



# Market Outlook

## Investor presentation

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Corporate Strategy & analysis

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# Agenda

- 1 About Hydro
- 2 Market Outlook
- 3 Hydro strategy

# Hydro – a fully integrated aluminium company

World class assets, high-end products and leading market positions



- Global provider of alumina, aluminium and aluminium products
- Leading businesses along the value chain
- 13 000 employees involved in activities in more than 40 countries

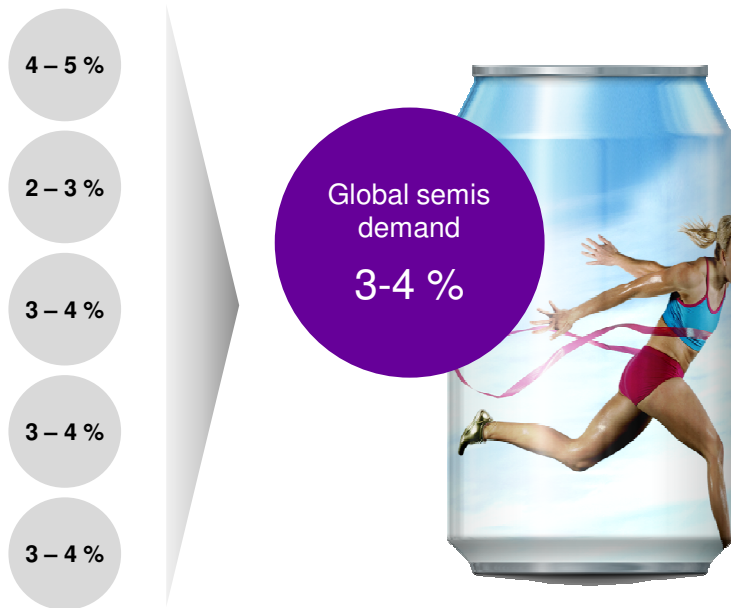
- Market capitalization ~USD 12 billion
- Annual revenues ~USD 11 billion

01

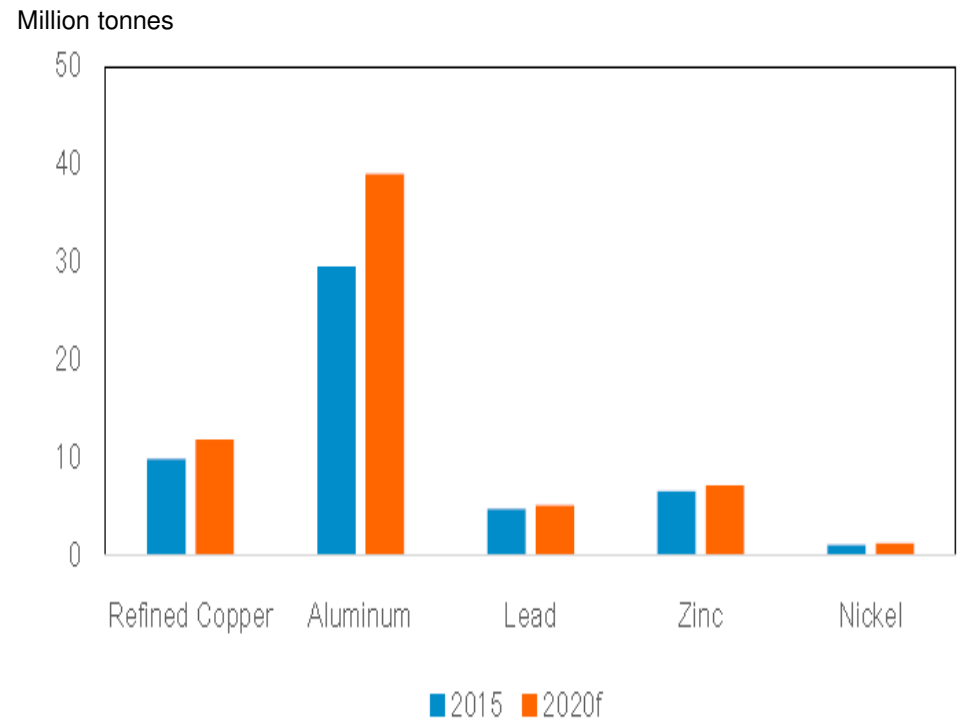
Downstream

# Global aluminium demand first in class

Semis demand CAGR 2016 – 2025



**Chinese primary consumption**  
(consensus forecast)



Source: GRU

# Environmental regulations accelerate substitution across segments

## Steel substitution in automotive



Lighter vehicles in aluminium make a big impact on the climate challenge:

- US CAFE regulations
- EU CO2 emission reduction targets

## Copper substitution in HVAC&R, cabling and transmission lines



Aluminium weight and price advantages vs copper on a volume conductivity equivalent basis

## Key enabler for energy-efficient buildings



Flexibility and formability of aluminium enable energy-efficient building solutions:

- US Building energy use laws
- EU 2012 Energy efficiency directive

\* Global BiW CAGR including China

\*\* Heat, ventilation, air conditioning & refrigeration (HVAC&R)

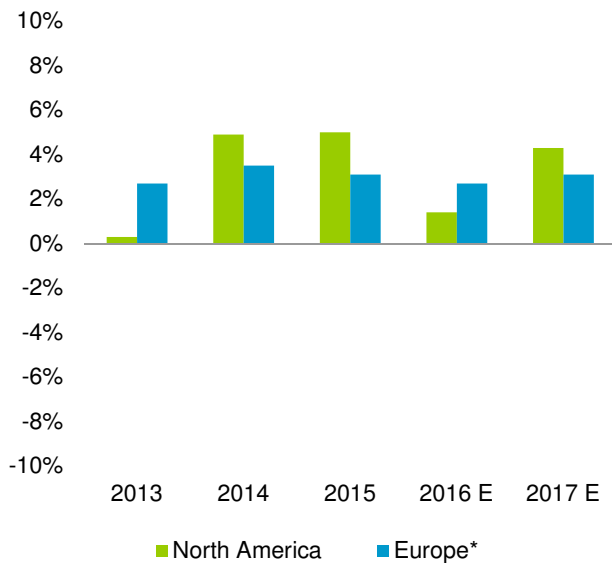
Source: Ducker Europe, CRU; Hydro analysis, Sapa analysis

# Rolled products demand driven by transport segment

Transport share increasing in total rolled products demand

## General rolled products demand, selected regions

YoY-growth

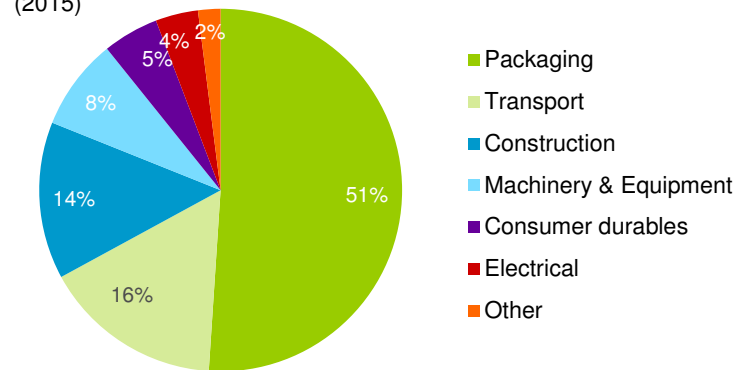


## Expected market development

- Continued substitution trend in transport segment contributing to overall demand growth
- Packaging segment key growth driver in terms of size

