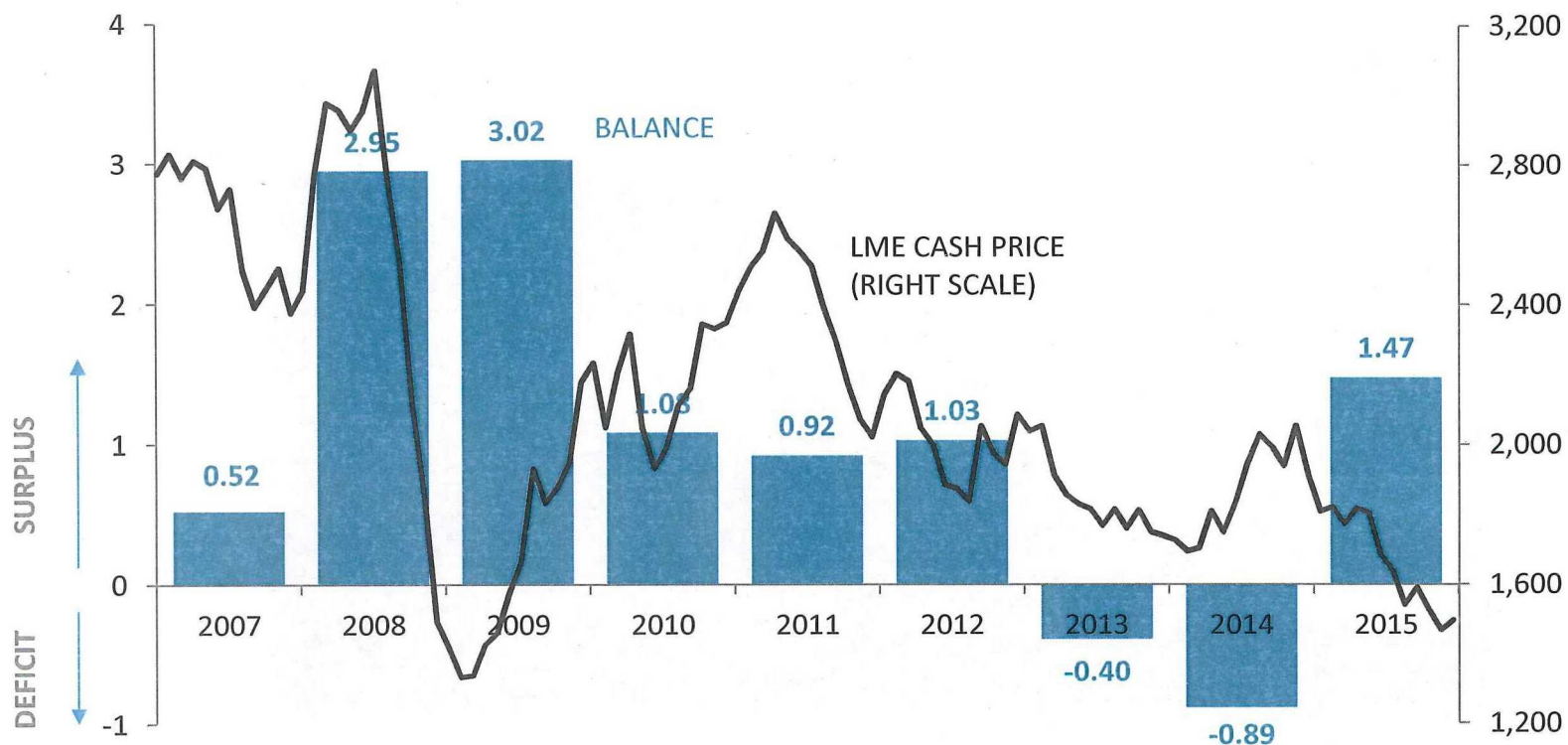


The global market has consistently overproduced...

WORLD PRIMARY ALUMINUM MARKET BALANCE VS LME CASH PRICES

(million mton vs \$/mton; annual vs monthly data)

