

# Capital Markets Day

London December 1, 2016

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#### Safety information at London Stock Exchange

- There are no scheduled fire alarm tests today, so if the fire alarms do go off please listen to the announcements and follow the instructions.
- The Fire Assembly point is over by St Pauls Cathedral opposite the 'Blacks Camping Store'.
- The Event Management Team will be on hand to assist.
- The nearest fire exits to this location are:
  - Auditorium Out of the entrance doors at the back, and turn to your left or right, the fire exits are indicated by the Green Running Man sign.
  - Forum 1 & 2 Out of the entrance doors and turn to your left or right, the fire exits are indicated by the Green Running Man sign.
  - In the event of a medical emergency please inform the Event Management Team, who are trained first aiders, or where required, can contact the relevant services.



# Cautionary note in relation to certain forward-looking statements

Certain statements included in this announcement contain forward-looking information, including, without limitation, information relating to (a) forecasts, projections and estimates, (b) statements of Hydro management concerning plans, objectives and strategies, such as planned expansions, investments, divestments, curtailments or other projects, (c) targeted production volumes and costs, capacities or rates, start-up costs, cost reductions and profit objectives, (d) various expectations about future developments in Hydro's markets, particularly prices, supply and demand and competition, (e) results of operations, (f) margins, (g) growth rates, (h) risk management, and (i) qualified statements such as "expected", "scheduled", "targeted", "planned", "proposed", "intended" or similar.

Although we believe that the expectations reflected in such forward-looking statements are reasonable, these forward-looking statements are based on a number of assumptions and forecasts that, by their nature, involve risk and uncertainty. Various factors could cause our actual results to differ materially from those projected in a forward-looking statement or affect the extent to which a particular projection is realized. Factors that could cause these differences include, but are not limited to: our continued ability to reposition and restructure our upstream and downstream businesses; changes in availability and cost of energy and raw materials; global supply and demand for aluminium and aluminium products; world economic growth, including rates of inflation and industrial production; changes in the relative value of currencies and the value of commodity contracts; trends in Hydro's key markets and competition; and legislative, regulatory and political factors.

No assurance can be given that such expectations will prove to have been correct. Hydro disclaims any obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

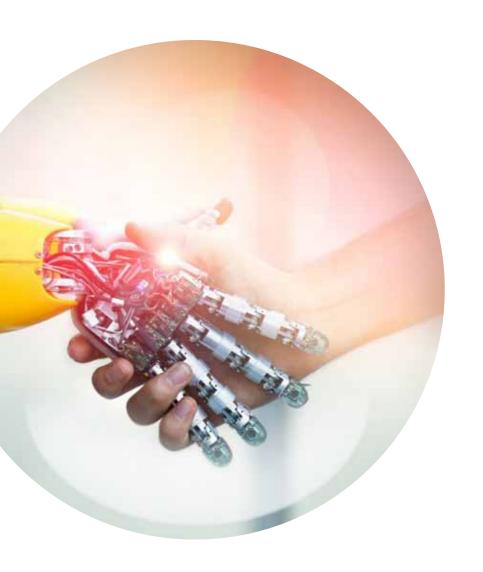


# Agenda

07:30 - 08:00	Light breakfast and registration	11:25 – 11:40	Q&A
08:00 - 08:05	Welcome	11:40 – 11:55	Break
08:05 - 08:55	Hydro	11:55 – 12:15	Bauxite & Alumina
08:55 – 09:35	Finance	12:15 – 12:35	Energy
09:35 – 09:50	Q&A	12:35 – 12:45	Q&A
09:50 - 10:00	Break	12:45 – 13:00	Summary and Q&A
10:00 – 10:45	Market outlook	13:00 – 14:00	Lunch
10:45 – 11:05			
	Rolled Products		
11:05 – 11:25	Primary Metal		



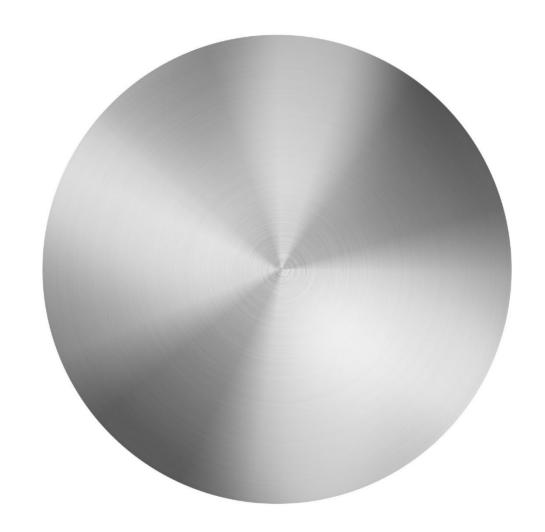




# Innovation and differentiation through integrated value chain

Svein Richard Brandtzæg

Capital Markets Day 2016



Hydro continues its strong progress in 2016



# Conducting business the Hydro Way

#### Safety and environment



Safety performance (TRI) at industry benchmark

2.6\*

2020 ambition of a TRI rate below 2.0 and zero fatalities

On track



Carbon-neutral from a life-cycle perspective

On track

1:1 reforestation by 2017

On track

#### Corporate responsibility













<sup>\*</sup> TRI rate for own employees YTD end-October 2016 - total recordable incidents per million hours worked

# Main developments during 2016



Record high alumina production at Alunorte



Karmøy technology pilot construction ~70%\* complete



Production started at UBC line and Automotive line 3



2.3 TWh power sourcing in Germany and Norway\*\*



Record Sapa results through 2016

CMD 2015

Bauxite & Alumina

Primary Metal

USD 180 program

completed by end-2016

Products

Alunorf hotmill expansion completed

Energy

New law on industrial ownership approved in parliament

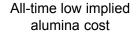


Sapa JV

CMD 2016

New supply agreement between Sapa and Hydro signed













<sup>\*</sup> Expectation for 2016

<sup>\*\* 1</sup> TWh from 2021-2040 in Norway, 1.3 TWh from 2018-2025 in Germany

# Ambitious mid-term strategic goals within the Hydro aspiration

	Ambitions	Target	Timeframe	Progress <sup>1</sup>	Status
Better	<ul> <li>Improve safety performance, strive for injury free environment</li> <li>Realize ongoing improvement efforts Better</li> <li>Secure new competitive sourcing contracts in Norway post 2020</li> <li>Lift bauxite production at Paragominas</li> <li>Lift alumina production at Alunorte</li> <li>Shift alumina sales to PAX-based pricing</li> <li>Extend technology lead with Karmøy technology pilot</li> </ul>	TRI<2 BNOK 2.9 4-6 TWh 11 mill mt/yr 6.6 mill t/yr > 85% PAX <sup>5</sup> Start production	2020 2019 2020 2018 2018 2020 2H 2017	2.6 <sup>2</sup> 1.1 BNOK 1 TWh <sup>3</sup> 10.8 mill mt/yr <sup>4</sup> 6.3 mill mt/yr <sup>4</sup> ~50% PAX <sup>6</sup> ~70% complete	
Bigger	<ul> <li>Realize technology-driven smelter capacity creep</li> <li>Lift equity bauxite production</li> <li>Increase nominal automotive Body-in-White capacity</li> <li>Complete ramp-up of UBC recycling line</li> </ul>	200,000 mt/yr 19 mill t/yr <sup>7</sup> 200,000 mt/yr >40 000 mt/yr	2025 Long-term 2017 2017	35,000 mt  Negotiations halted  Trial production started  Started, delayed ramp-u	up •
Greener	<ul> <li>Become carbon-neutral from a life-cycle perspective</li> <li>Increase recycling of post-consumed scrap</li> <li>Deliver on reforestation ambition</li> </ul>	Zero >250,000 mt/yr 1:1	2020 2020 2017	On track 129,000 mt/yr On track	