## Global segment composition, rolled products

(2015)



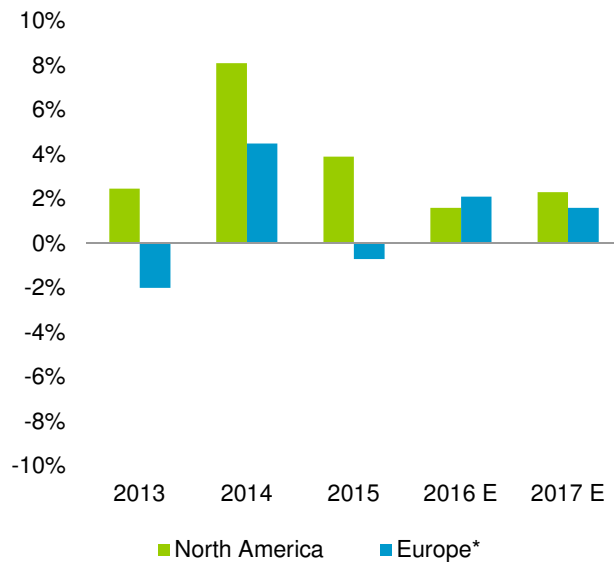
Source: CRU, Hydro Analysis  
\*Total EU27+EFTA

# Continued growth in extrusion demand

Gradual improvement expected in Europe

## Extrusion demand, selected regions

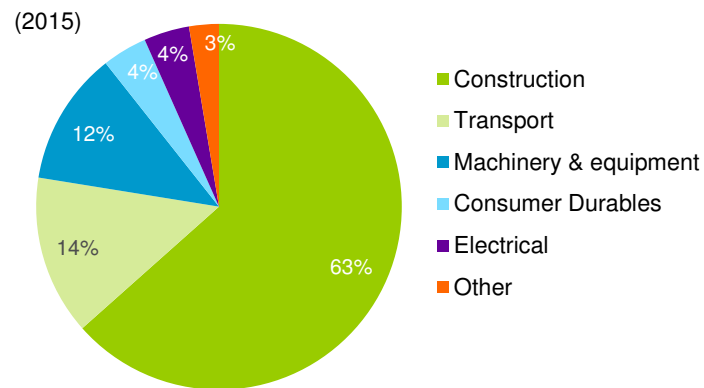
YoY-growth



## Expected market development

- US housing market still sustaining positive momentum
- Weakness in US truck and trailer segment
- Construction activity in Europe continues to improve from low levels

## Global segment composition, extrusion (2015)



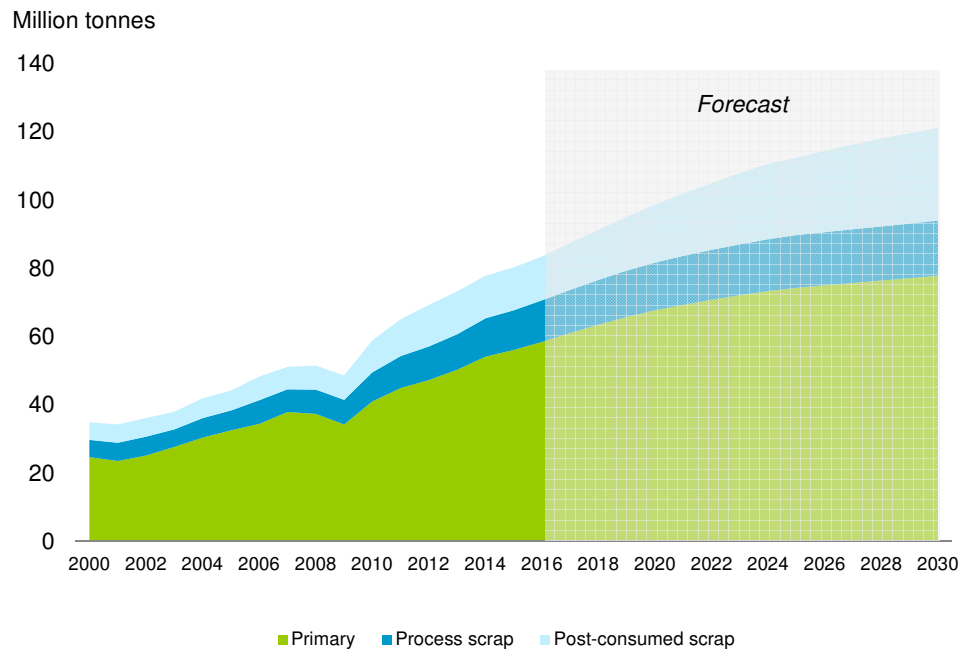
Source: CRU, Hydro Analysis  
\*Total EU27+EFTA



# Recycling gaining importance

Growth in recycling will contribute to making Hydro carbon-neutral

Primary demand versus recycled material, global



## Market

- Substantial growth in post-consumed scrap
- Recycling driven by product markets and customer demand
- Both recycling and primary aluminium will be needed to satisfy demand growth

## Hydro's recycling response

- Primary Metal: From remelting to recycling; utilizing more contaminated and end of life scrap
- Rolled Products: Lift recycling potential in the metal balance to reduce cost

