundry creditors	2,674	3,600	3,700	4,000
Others	6,728	9,116	8,446	8,512
Total current liabilities	9,401	12,716	12,146	12,512
Total debt	0	2,000	2,000	3,000
Other liabilities	6,417	6,817	7,418	8,019
Total liabilities	15,819	21,533	21,563	23,531
Shareholders' equity	58,927	76,877	87,789	96,242
BVPS (Rs)	91.5	119.3	136.3	149.4

Cash flow statement				
Rs in millions, year-end Mar	FY06	FY07E	FY08E	FY09E
Net Income (pre-exceptional)	15,326	22,280	15,531	13,143
Add: depreciation	3,772	4,132	4,320	5,175
Working capital movement	980	1,208	1,551	(143)
Operational cash flow	20,079	27,619	21,402	18,175
Net Capex	(2,083)	(14,878)	(24,188)	(16,000)
Free cash flow	17,996	12,741	(2,785)	2,175
Equity raised/ (repaid)	296	0	(0)	1
Debt raised/ (repaid)	0	2,000	0	1,000
Other				
Dividends paid	3,673	4,330	4,618	4,691
Beginning cash	7,552	21,937	31,373	25,070
Ending cash	21,937	31,373	25,070	24,176
DPS (Rs)	5.0	6.0	6.4	6.5

Ratio analysis				
%, year-end March	FY06	FY07E	FY08E	FY09E
EBITDA margin	53	58	47	42
Operating margin	45	51	38	32
Net profit margin	32	36	31	26
Sales growth	17	27	-18	0
Net profit growth	24	45	-30	-15
EPS growth	24	45	-30	-15
Interest coverage (x)		478	159	114
Net debt to total capital	-0.3	-0.3	-0.2	-0.2
Net debt to equity	-0.4	-0.4	-0.3	-0.2
Sales/assets	0.7	0.6	0.5	0.4
Assets/equity	1.3	1.3	1.2	1.2
ROE	29	33	19	14
ROCE	45	49	26	20

Source: Company reports and JPMorgan estimates.