<sup>1)</sup> Based on 2016 estimate unless stated otherwise

<sup>2)</sup> YTD Oct-2016, own employees

<sup>3)</sup> Power sourcing since CMD 2015

<sup>4)</sup> YTD 2016 annualized

<sup>5)</sup> Based on sourcing volume of ~ 2.3 million tonnes per annum

<sup>6)</sup> Based on sourcing volume of ~ 2.5 million tonnes for 2016

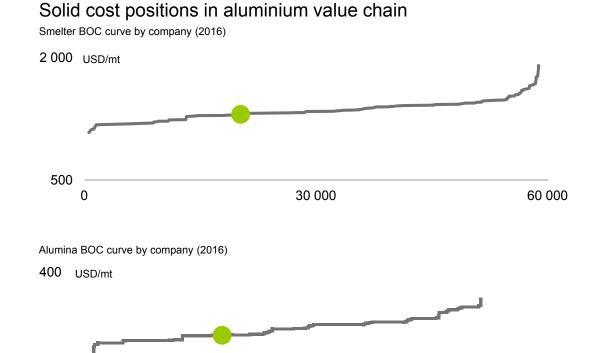
<sup>7)</sup> Provided the acquisition of a 40% stake in MRN from Vale

Ambition on track and on target

Ambition behind plan, but on target

Ambition will not meet the target

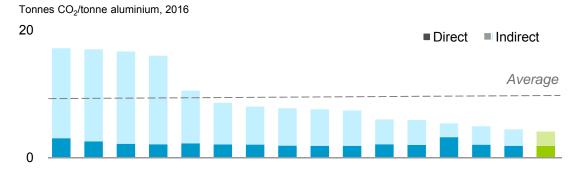
# Operational leadership among peers



70 000

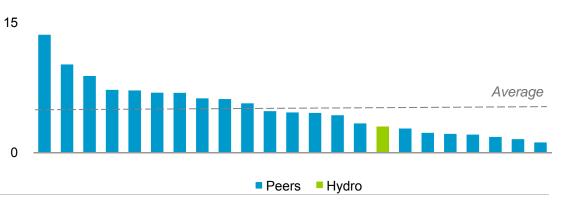
140 000

#### Lowest CO<sub>2</sub> emissions



#### Among the best on safety performance

Incidents per 1 mill hrs worked among ICMM member companies, 2015



Source: CRU, International council on mining and metals (ICMM)

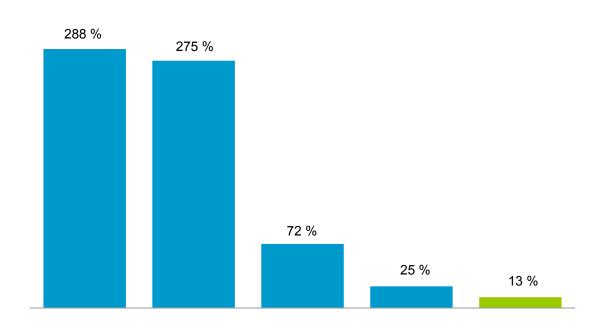


# Leading financial position and clear priorities

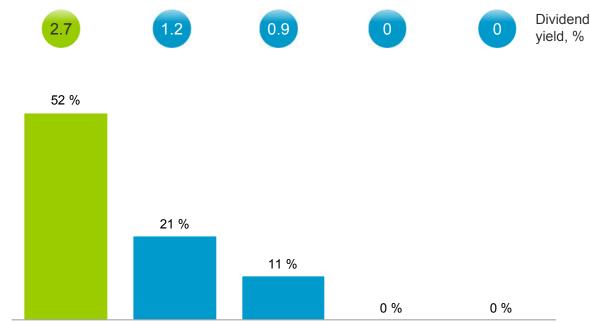
Maintaining financial strength and shareholder focus

#### Strongest balance sheet,

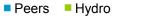
Total Debt/Total Equity, 2011-2015

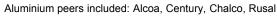


#### Highest underlying payout ratio and dividend yield 2011-2015





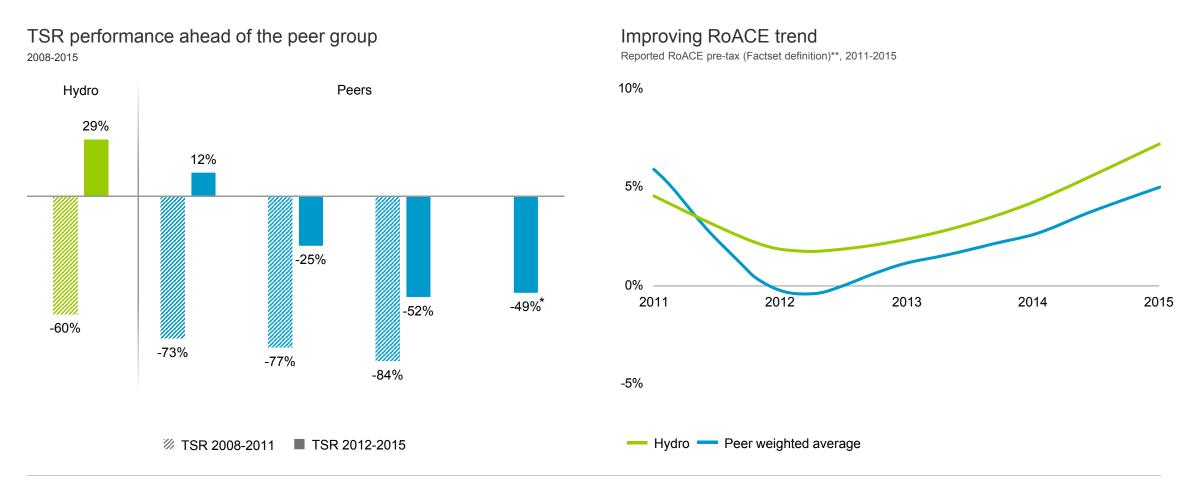


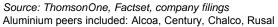




# Capital returns challenged by weak market fundamentals

Hydro's improvement trend ahead of the peer group in recent years





Total shareholder return (TSR) = (Price end of period – Price beginning of period + Dividends in the period)/Price beginning of period



<sup>\*</sup> No trading data available prior to 2010

<sup>\*\*</sup> Reported RoACE pre-tax (Factset definition) = Operating Income/(Total assets-current liabilities). Peer weighted average RoACE by capital employed

# Lifting performance, driving shareholder value



Managing cyclicality through financial strength and flexibility



Strengthening competitiveness through improvements and high-grading



Differentiating through the integrated value chain





Opportunities and challenges in the global aluminium landscape



# Opportunities and risks within the global megatrends



Macroeconomic development

- Global GDP improving from moderate growth levels
- Geopolitical uncertainty remains high



**Emerging** economies

- economies
- Brazil and Russia improving following recessions
- India rising, China moderating
- Rise of middle class in South-East Asia
- Continued urbanization and demographic change



Global trade and regulatory framework

- International trade agreements and duties regime under pressure
- Renewed trade concerns following US presidential election



Global climate challenge

- Changing behavior following the Paris climate agreement
- Circular economy focus strengthens recycling
- Climate performance an increasing issue for advanced customers



revolution

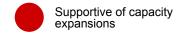
- Rapidly growing digitalization and automation
- Increasing global interconnectedness and flow of information
- Industry 4.0

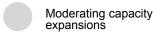


# Key drivers for China's aluminium expansion losing momentum



Past	Present		
		٠	Continued strong growth short-term, but expected to slow longer term
		٠	From softer to harder constraints, as exemplified by environmental inspections
		•	Competitive advantage of coal-rich regions moderating, combined with rising coal prices
		٠	Tighter financial liquidity perceived as constraint for potential capacity new-builds and restarts
		•	Depleting domestic bauxite reserves, more dependent on imports
	Past	Past Present  O O  O O  O O  O O  O O  O O  O O  O	





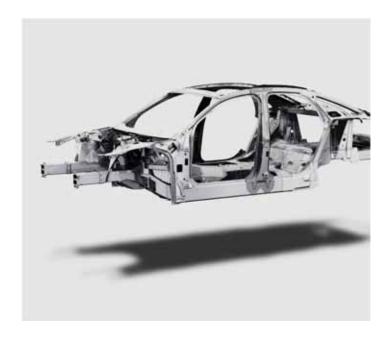


# Stakeholders are increasingly valuing corporate responsibility

Stricter regulations, increasing customer demands, strong focus on compliance, climate and sustainability