02

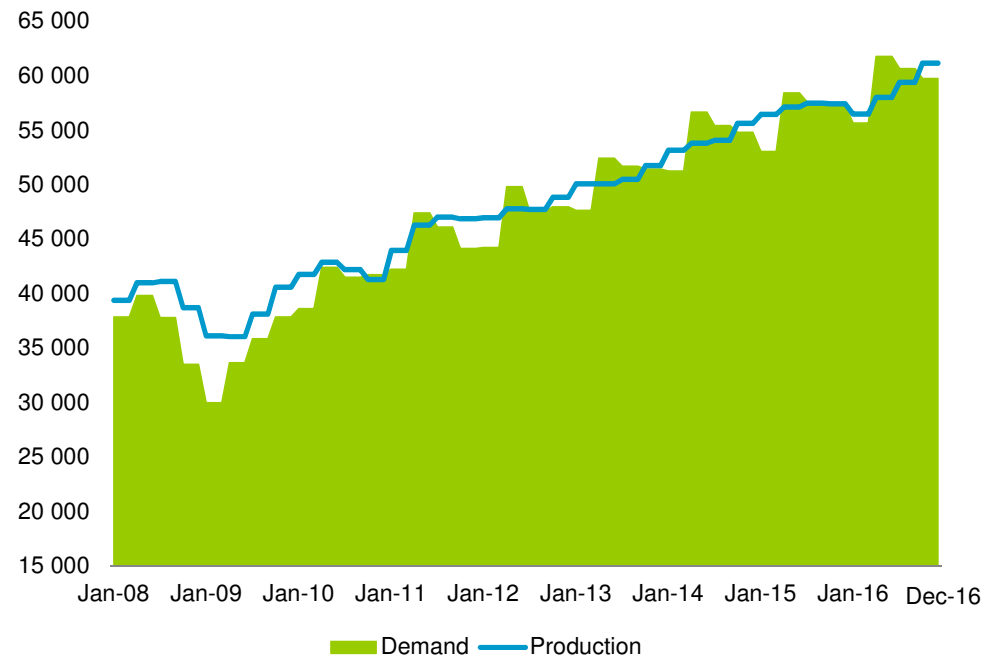
Primary

# Global undersupply in 2016

Moderate supply growth and continued strong demand growth

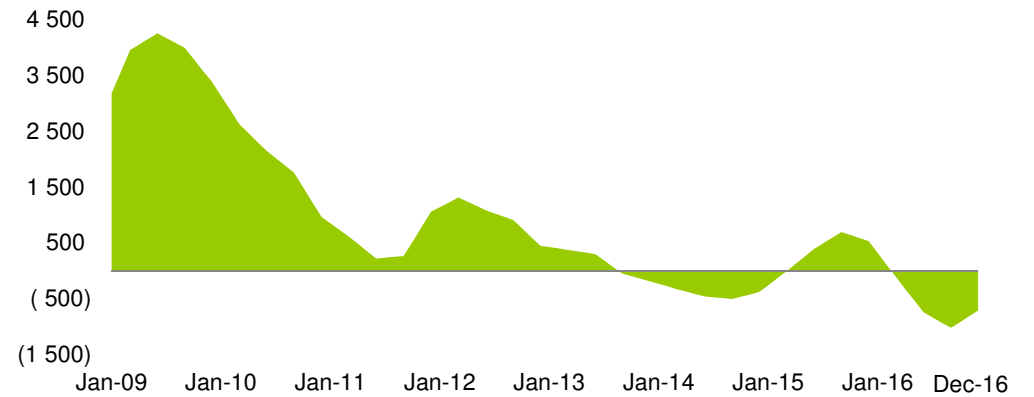
## Demand and production

Quarterly annualized, in 1 000 mt primary aluminium



## Production less demand

12 month rolling quarterly average, in 1 000 mt primary aluminium

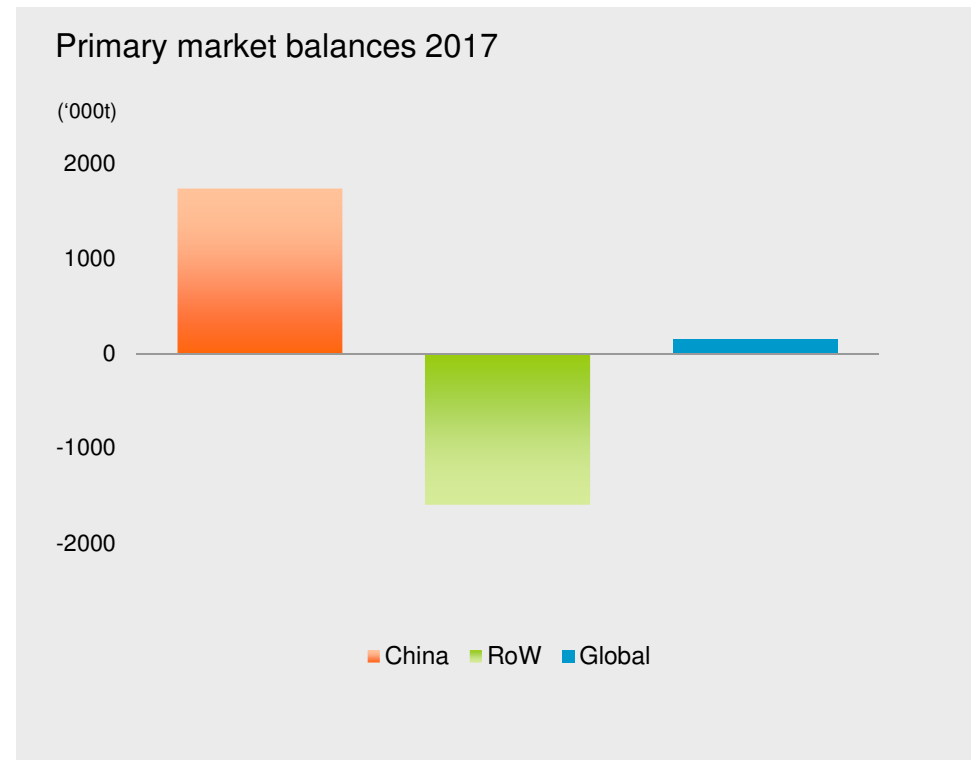
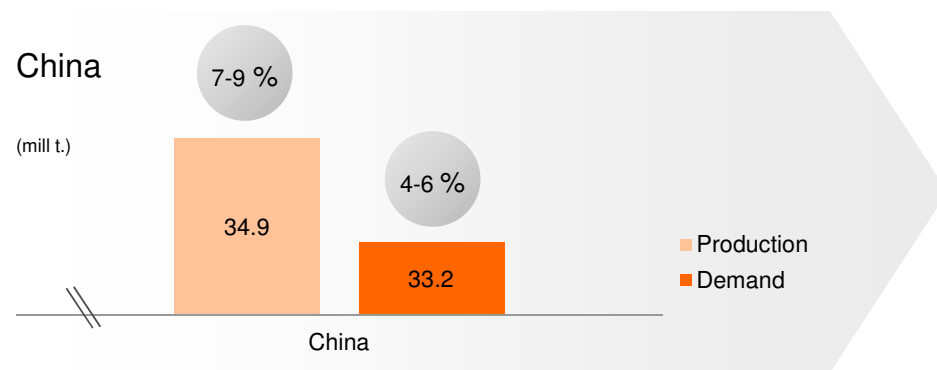
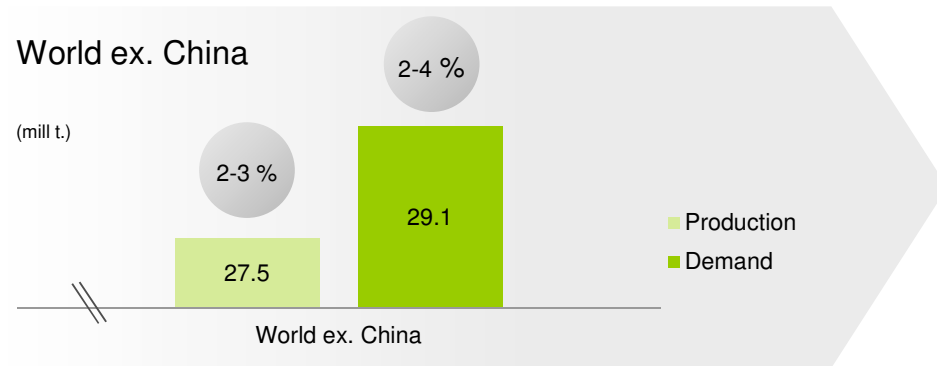