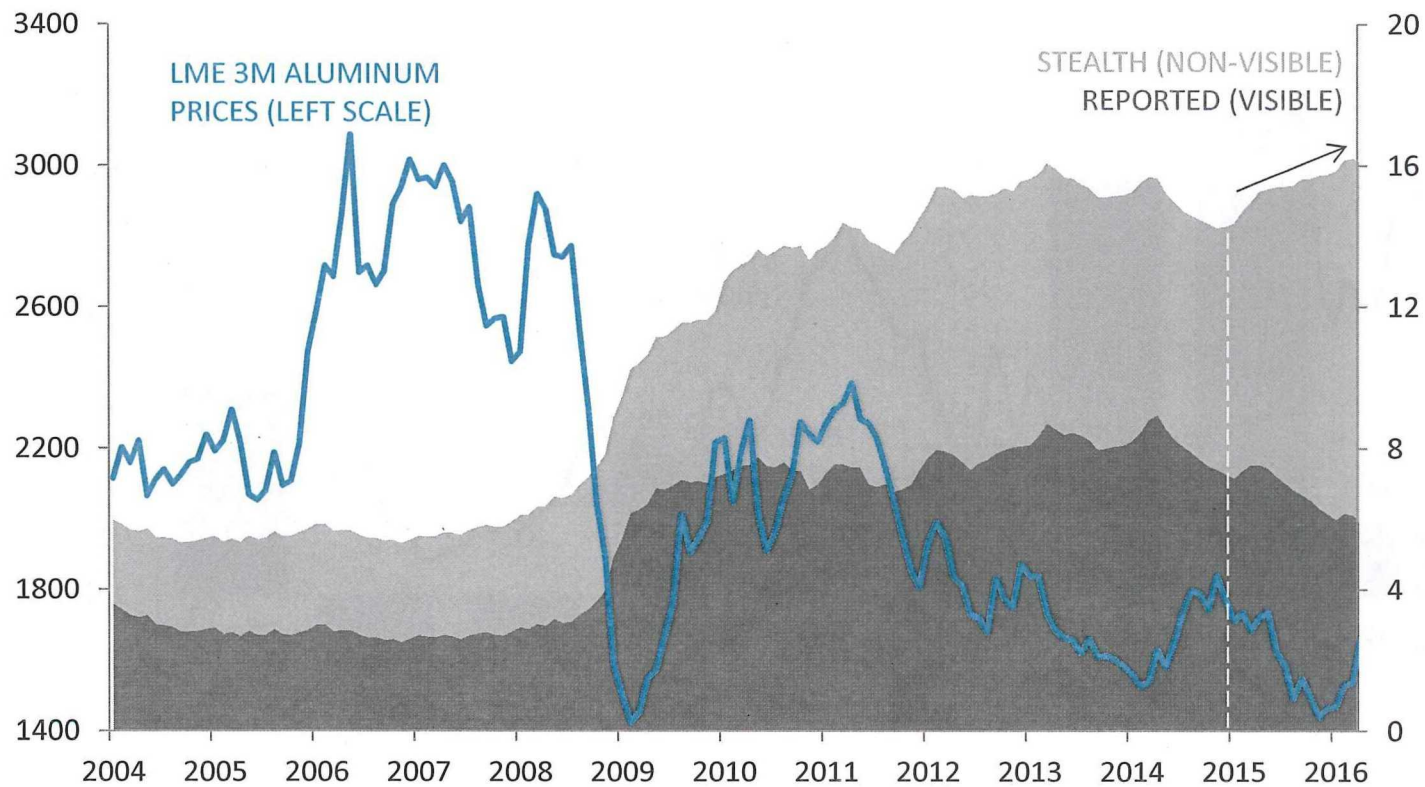


Source: HARBOR Aluminum.

...which has increased global aluminum stocks to a record high of 16 million mton

WORLD PRIMARY ALUMINUM INVENTORIES

(\$/mton vs million mton; monthly data)



Source: HARBOR Aluminum, CME, IAI, LME, Marubeni, SHFE, and SMM data

At the same time, China's smelters have become much more competitive

PRIMARY ALUMINUM CASH COST OF PRODUCTION*

(monthly average data: \$/mton)

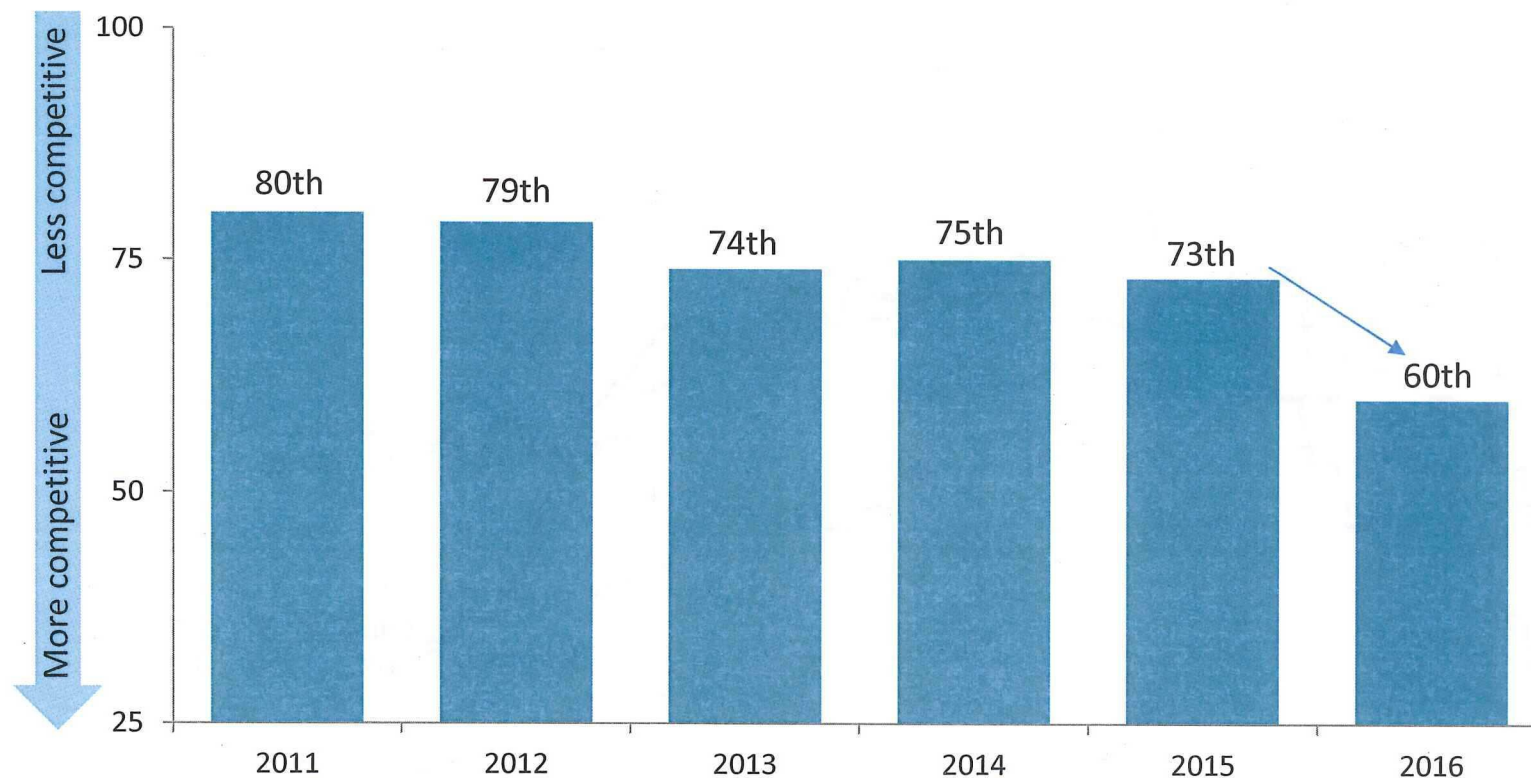


Source: HARBOR Aluminum

*Before casting (molten metal). Does not include depreciation, interest payments or working capital; Excludes applicable VAT of 17% that Chinese aluminum smelters pay on raw materials, energy and services.