Among **regulators and NGO's**, due to the increasing demands for transparency and compliance, and perceived urgency in responding to the global climate challenge



For **customers and end-users**, due to the increasing understanding of the lifecycle perspective of products, and rising sustainability expectations



In **international finance**, due to heightened focus among investors and analysts on the importance of the extrafinancial dimension



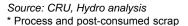
# A decade of healthy demand growth for aluminium

CAGR 2016-2025







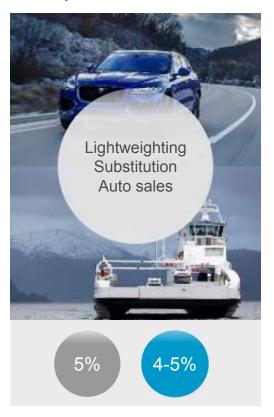




# Aluminium's reach is growing in response to key long-term trends

Substitution continues to be a key driver for aluminium

#### Transport



Packaging



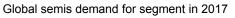
Building & construction



Electrical





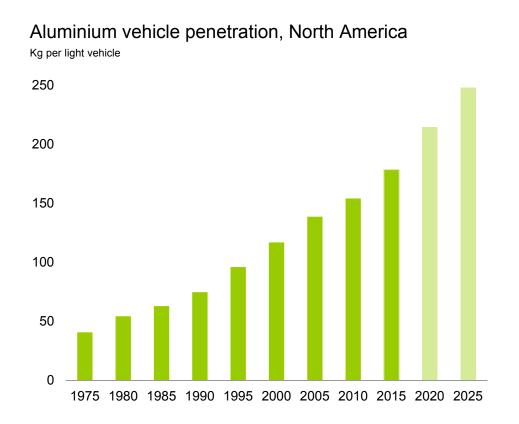






#### Material substitution in automotive driving aluminium demand

Aluminium is essential for automotive lightweighting and emissions reduction

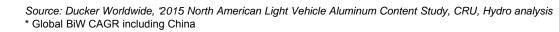


15 % BiW CAGR\* 2015-2022





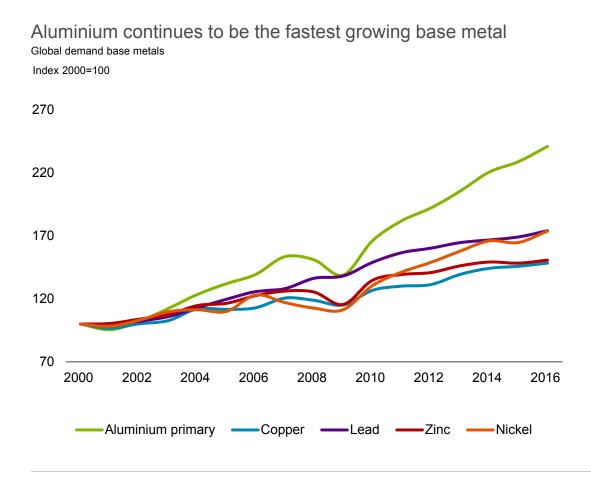
- 10% reduction in vehicle weight gives car makers a 5-7% fuel saving
- 1 kg of aluminiumsubstitution in cars saves15-20 kg GHG emissions

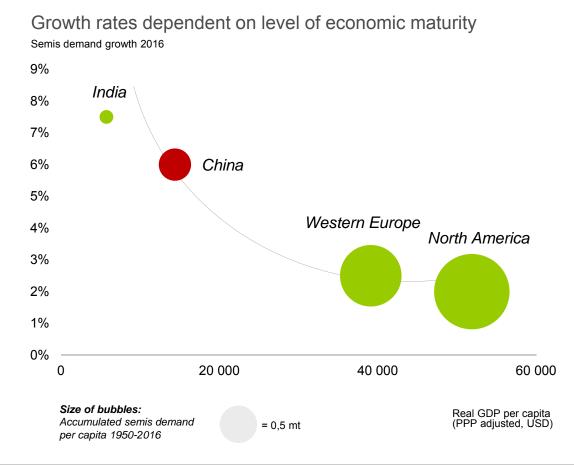




#### Aluminium demand continues to outpace other base metals

China still has considerable growth potential from a per capita perspective



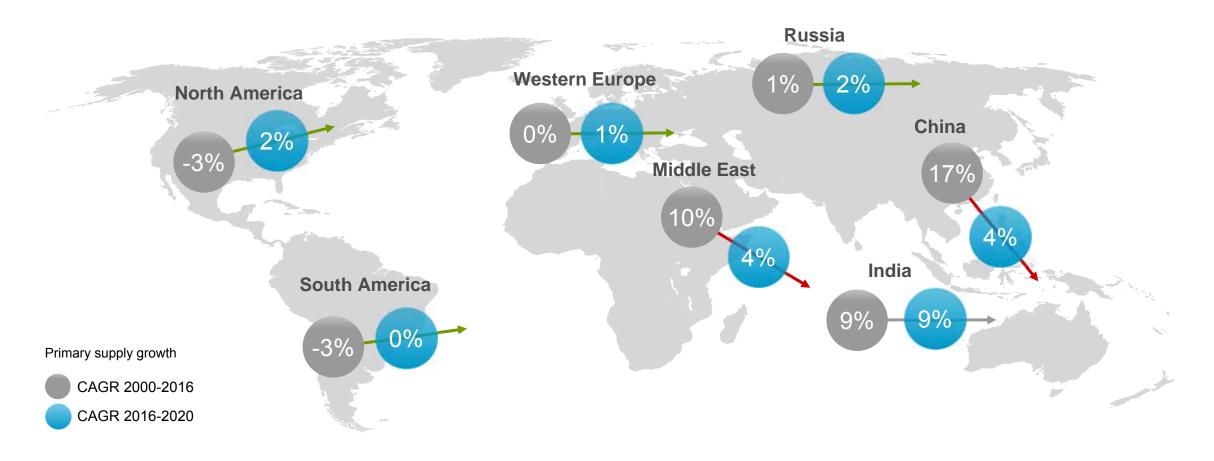


Source: CRU, Hydro analysis



# Primary supply growth moderating

Chinese and Middle East primary production growth coming down



Source: CRU



# Global market balance progressing better than expected in 2016

External analysts expecting deficits 2018-2020

CRU estimates of global primary metal balances at different points in time\*





<sup>\*</sup> CRU net capacity additions (including unallocated curtailments, expected additions&restarts and some unallocated disruptions): 2017: 3.1 million mt, 2018: 1 million mt, 2019: 2.7 million mt, 2020: 1.9 million mt





Further strengthening Hydro's solid position



#### Full value chain approach for higher value creation

Dedicated business models in each area combined within an overall company framework



#### Benefits of Hydro's integrated model

#### **Operations and technology**

- Operational excellence
- Continuous improvements
- Technology and innovation

#### **Customers and markets**

- Customer cooperation
- Commercial edge & innovation
- Market understanding

#### Responsibility and climate

- Value chain control
- Sustainability and climate
- Compliance and responsibility

#### **Growth and exposure**

- Business development
- Growth opportunities
- Full cycle exposure



# Investing across the value chain

Focus on technology, recycling and automotive growth

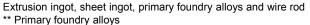
Major ongoing projects, capex and	completion date	Status	Effects
	Karmøy technology pilot Net BNOK 2.7 Gross BNOK 4.3 2017	~70% complete end-2016	<ul> <li>Piloting world's most energy and climate-efficient technology</li> <li>Adding 75 000 mt capacity</li> <li>Spin-offs to existing smelter portfolio: lifting production by 100,000 mt by 2025 with ~300 MNOK* in annual EBITDA effect</li> </ul>
	Automotive line 3 MEUR 130 2016	Trial production started	<ul> <li>Pursuing high-margin high-growth opportunity</li> <li>Increasing exposure to automotive</li> <li>Raising nominal BiW capacity by 150,000 mt</li> </ul>
	UBC recycling line MEUR 45 2015	Delayed start-up, ramping-up	<ul> <li>Improving metal cost</li> <li>Reducing energy consumption and emissions</li> <li>Lifting UBC recycling by &gt; 40,000 mt</li> </ul>
	Tailing dam & bauxite residue deposit BBRL 1.6 2016/2017	On time and on budget	<ul> <li>Ensuring operational excellence for the next 10-15 years</li> <li>Utilizing new technology and improving safety</li> <li>Reducing environmental footprint and costs</li> </ul>