- ~5.3 % demand growth vs ~3.1 % supply growth in 2016
- ~4.3 % demand growth Q4-16 vs Q4-15
  - ~5.5 % China
  - ~2.9 % World ex. China

Source: CRU/Hydro

# Primary aluminium market expected to be largely balanced in 2017

Expected global demand growth of 3-5%, increasing production growth in China on new projects and restarts



Source: GRU, Hydro analysis

x% Growth from 2016 to 2017

# Environmental issues higher on the agenda in China

## What has been conducted

- Environmental inspections conducted in November/December
- Limited effects on primary & alumina, some effect downstream
  - Some extruders forced to shut down casthouses, but some have already restarted

## What has been proposed

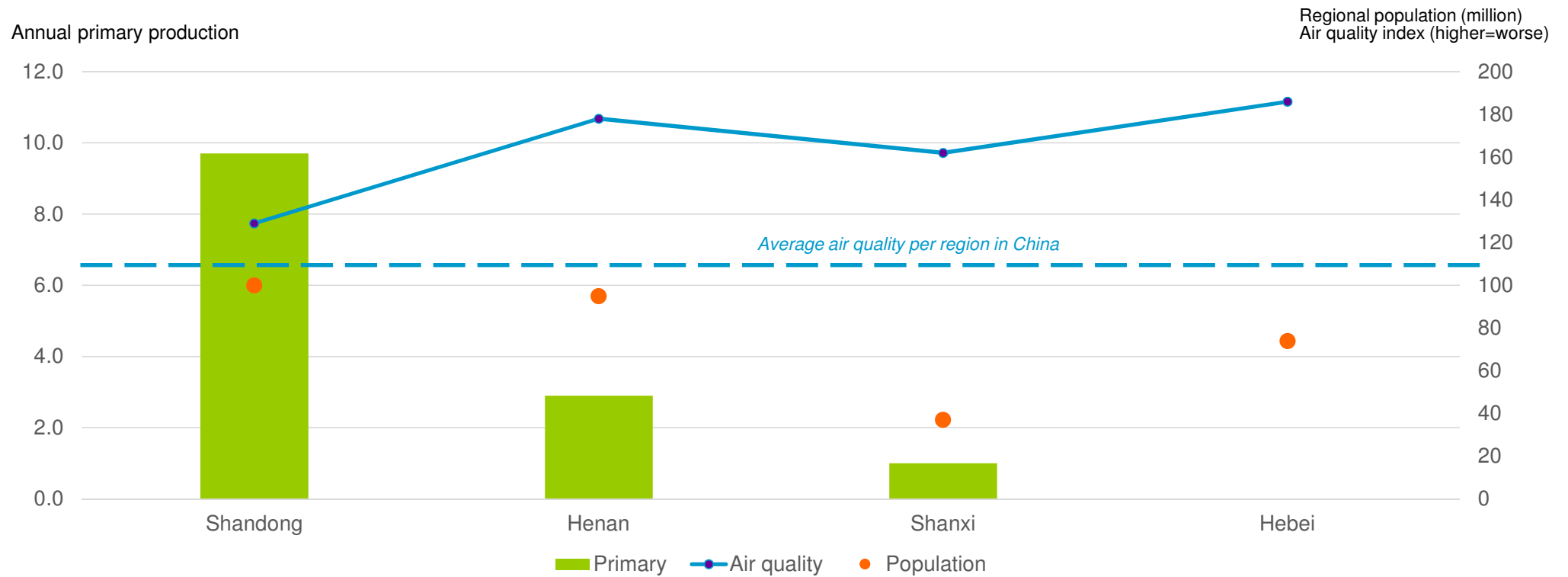
- Temporary shutdown of some primary and alumina capacity during winter 2017/18 in specific regions, including Shandong and Henan
- Full implementation *could* reduce production with up to ~1.5 mt in primary and ~3.0 mt in alumina in 2018, vastly improving global balances
- Moreover, the policy also details shutdowns for carbon anode production
- The government is reported to have finalized the policy document on suggested curtailments – however, the final outcome is very uncertain at this stage



Source: CRU

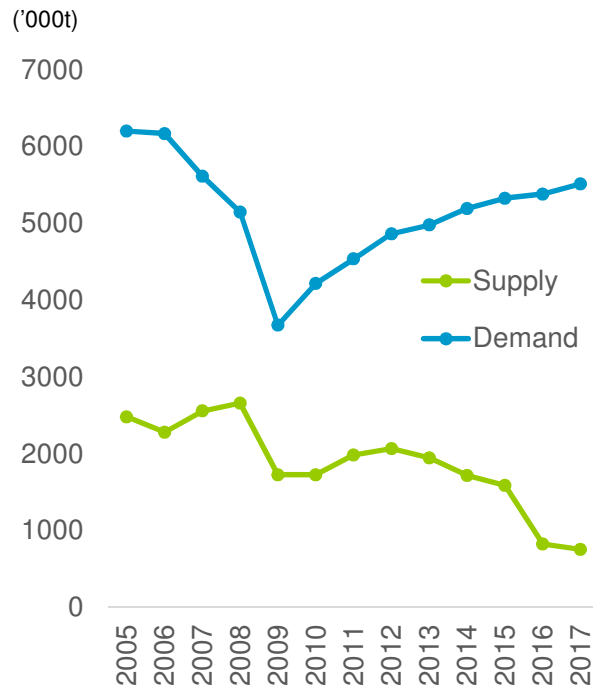
# Shandong will be key affected region in terms of primary production

All the targeted regions have low air quality combined with a large population

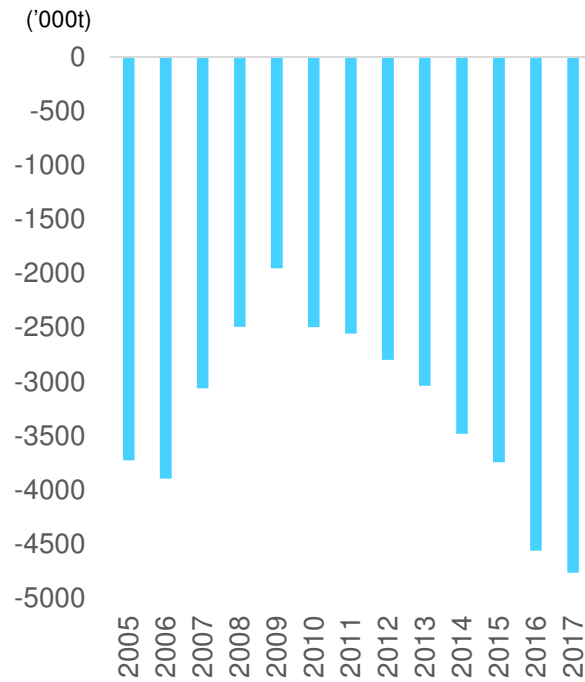


# US primary metal deficit increasing; potential restarts will reduce import requirements to a limited extent

**US primary supply & demand**



**US primary metal deficit**



**Possible restarts**

**Alcoa**

Wenatchee, 184,000tpy  
 Warrick, 269,000tpy (slated for demolition)