In fact, China has moved down to the 60th percentile of the cost curve

CHINA'S PRIMARY ALUMINUM SMELTING INDUSTRY CASH COST CURVE POSITION*
(Q1 of every year; percentile)

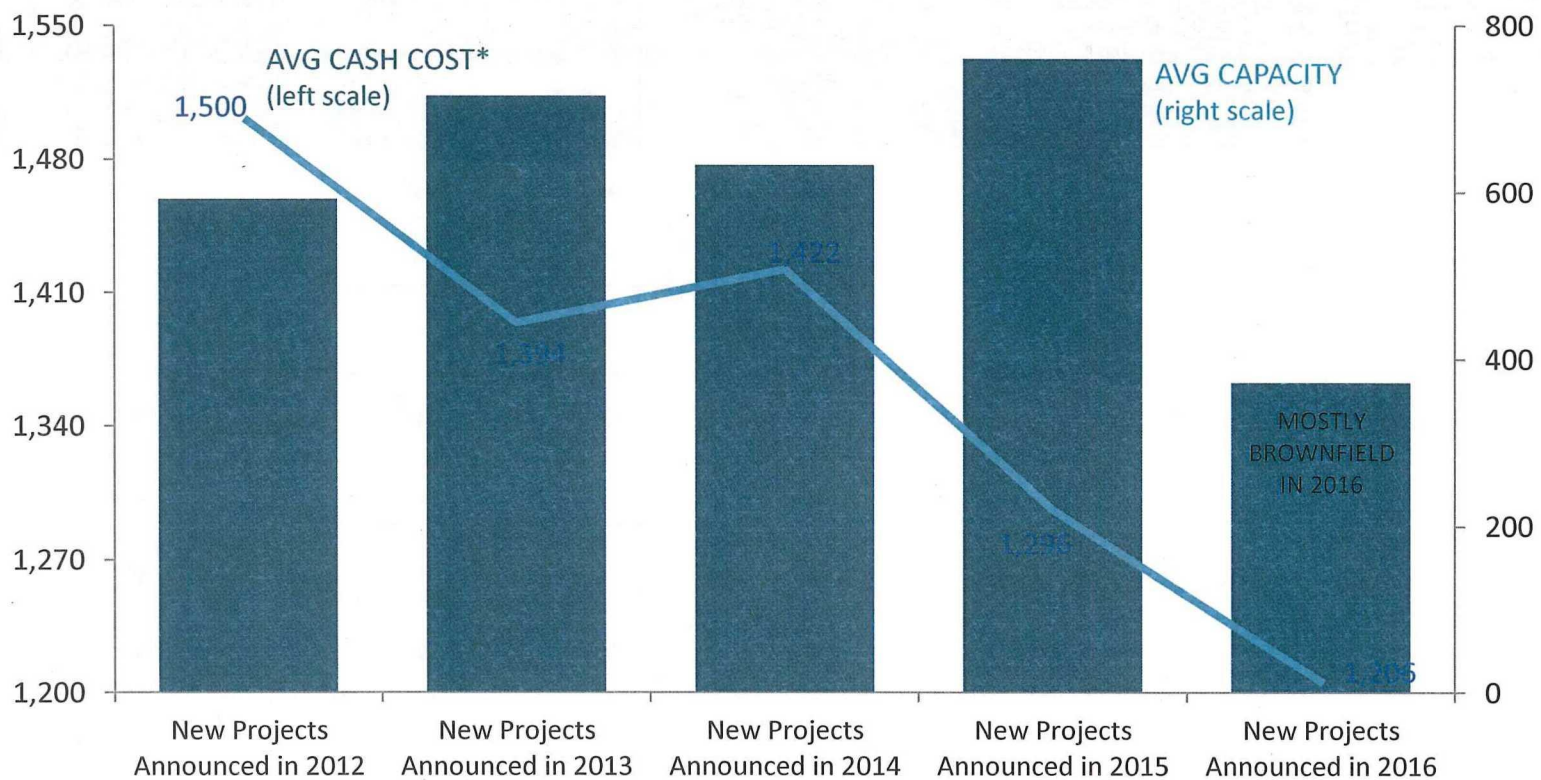


* Cash cost before casting (molten metal). Does not include depreciation, interest payments, sustained capital expenses or working capital; excludes applicable VAT of 17% that Chinese aluminum smelters pay on raw materials, energy and services.

Source: HARBOR Aluminum

...and building low-cost, state-of-the-art mega smelters...

CHINESE PRIMARY ALUMINUM SMELTER PRODUCTION CASH COST* AND CAPACITY (\$/mton and thousand mtpy)



* On cash cost basis before casting (molten metal). Does not include depreciation, interest payments, sustained capital expenses or working capital; excludes applicable VAT of 17% that Chinese aluminum smelters pay on raw materials, energy and services.