 $<sup>^{\</sup>star}$  Calculated based on the actual EBITDA margin 2015



# Hydro with strong market positions globally





<sup>\*\*\*</sup> Outside China



#### Targeting value-add, specialized and advanced product niches

Examples of Hydro's high competence, high margin strategy

#### Metal products



**Crash-resistant alloy** for automotive customers

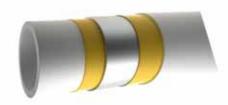


Automotive heat-transfer alloy for heat exchangers

#### Rolled products



**Body-in-White** One-piece side car panel

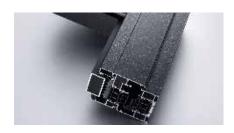


Hytubal
Innovative multi-layer tube solution for multiple applications

#### Extruded products



Crash management system for safer trucks



Advanced window profile for more flexible and energyefficient solution



#### Combining high-value outputs with lower value inputs

Repositioning Hydro's recycling activities, preparing for the circular economy

#### Recycling benefits for Hydro

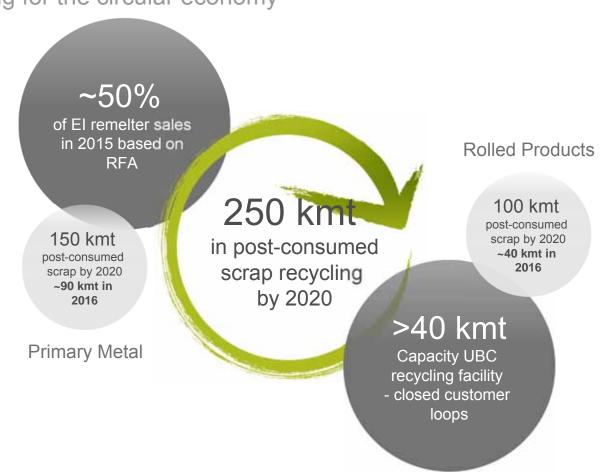
- Reduced metal costs, increased margins and returns
- Improved capacity utilization
- Reduced energy consumption and emissions

Key competences available, new technologies under development

- Build on leading remelt capacity
- Advanced sorting technologies

#### Hydro's recycling strategy

- Develop remelters into recycling plants
- Optimize scrap sourcing and processing
- Increase sales of recycling friendly alloys (RFA)
- Lift recycling potential in the metal balance
- Develop closed customer recycling loops





#### The most ambitious climate strategy in global aluminium

Carbon-neutral by 2020 from a life-cycle perspective

Hydro's climate strategy

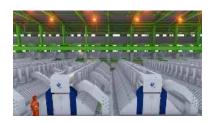
Climate and energyefficiency in production

Use-phase benefits

Recycling



Value-creating implementation examples



Karmøy technology pilot Primary Metal, Norway



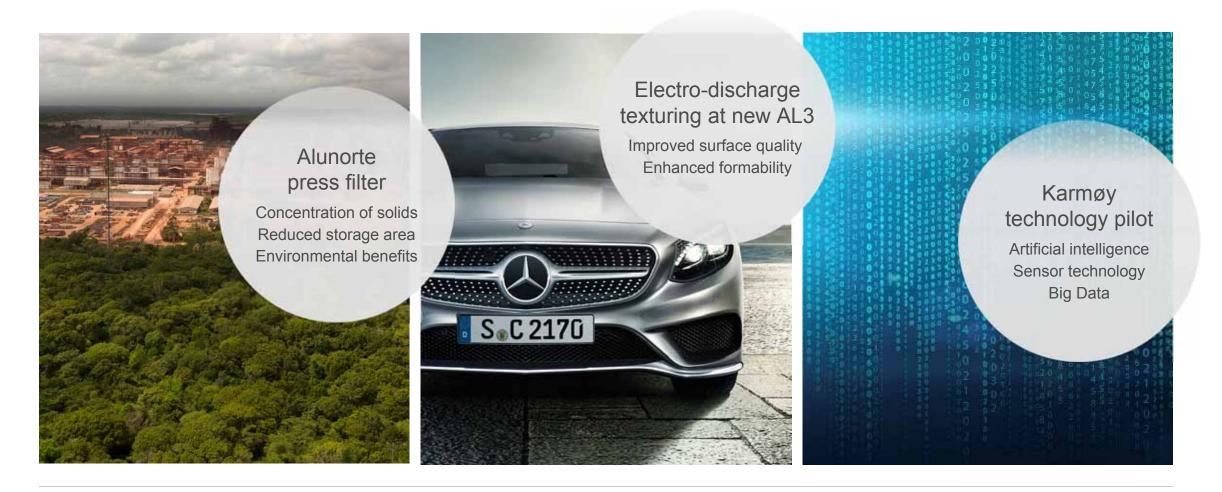
Automotive line 3
Rolled Products, Germany



UBC recycling line
Rolled Products, Germany



# Leading the way in technology, innovation and digitalization





# Industry's most ambitious improvement efforts on track

NOK 2.9 billion targeted in 2016-2019, NOK 1.1 billion in 2016



#### Target 2016 NOK 500 million

- Ahead of the 2016 target
- High and stable production at Alunorte and Paragominas
- Logistical optimization
- Raw material efficiency



#### Target 2016 NOK 200 million

- Behind the 2016 target
- Strong operational improvements, offset by portfolio mix and delayed ramp-up of the UBC recycling line
- Trial production started at new automotive line



#### Target 2016 NOK 400 million

- Behind the 2016 target
- Improved overall performance, negative impact from Årdal power outage
- USD 180 JV program to be completed by end-2016



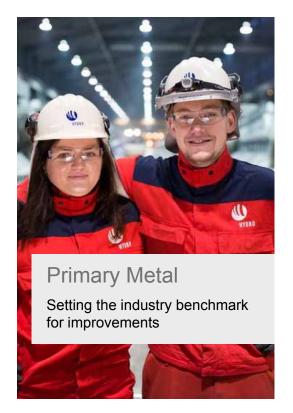


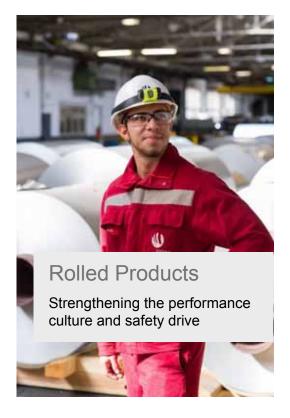
<sup>1)</sup> Real 2015 terms. Includes some larger investments of NOK ~3 billion NOK in 2015-2019: AL3 and UBC in Rolled Products. Creep projects in Primary Metal. Alunorte debottlenecking in B&A.