**Century Aluminum**

Hawesville, 150,000tpy (partial idle)  
 Mount Holly, 120,000tpy (partial idle)

**ARG (Noranda)**

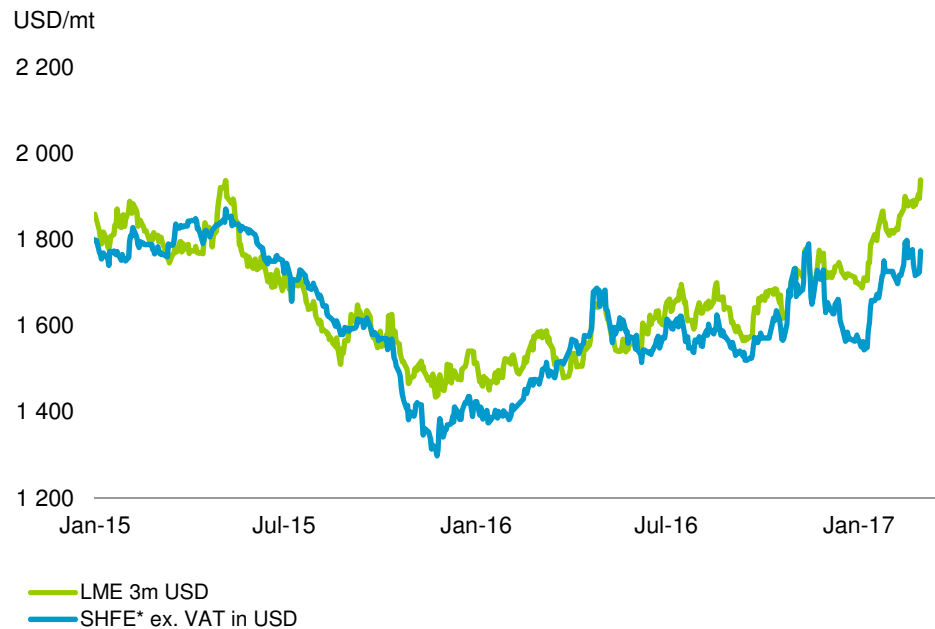
New Madrid, 274,000tpy

**Total: maximum 1 million tonnes per year**

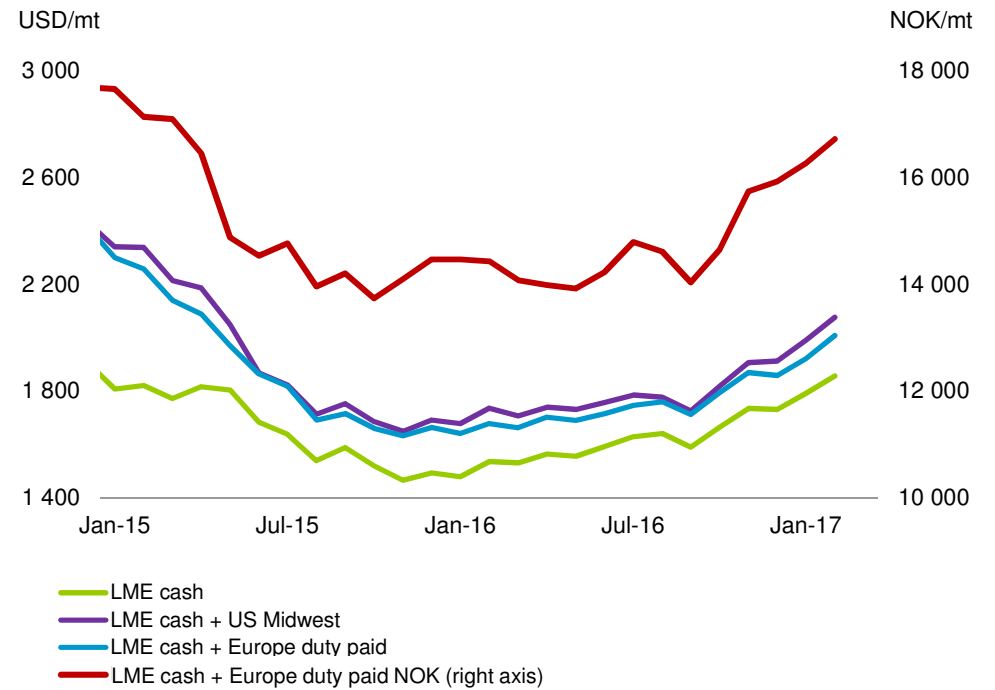
# Increasing average all-in aluminium prices

2016 average all-in aluminium prices down from 2015

## LME and SHFE aluminium prices



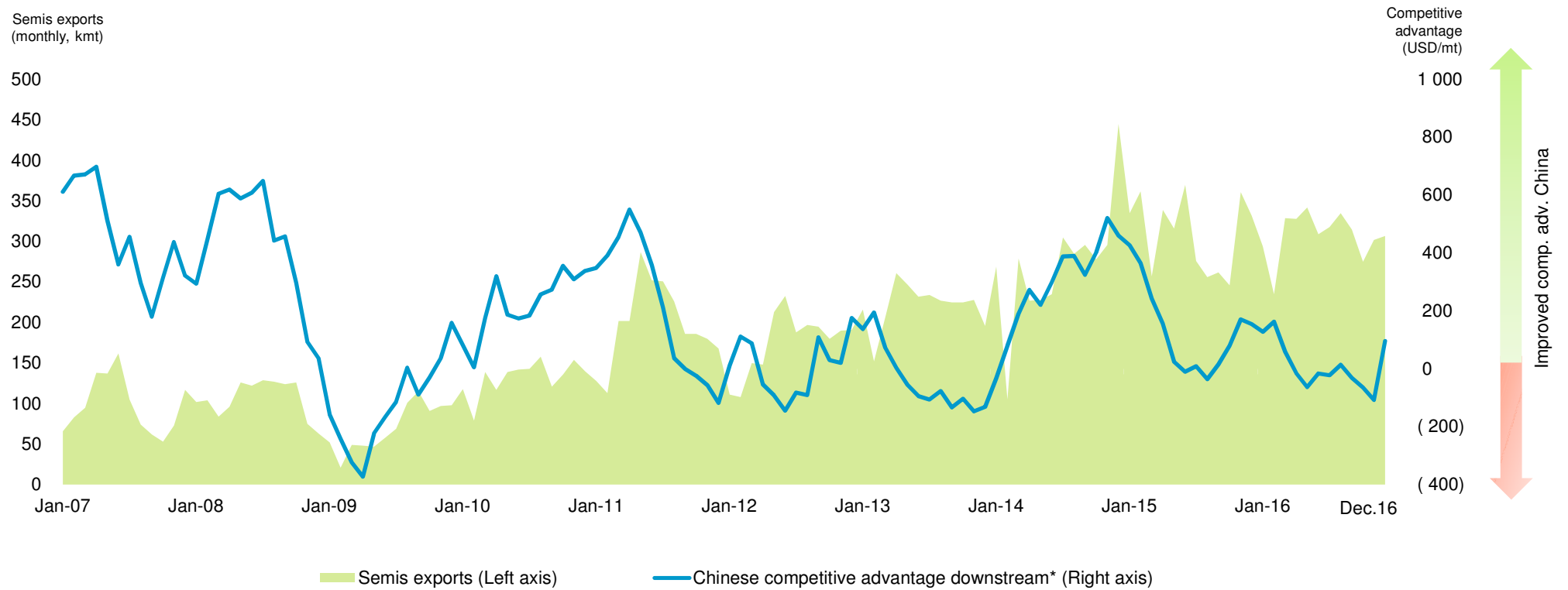
## All-in aluminium prices



Source: Metal Bulletin, Platts, Reuters Ecowin, Hydro analysis  
\* Shanghai Futures Exchange