Source: HARBOR Aluminum

...with captive coal mines, power plants and in some cases downstream assets

CHINESE PRIMARY ALUMINUM PROJECTS' STRUCTURE

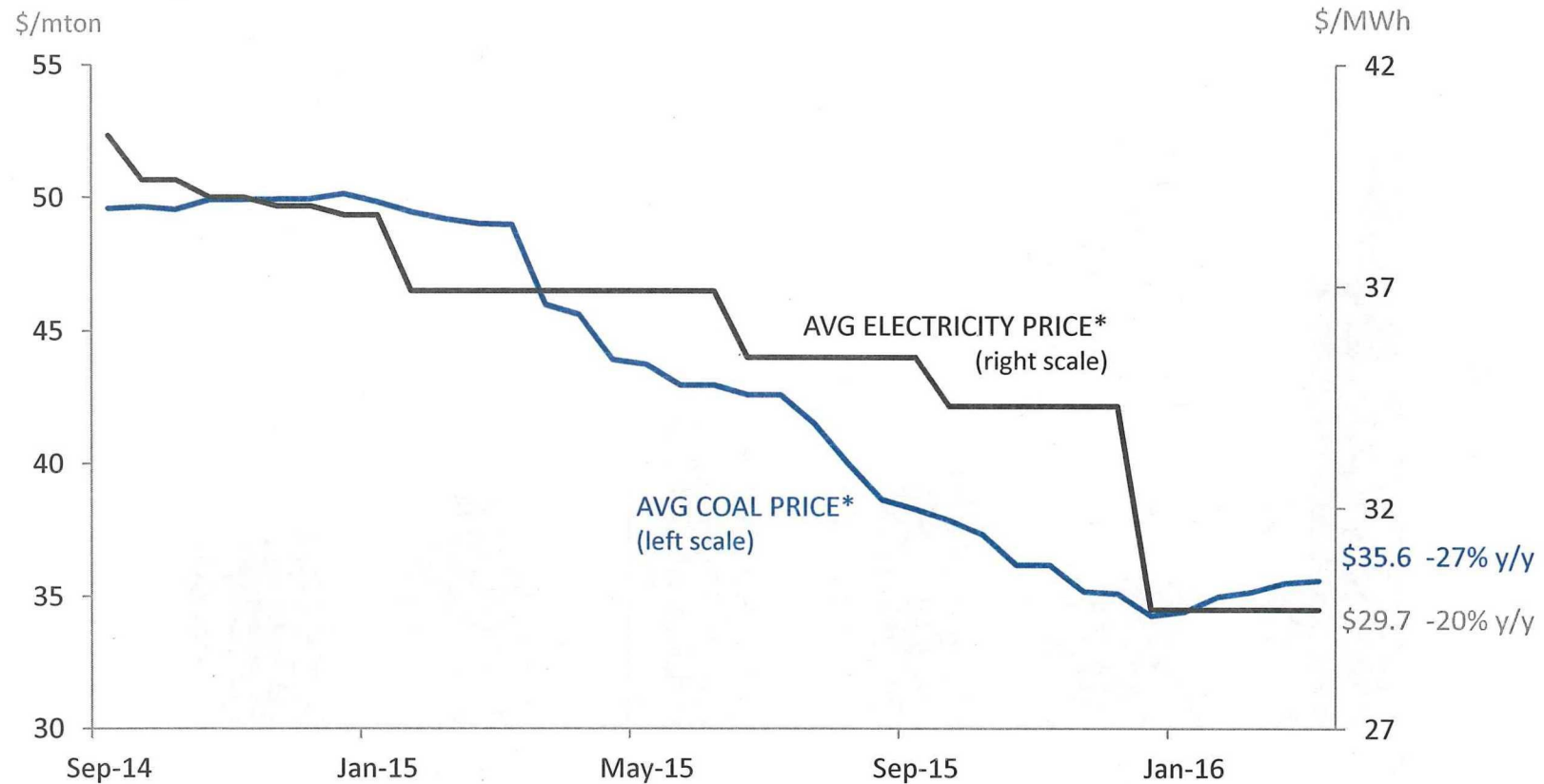
(New primary aluminum projects announced in 2011-2015)

# OF PROJECTS	UPSTREAM			ENERGY		DOWNSTREAM
	BAUXITE	ALUMINA	ALUMINUM	COAL	POWER	SEMIS PRODUCTION
20			✓	✓	✓	
10			✓		✓	
10			✓			
9			✓	✓	✓	✓
4			✓		✓	✓
3			✓			✓
1	✓	✓	✓	✓	✓	✓
2		✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	

Moreover, declining coal prices have reduced China's electricity price by 20%...

CHINA COAL PRICE AND PRIMARY ALUMINUM INDUSTRY ELECTRICITY PRICE

(weekly data;)