#### Maximizing value-creation from Hydro's strong competence base

Business systems, innovation, capabilities and people engagement











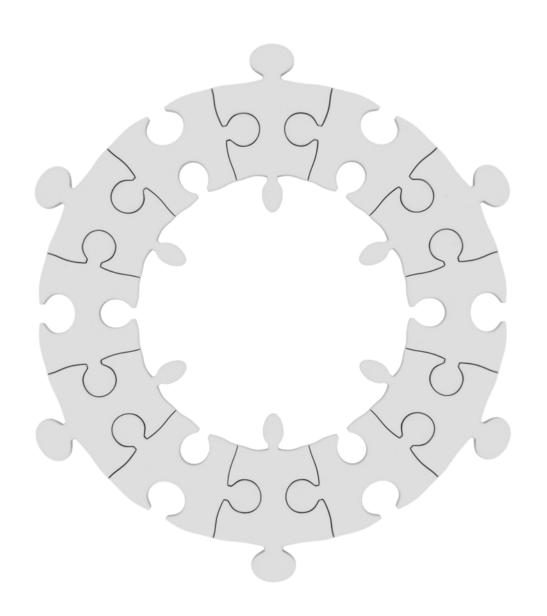
<sup>\*</sup> Bauxite & Alumina Business System

# Sapa JV – global market leader, strong improvement trend

From restructuring to profitable growth







Hydro's strategic direction



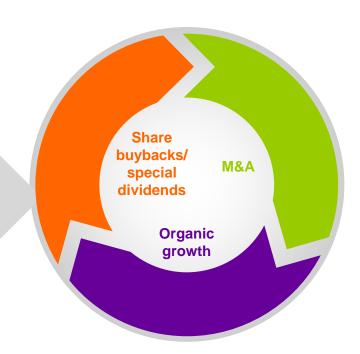
### Driving long-term shareholder value

Priorities for cash over the cycle

Solid balance sheet and liquidity

Sustaining capex and selective growth

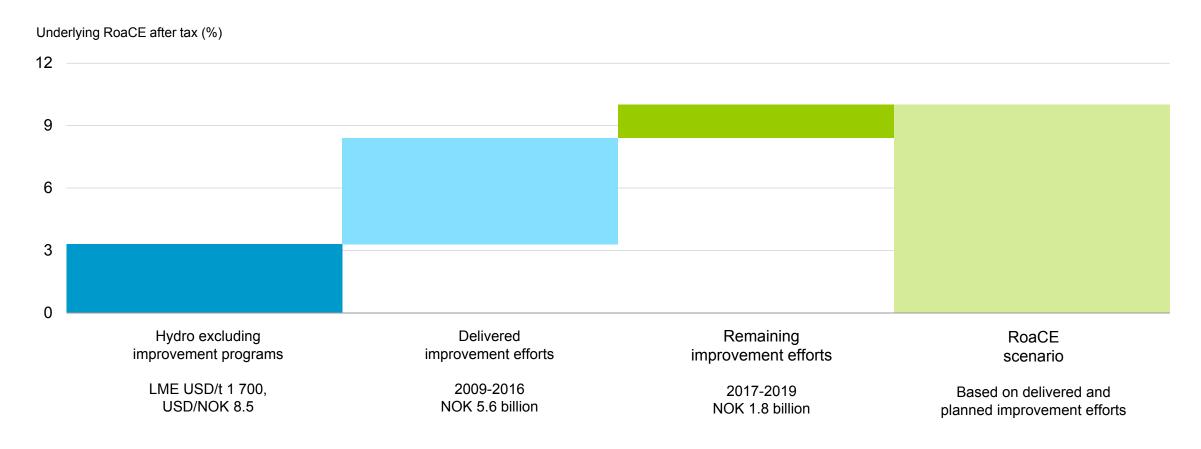
Reliable and predictable dividend





### Hydro's roadmap towards improved profitability

Solid contribution from improvement efforts, continued currency support and improving price level





### Lifting performance, driving shareholder value



# Managing cyclicality through financial strength and flexibility

- Maintain financial strength and flexibility
- Lift cash flow generation
- Maximize potential for sustainable shareholder value creation



# Strengthening competitiveness through improvements and high-grading

- Strengthen leading positions in safety and sustainability, pursue compliance always and everywhere
- Improve relative industry position through improvements drive
- Shift portfolio towards high-margin segments for advanced customers



## Differentiating through the integrated value chain

- Add customer-value through unique integrated value chain model
- Extend technological lead to high-grade, innovate and lift efficiency
- Capitalize on one of the industry's most sustainable portfolios

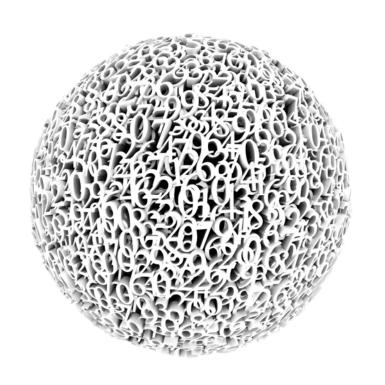




Better Bigger Greener







### Finance

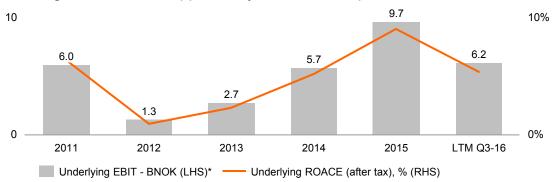
Maximizing long-term value creation potential

**Eivind Kallevik** 

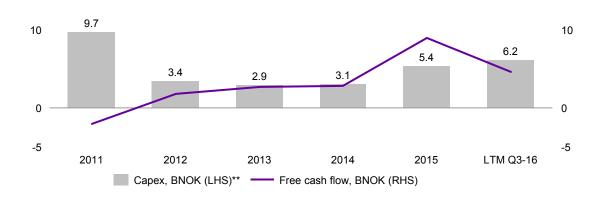
Capital Markets Day 2016

### Financial performance over time

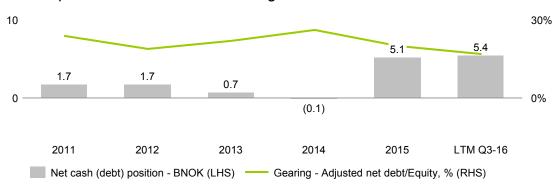
#### Earnings and RoACE supported by continuous improvements



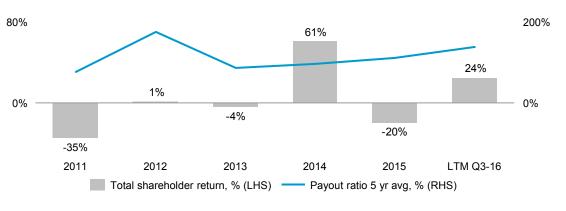
### Capital discipline and positive FCF generation



#### Uncompromised balance sheet strength



#### Reliable cash returns to shareholders in a volatile environment



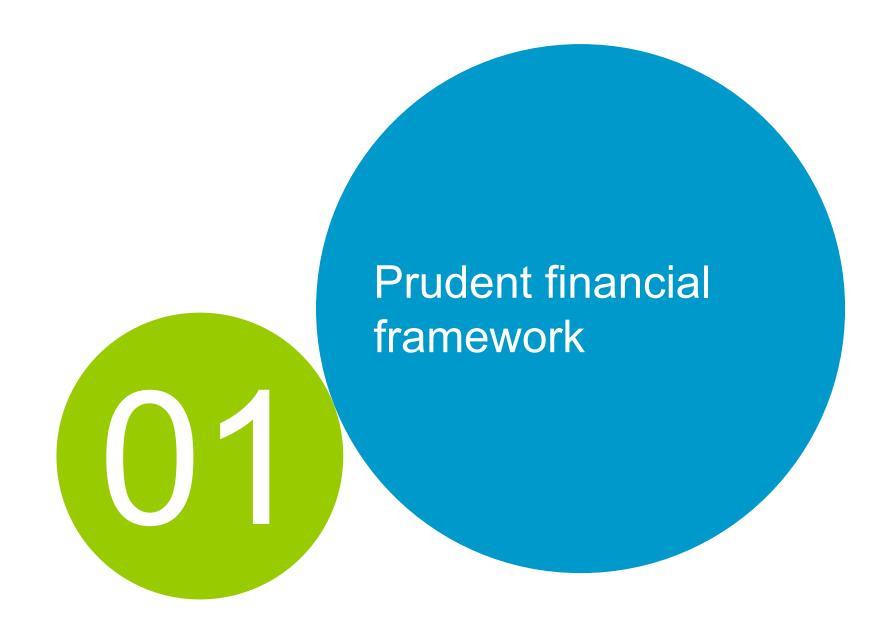
LTM - last 12 months (Q4'15 - Q3'16)

Total shareholder return = (Price end of period – Price beginning of period + Dividends in the period)/Price beginning of period Payout ratio 5 year average – dividend per share divided by earnings per share from continuing operations for the last 5 years Free cash flow (consolidated) = operating cash flow – net investments



<sup>\*</sup> Underlying EBIT excluding extruded products

<sup>\*\*</sup>Capex excluding extruded products. 2011 includes capex related to the acquisition of Vale's assets in Brazil.