# Stable Chinese export levels 2016 vs 2015



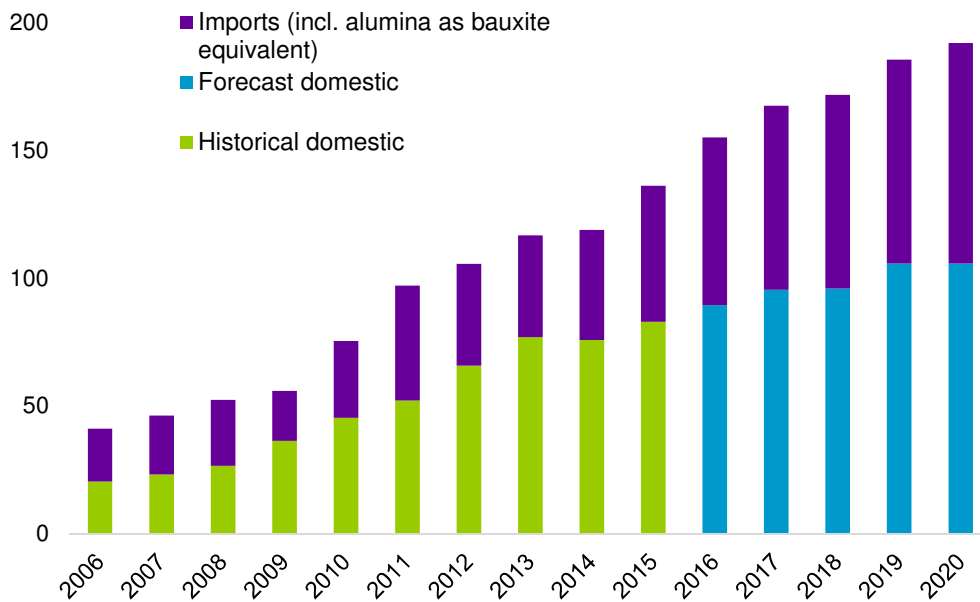
Source: GRU/Ecowin  
 Est. metal cost China versus Europe  
 Europe: LME cash + European duty-paid standard ingot premium, China: SHFE cash + avg. local premium + freight – export rebates (~13%)

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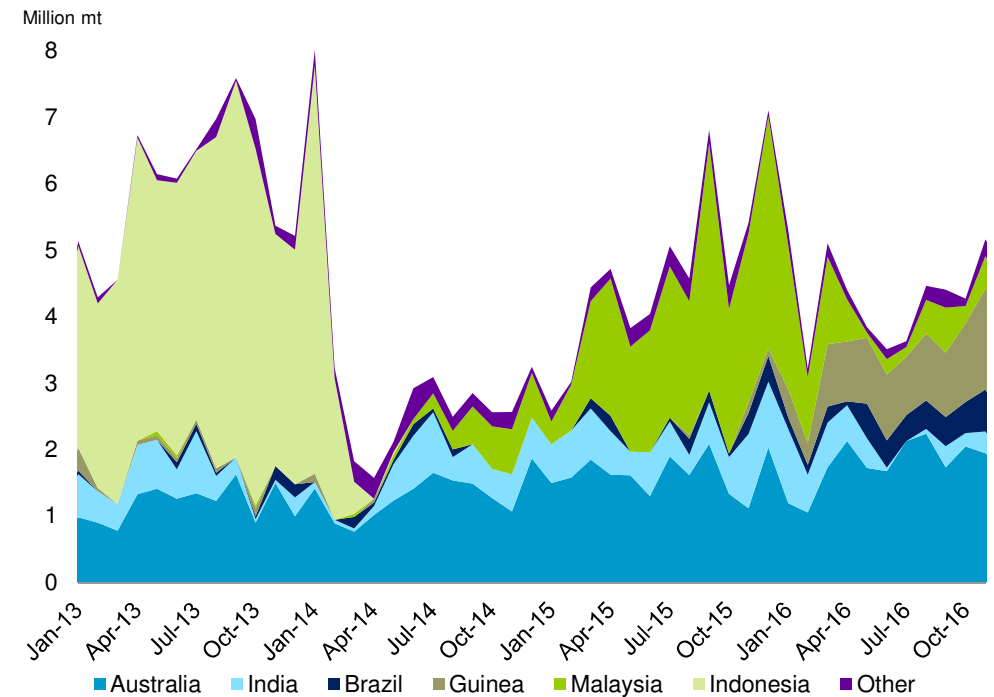
B&A

# Bauxite production in China to level off, higher bauxite imports from the Pacific increases freight exposure

Chinese bauxite production and imports  
Mtpy



Monthly Chinese bauxite imports  
Million mt

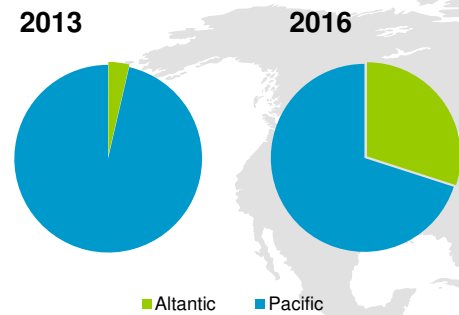


Source: CM Group

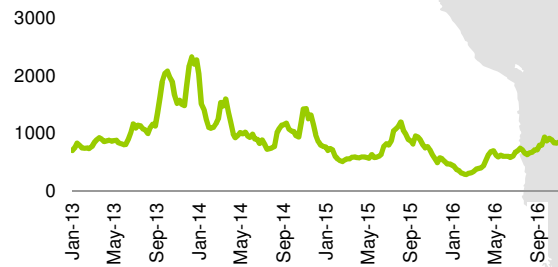
# Chinese bauxite imports increasingly exposed to freight

Freight represents ~10 to 50% of the CIF price, freight rates at current low levels