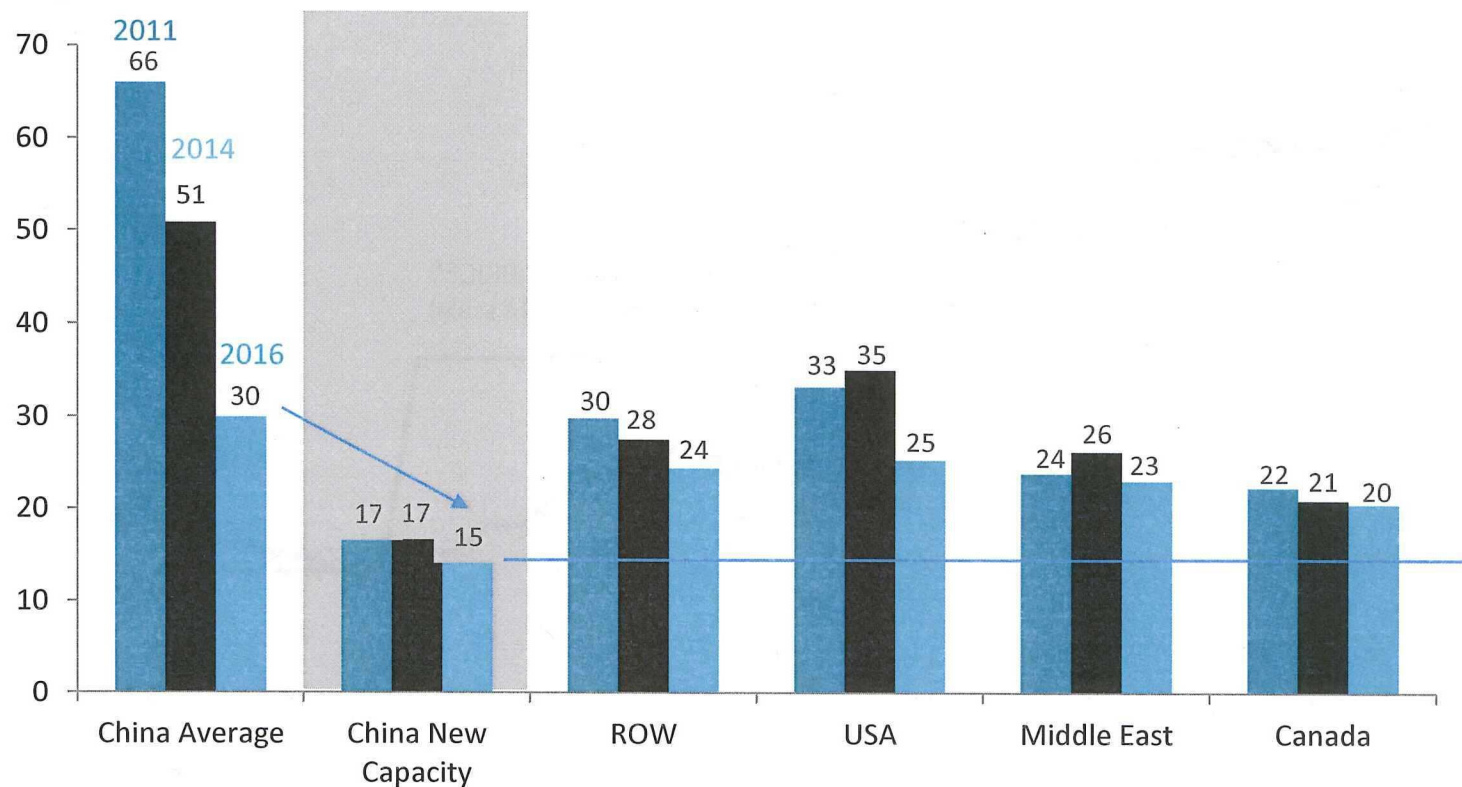


* Domestic price excluding 17% VAT.

Source: HARBOR Aluminum

...and have pushed China's electricity cost down to ROW's levels

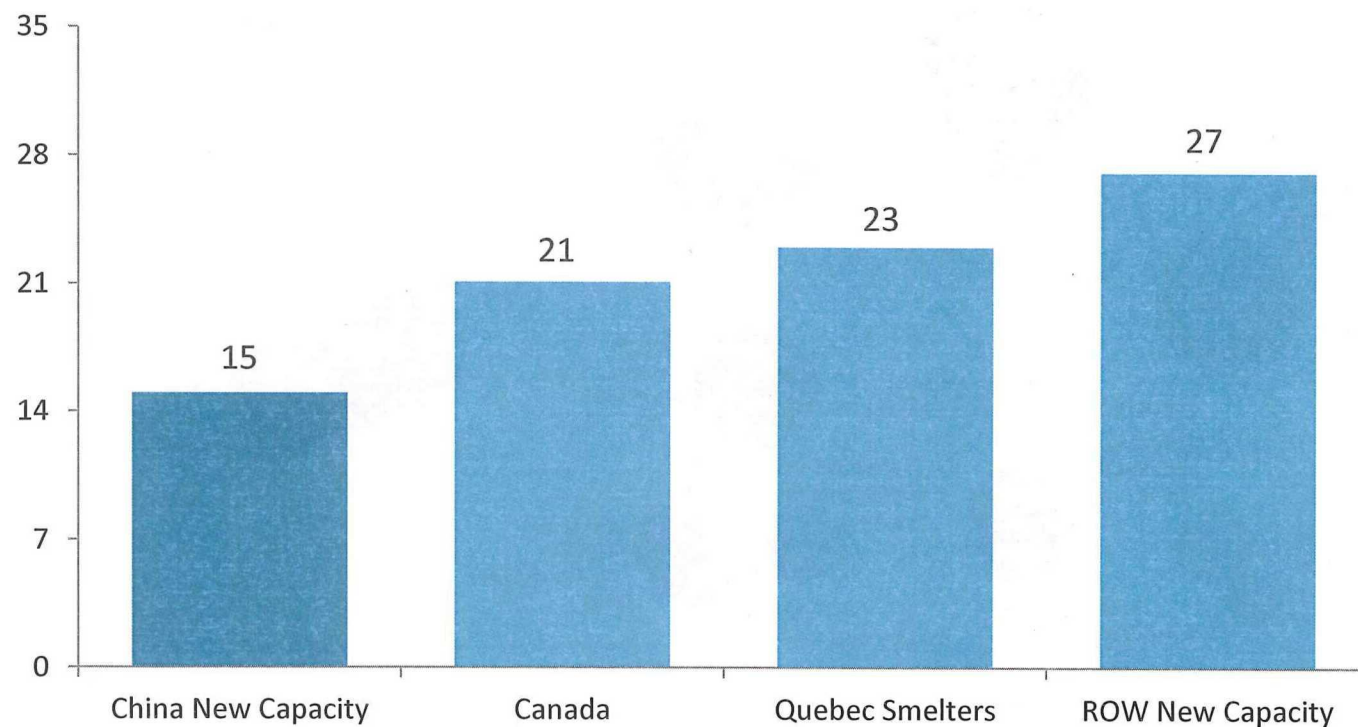
PRIMARY ALUMINUM ELECTRICITY PRICE BY SELECTED COUNTRIES/REGIONS*
(\$/MWh)