### Prudent financial framework

Managing industry cyclicality, driving long-term shareholder value

Lifting cash flow potential

Improving efficiency, strengthening margins

Improvement efforts

- 4.5 BNOK 2009-2015
- 1.1 BNOK 2016E
- 1.8 BNOK 2017-2019E <sup>1)</sup>

Managing working capital

Financial strength and flexibility

Investment grade credit rating

Financial ratio targets over the cycle

- FFO/aND <sup>2)</sup> > 40%
- aND/E  $^{3)}$  < 55%

Strong liquidity

Disciplined capital allocation

Long-term sustaining capex below depreciation

Around 4 BNOK per year

Total capex incl. growth

- 2016E BNOK 7.8 <sup>4)</sup>
- Average 2017-2019E BNOK 6.0 <sup>4)</sup>

Selective value-add growth

Attractive organic growth prospects and M&A optionality

Reliable shareholder remuneration policy

Sector competitive TSR

Dividend policy since 2014

- Dividend 1 NOK/share
- 40% payout ratio of Net income over the cycle

Special dividends and share buybacks in the toolbox

Effective risk management

Volatility mitigated by strong balance sheet and relative positioning

Hedging policy

- Operational LME and currency hedging
- Limited financial hedging
- Long-term debt in USD

Diversified business



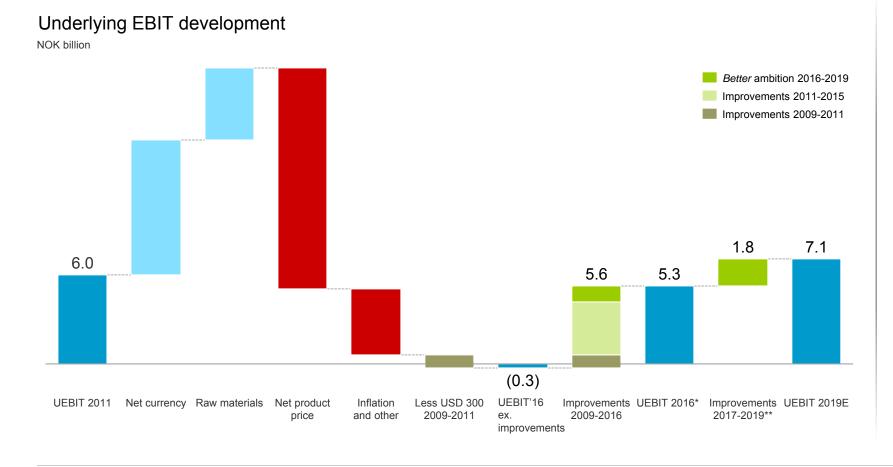
<sup>1)</sup> Real 2015 terms

<sup>2)</sup> Funds from operations / adjusted net debt

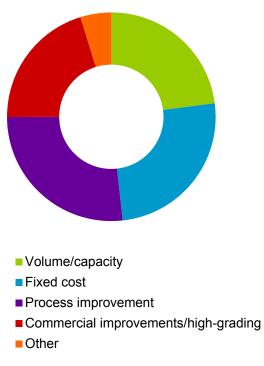
<sup>3)</sup> Adjusted net debt / Equity

<sup>4)</sup> With Karmøy Technology Pilot net investment, after ENOVA support

### Supporting earnings with industry-leading improvement ambitions



Better improvement ambition by categoty, 2.9 BNOK 2016-2019



Hydro UEBIT excluding Extruded Products before 2013 and Sapa after 2013. Improvements exclude Sapa



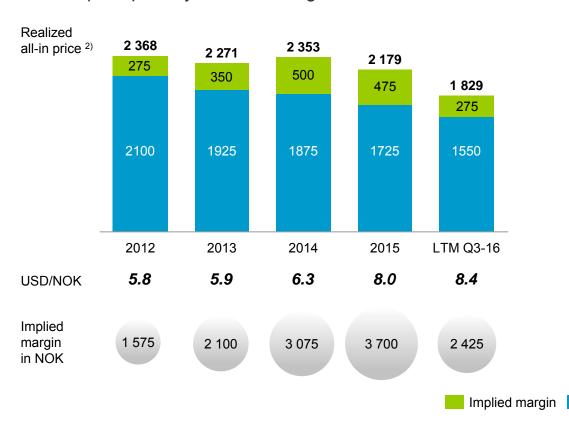
<sup>\*</sup> Underlying EBIT 2016 - Q3 annualized

<sup>\*\*</sup> Remaining improvement programs in real 2015 terms

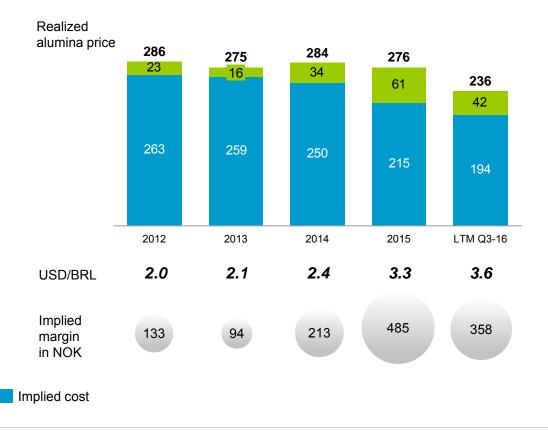
### Structurally improved cost position upstream

Productivity gains supported by currency tailwinds

All-in implied primary cost and margin, USD/mt 1)



Implied alumina cost and margin, USD/mt 3)



<sup>1)</sup> Realized all-in aluminium price minus underlying EBITDA margin, including Qatalum, per mt aluminium sold. Implied primary cost and margin rounded to the nearest "25"

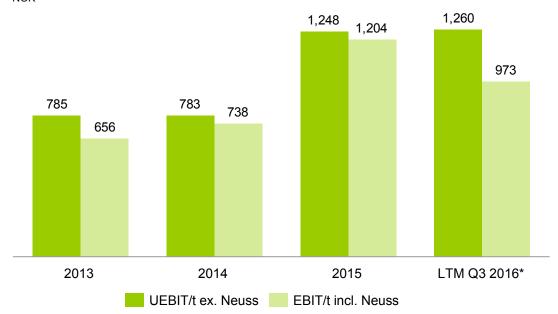


<sup>2)</sup> Realized LME plus realized premium, including Qatalum

<sup>3)</sup> Realized alumina price minus underlying EBITDA for B&A, per mt alumina sales

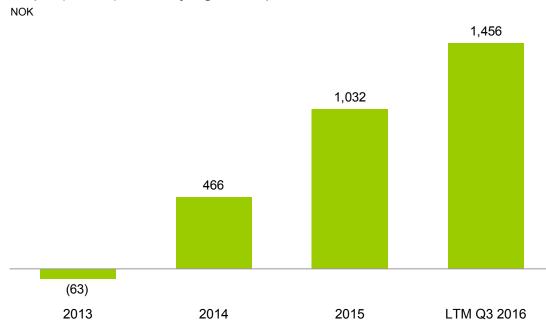
### Improving margins downstream

### Rolled Products Underlying EBIT per mt



- Gradual margin improvement in Rolled Products despite margin pressure, as a result of portfolio high-grading, improvements and currency support
- Negative effect from the Neuss smelter to be mitigated with a more competittive power contract from 2018