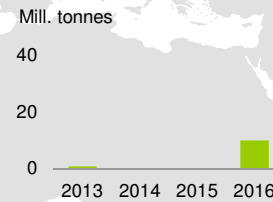
## Chinese bauxite imports origin



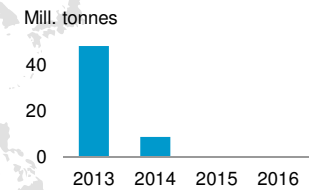
## Baltic Dry Index



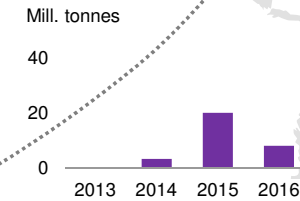
## Guinea



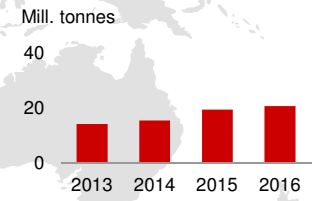
## Indonesia



## Malaysia



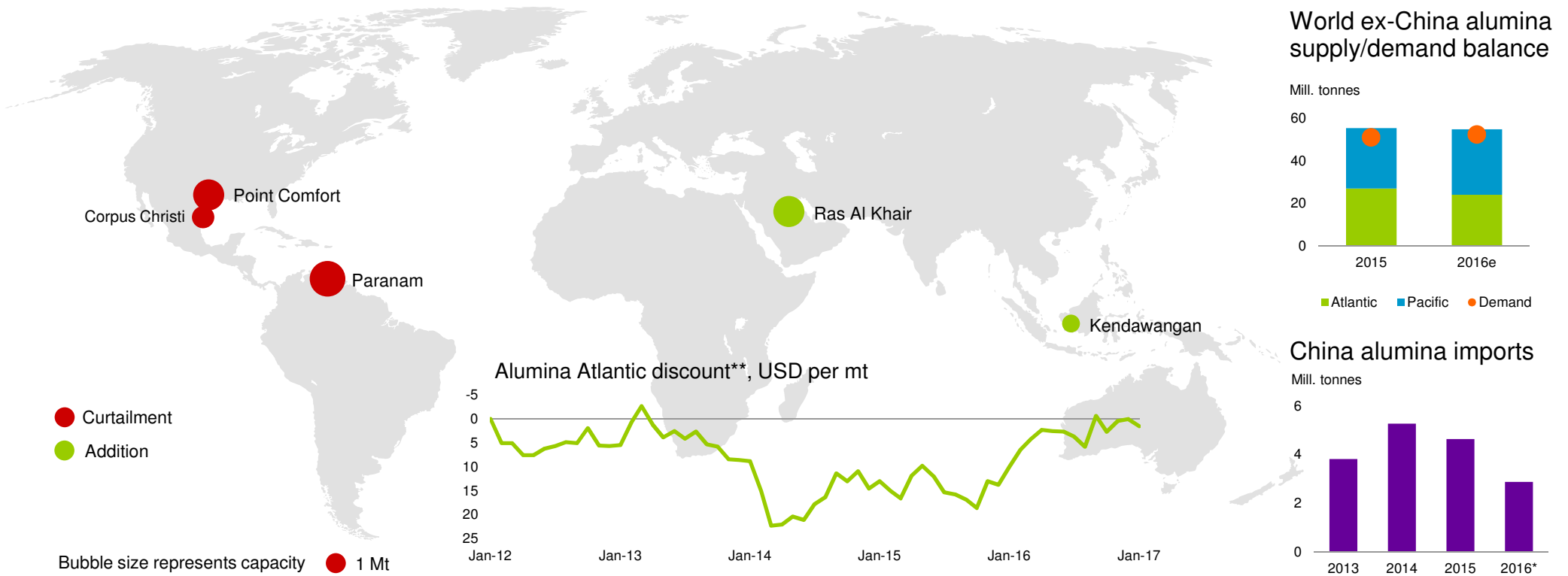
## Australia



Source: China customs, Bloomberg, Hydro analysis  
Note: 2016 is Jan-Sep annualised

# Alumina curtailments reduce oversupply outside China

Capacity curtailments in the Atlantic basin, offset by growth in Pacific



Source: China customs, CRU, Hydro analysis

\* Jan-Sep 2016 annualised

\*\* Alumina Atlantic discount is the difference between Alumina Price Index FOB Western Australia and Atlantic Basis index (ABP) FOB Brazil

# Alumina prices rising amid smelter restarts and cost inflation

## Recent alumina price drivers

### Market balances

- Smelter restarts and new projects ramping up in China
- Tight markets ex. China amid curtailments

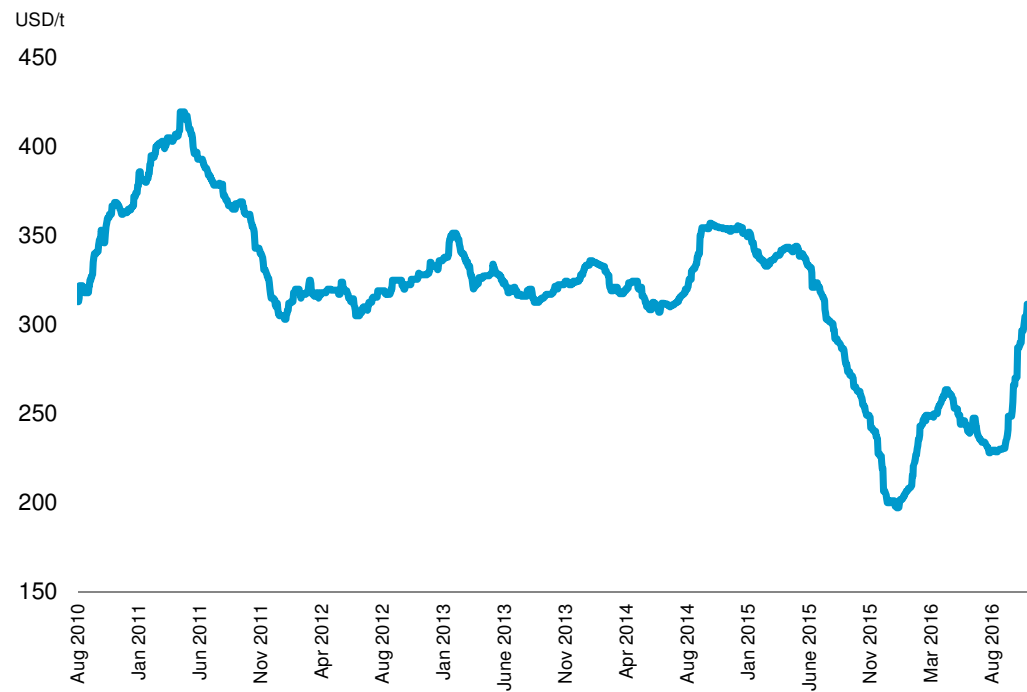
### Cost inflation

- Rising coal prices
- Higher caustic soda costs
- Higher transport costs (road & rail)

### Other factors

- Transport bottlenecks
- Environmental issues

Platts alumina index (PAX)