* Excludes 17% VAT for China.
Source: HARBOR Aluminum

New Chinese smelters pay about half the electricity price of new smelters in ROW

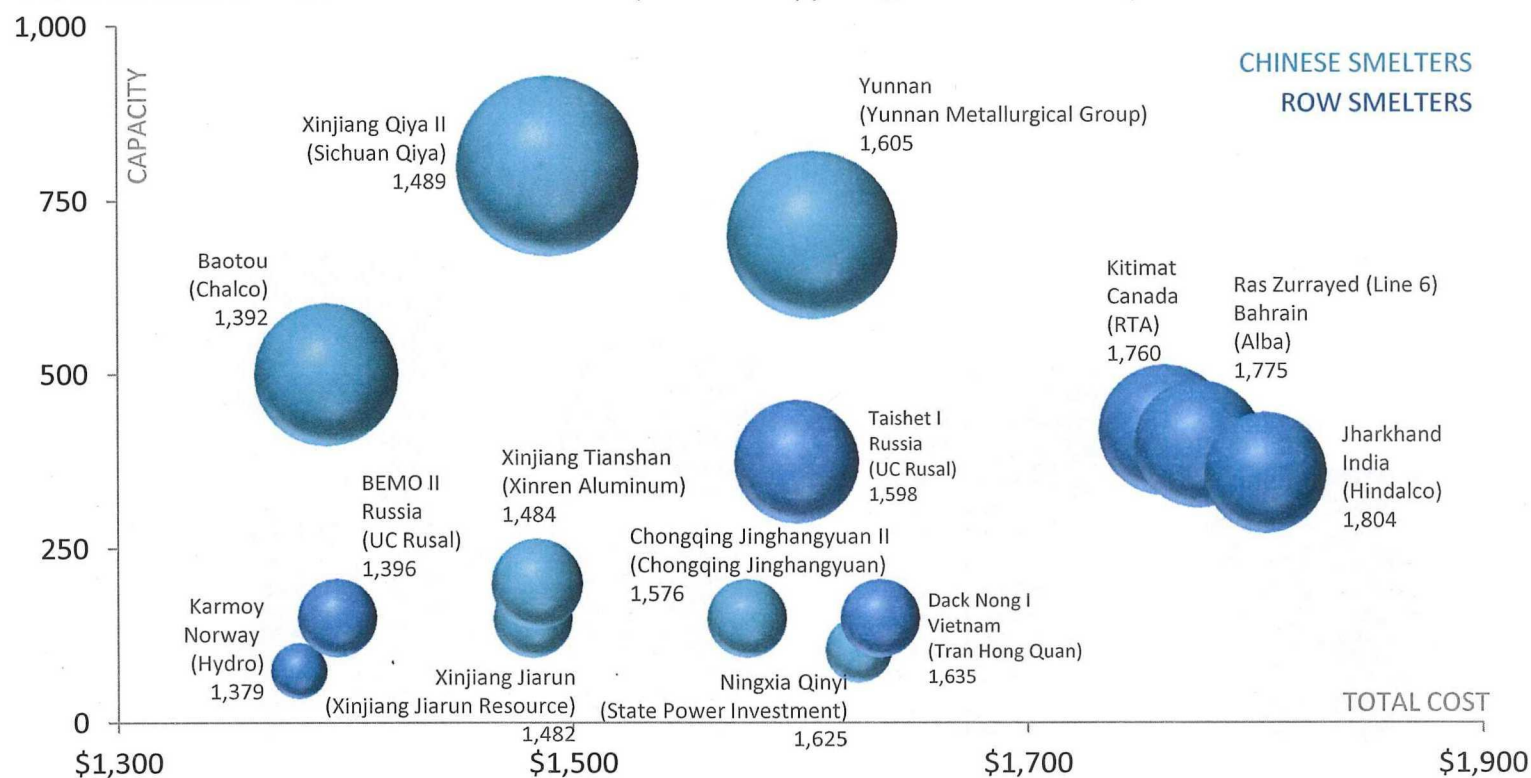
CHINA AND ROW PRIMARY ALUMINUM ELECTRICITY PRICE*
(average \$/MWh)



* Excludes 17% VAT for China.
Source: HARBOR Aluminum

New Chinese smelting projects are more competitive than ROW's if capex is considered

2016-2020 PRIMARY ALUMINUM COMMITTED PROJECTS' CAPACITY AND TOTAL COST* OF PRODUCTION (thousand mtpy and \$/mton of aluminum)