#### Sapa (100%) Underlying EBIT per mt



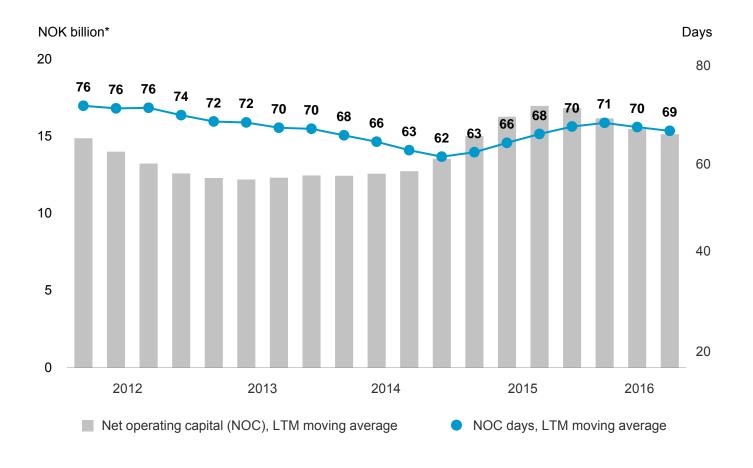
 Strong margin growth in Sapa as a result of restructuring efforts and higher share of value-add products, supported by strong markets and currency



<sup>\*</sup> Excluding Slim

### Optimizing working capital remains key priority

Release in 2016 following the above-average inventory build-up last year



- Net operating capital generally follows LME
- NOC release throughout 2016 driven by
  - Unwinding of the above average inventory build-up in 2015
  - Improved inventory turnover in Rolled Products and Primary Metal
  - Lower price level
- Inventory build-up through 2015
  - Intensified business activity on the back of tighter markets and higher all-in prices in 2014
  - Replaced by supply overhang and subsequent collapse in premiums in early 2015



<sup>\*</sup> Pro-forma, excluding extruded products for Q1 2012 - Q3 2013

#### LIFTING CASH FLOW POTENTIAL

### Continuous portfolio review

Recent non-core and legacy asset divestments contribute to cash flow

Asset/business	Completed	Cash effect	Accounting effect	Description
Casthouse Hannover, Germany	Q1 2014	~MEUR 7	~MEUR 4	Legacy asset
Koorang Bulk Facilities, Australia	Q4 2014	~MAUD 12	~MAUD 11	Stranded asset following closure of Kurri smelter
Slim Rolling Mill, Italy	Q4 2015	Neutral	(MEUR 50)	Rolling mill targeting non-core product segments
Menstad property (West), Norway	Q4 2015	MNOK 25	MNOK 22	Legacy asset
Herøya Industrial Park, Norway	Q2 2016	Not disclosed	~MNOK 350	Legacy asset
Menstad property (East), Norway	Nov 2016	~MNOK 16	~MNOK 16	Legacy asset
Herøya Nett, Norway	Ongoing	TBD	TBD	Legacy asset
Hannover property, Germany	Ongoing	TBD	TBD	Legacy asset



#### FINANCIAL STRENGTH AND FLEXIBILITY

### Maintain investment-grade credit rating

Funds from operations determine the balance sheet structure

- Maintain investment-grade rating
  - Currently: BBB (S&P), Baa2 (Moody's), both with stable outlook
- Financial ratio ambitions over business cycle
  - Funds from operations to adjusted net debt > 40%
  - Adjusted net debt to equity < 55%</li>
- Strong liquidity
  - NOK 8.0 billion in cash and cash equivalents by end-Q3 2016
  - USD 1.7 billion credit facility with maturity 2020, currently undrawn

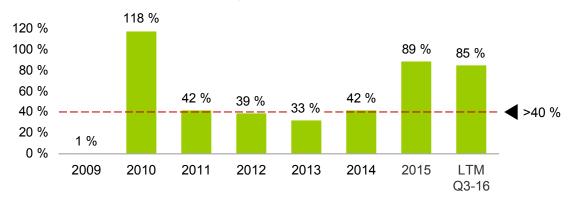
«Hydro's solid credit profile and Baa2 rating are underpinned by the group's conservative and proactive management of the balance sheet, with low absolute level of adjusted debt and high level of cash», Moody's

«Hydro continues to maintain a prudent financial policy and a very comfortable liquidity position» ... «Our base case takes into account Hydro's **conservative financial policies, modest leverage, and limited pressure on dividends**», Standard&Poor's

#### Adjusted net debt / Equity



#### Funds from operations / Adjusted net debt





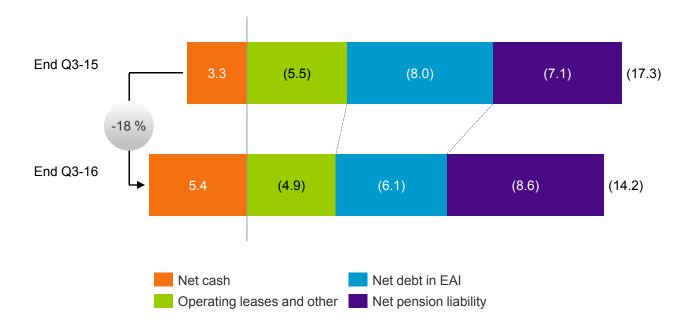
#### FINANCIAL STRENGTH AND FLEXIBILITY

### Maintain a solid balance sheet

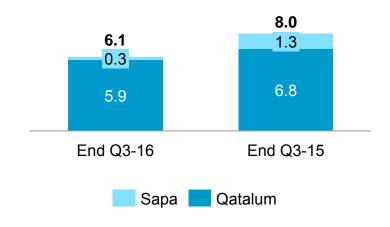
#### Reduced adjusted net debt

#### Adjusted net debt

NOK billion



 Reduction in Qatalum and Sapa net debt due to positive net cash flow and stronger NOK



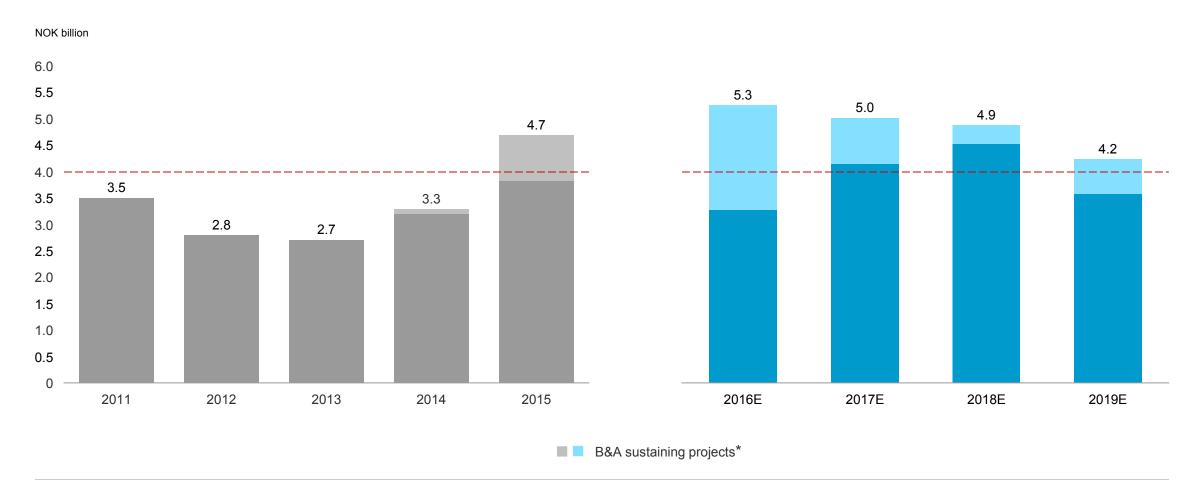
- Higher net cash position driven by cash flow from operations
- Increase in net pension liability mainly due to lower discount rates



<sup>\*</sup> USD/NOK balance sheet date exchange rates 8.05 end Q3-16 and 8.50 end Q3-15