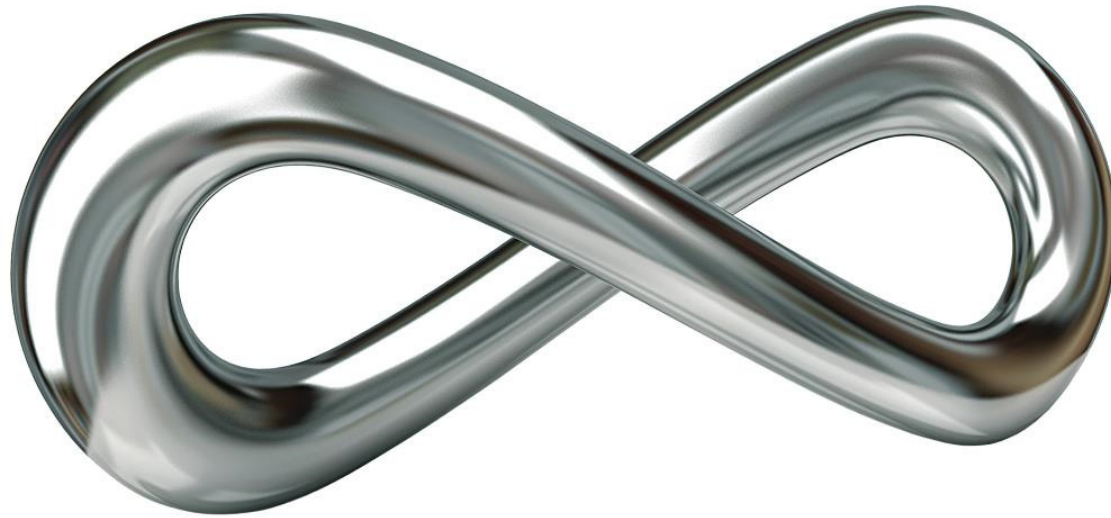


Source: Platts, Bloomberg



Hydro's response

Aspiration = inspiration



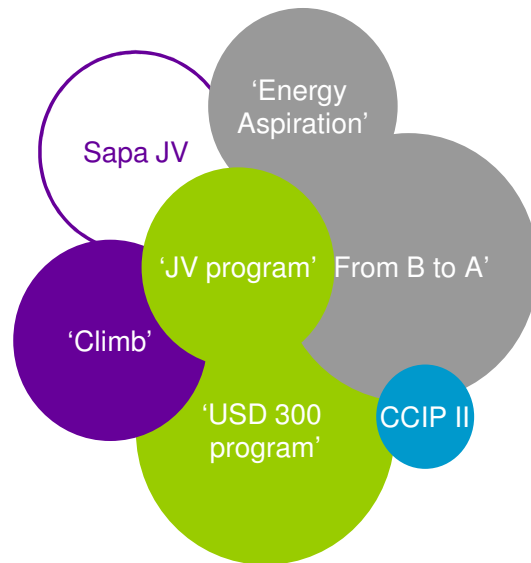
*Better Bigger Greener*



# Better: proven track-record of productivity gains continues

## Hydro's improvement drive until 2015

Total improvements 2009-2015:  
BNOK 4.5

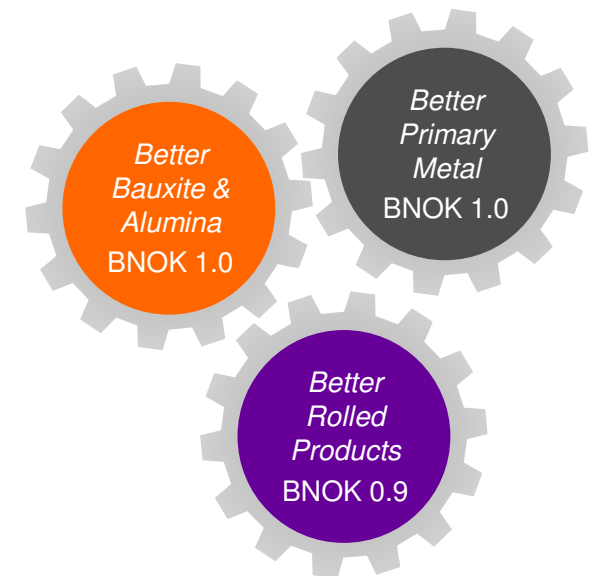


## Hydro's new improvement ambition

Total improvements of  
BNOK 2.9 from 2016-2019<sup>1</sup>, incl.  
BNOK 1.4 delivered in 2016



## Tailor-made ambitions across the value chain



1) Includes some larger investments of 3.0 billion NOK in 2015-2019: AL3 and UBC in Rolled Products, 100+100kt capacity creep in Primary Metal, Alunorte debottlenecking in B&A.  
2) Real 2015 terms

# Bigger: a solid platform for building an even stronger Hydro



## Recycling initiatives

- Increase recycling of post-consumed scrap above 100,000 t/year incl. ramp-up of UBC\* recycling line
- Grow post-consumed scrap recycling to 150,000 mt/yr

*Autoline 3*



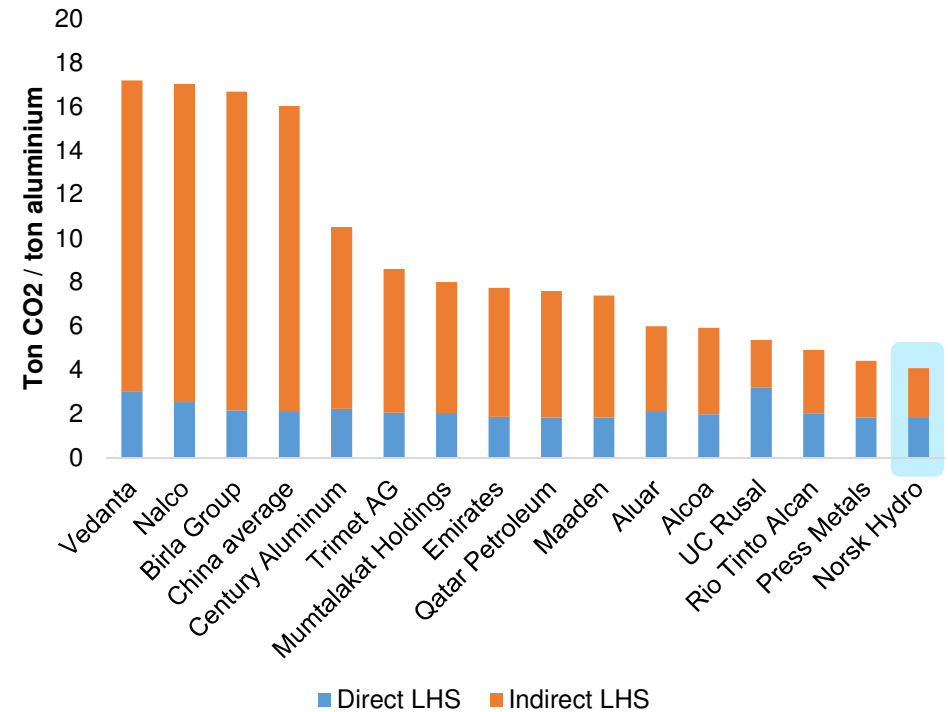
# Greener: The most ambitious climate strategy in global aluminium

Carbon-neutral by 2020 from a life-cycle perspective



Any customer of Hydro already benefits from being sourced by the 'greenest' company in global aluminium

Hydro has the lowest carbon footprint in the industry



Aspiration = inspiration



*Better Bigger Greener*