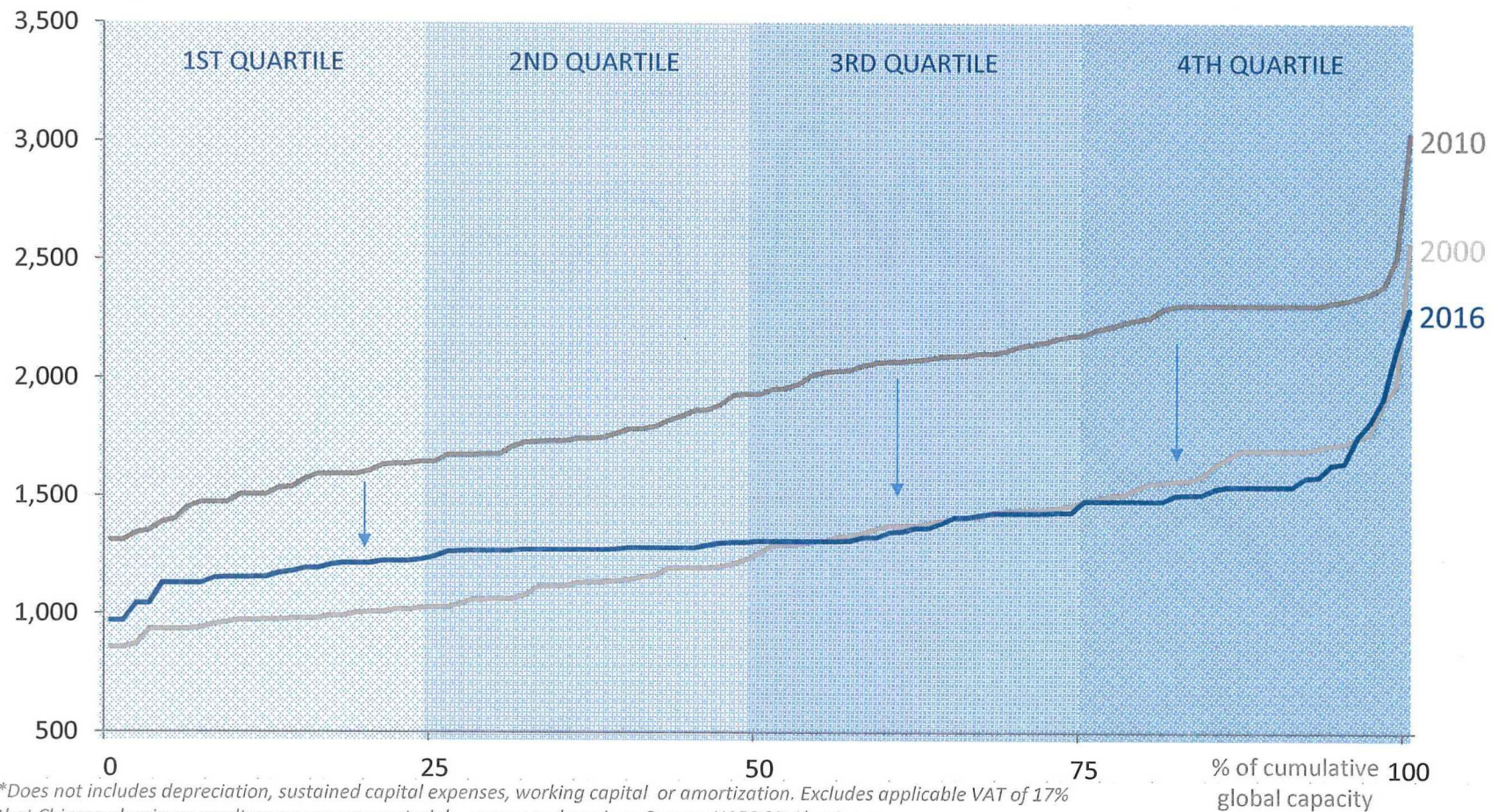


*Includes, interest payments, depreciation and working capital. Excludes applicable VAT of 17% that Chinese aluminum smelters pay on raw materials, energy and services. Bubble size = production capacity

Source: HARBOR Aluminum

...and World's production cash costs are down to year 2000 levels with a flatter curve

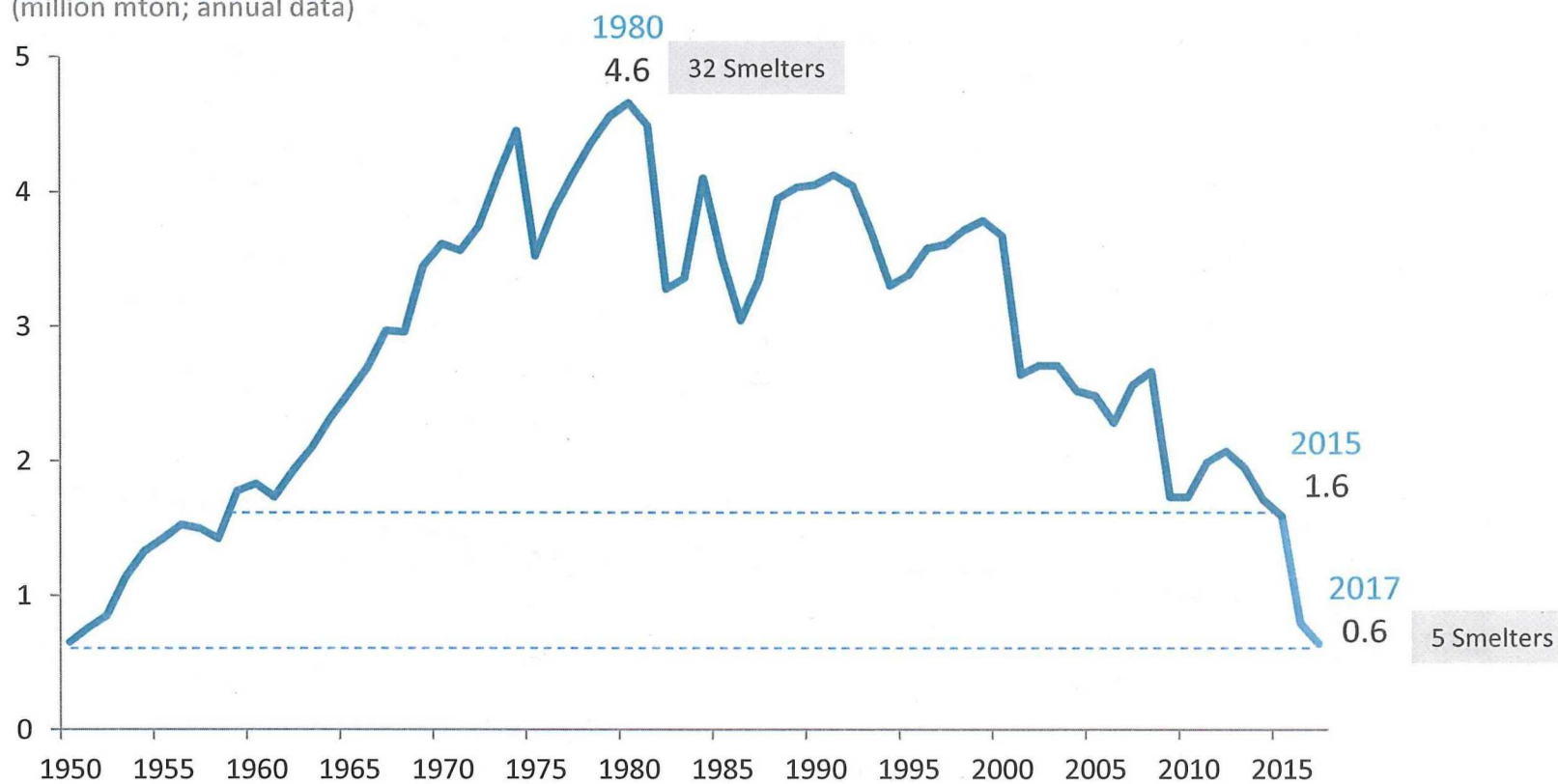
GLOBAL ALUMINUM PRODUCTION CASH COST CURVE BEFORE CASTING BY SMELTER*
(in \$/mton)



US primary aluminum production has been declining since 1980

USA PRIMARY ALUMINUM PRODUCTION

(million mton; annual data)

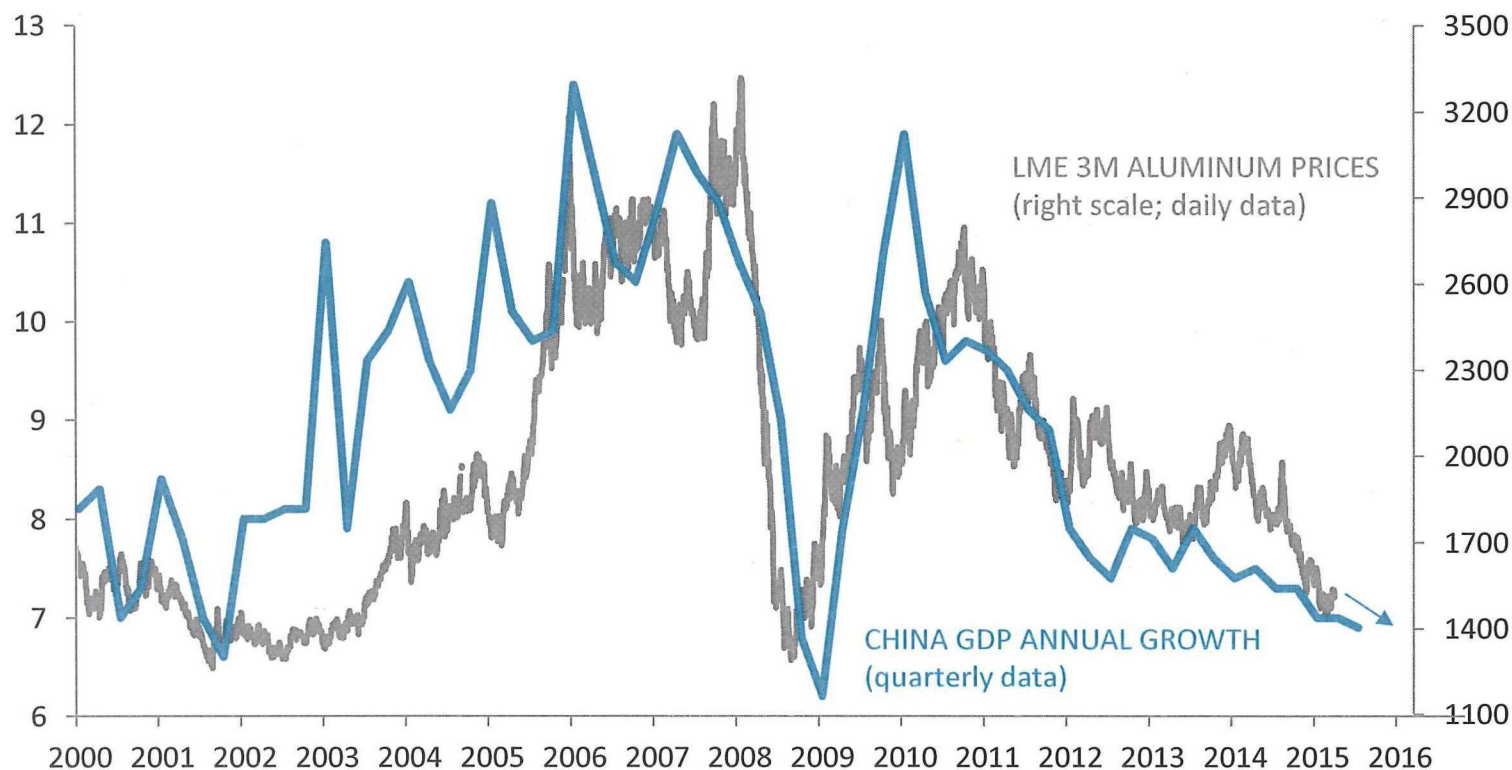


Source: HARBOR Aluminum with Aluminum Association data

China's economic and industry's transformation drove prices and margins up... and now down

CHINA GDP ANNUAL GROWTH VS LME 3M ALUMINUM PRICES

(annual % change vs \$/mton)



Source: HARBOR Aluminum with LME and NBS data