### Long-term sustaining capex around NOK 4 billion

Higher than average sustaining capex driven by sustaining investments in Brazil



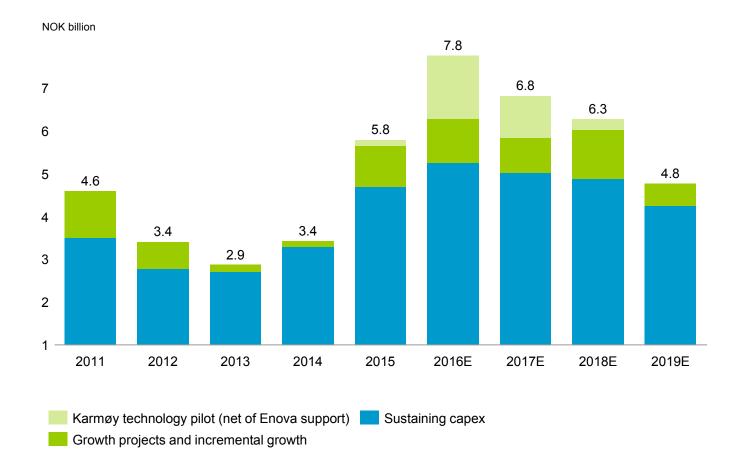
Excluding Extruded Products from 2012 onwards



<sup>\*</sup> Including red mud disposal area at Alunorte, tailing dam investments at Paragominas, and opening of a new mining area at Paragominas

### Growth capex focused on high-grading, recycling and technology

Majority of sustaining capex allocated upstream



- Sustaining projects for 2016-2019:
  - Red mud disposal area
  - Bauxite tailing dam
  - Opening of new bauxite mining area
  - Primary rectifiers
- Smelter relining
- Energy rehabilitation
- Ongoing organic growth projects:
  - RP Automotive line
  - Alunorte Debottlenecking
  - Incremental growth
- Karmøy technology pilot 2015-2018:
  - Gross investment 4.3 BNOK
  - Of which Enova support ~1.6 BNOK
  - Net investment 2.7 BNOK

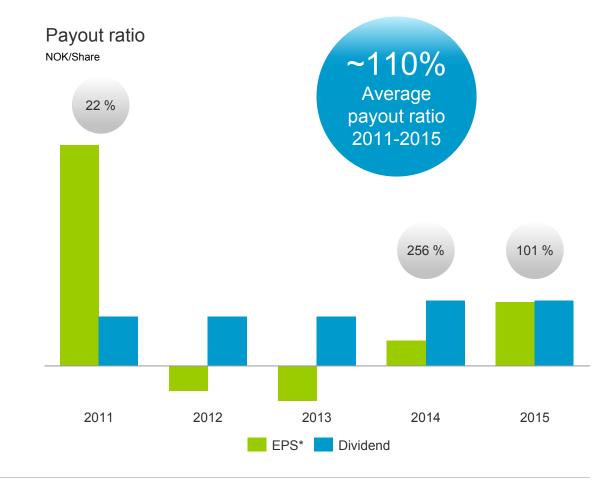


### Aiming for reliable and competitive returns to shareholders

Aiming for competitive shareholder returns compared to alternative investments in peers

#### Dividend policy since 2014

- Ordinary dividend: 40% of net income over the cycle
- Five-year average ordinary pay-out ratio 2011-2015 of ~110%
- Committed to a stable and reliable dividend level
  - Currently 1 NOK/share since 2014
- Share buybacks and extraordinary dividends as supplement in periods with strong financials and earnings outlook





#### **EFFECTIVE RISK MANAGEMENT**

### Limited financial hedging, flexible business model

Historical correlations between commodities and currencies indicate a natural earnings hedge

#### Hedging strategy

- Fluctuating with the market: revenues primarily exposed to LME, PAX and USD
- Volatility mitigated by strong balance sheet
- Strengthening relative position to ensure competitiveness

#### Diversified business

- Upstream cyclicality balanced with more stable earnings downstream
- Exposed to different markets and cycles

#### Bauxite & Alumina

- Currency exposure, mainly USD and BRL
- Exposed to LME and Platts alumina index prices

#### Primary Metal

- Operational LME hedging one-month forward sales
- Currency exposure, mainly USD, NOK and BRL

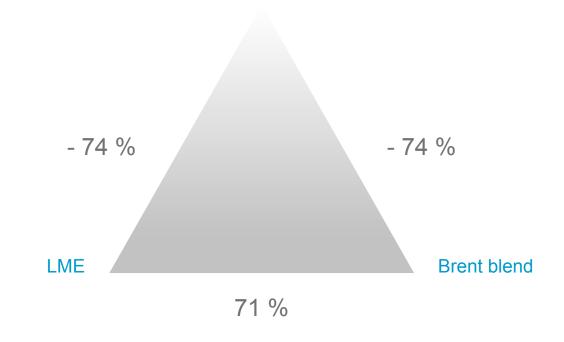
#### Metal Markets, Rolled Products

- Operational LME and currency hedging to secure margin
- Flexibility to hedge LME or currency in certain cases
- Maintaining long-term debt in the revenue currency (USD)

#### Cross-correlations between currencies and commodities

Monthly correlations 1994-2016

**USD/NOK** 



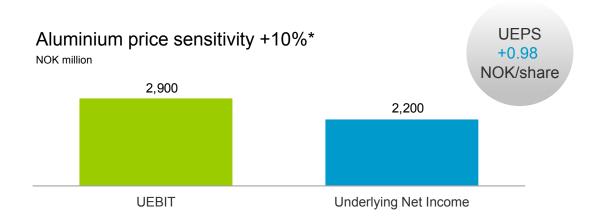




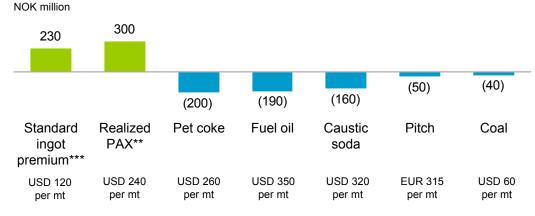




### Significant exposure to commodity and currency fluctuations



#### Other commodity prices, sensitivity +10%\*



#### Currency sensitivities +10%\*

#### Sustainable effect:

NOK million	USD	BRL	EUR
UEBIT	2 780	(1 120)	(250)
UEBITDA	2 830	(840)	(160)
UEPS	0.91	(0.31)	(0.06)

#### One-off reevaluation effect:

Financial items	(590)	510	(2 560)

- Annual sensitivities based on normal annual business volumes, LME USD 1 625 per mt, fuel oil USD 350 per mt, petroleum coke USD 260 per mt, caustic soda USD 320 per mt, coal USD 60 per mt, USD/NOK 8.30, BRL/NOK 2.60, EUR/NOK 9.30
- Aluminium price sensitivity is net of aluminium price indexed costs and excluding unrealized effects related to operational hedging
- BRL sensitivity calculated on a long-term basis with fuel oil assumed in USD. In the short-term, fuel oil is BRL-denominated
- Excludes effects of priced contracts in currencies different from underlying currency exposure (transaction exposure)
- Currency sensitivity on financial items includes effects from intercompany positions
- 2017 Platts alumina index (PAX) exposure used



<sup>\*</sup> Excluding Sapa JV

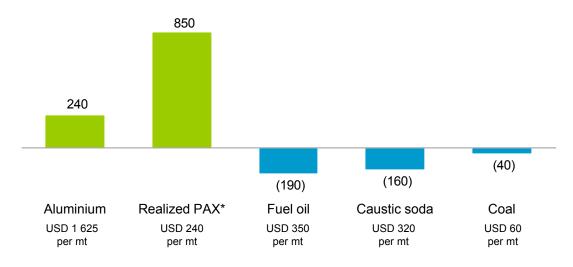
<sup>\*\* 2017</sup> Platts alumina index exposure

<sup>\*\*\*</sup> Europe duty paid standard ingot premium

### Bauxite & Alumina sensitivities

#### Annual sensitivities on underlying EBIT if +10% in price

NOK million



#### Currency sensitivities +10%

NOK million	USD	BRL	EUR
UEBIT	810	(770)	-

#### Revenue impact

- ~14.5% of 3-month LME price per tonne alumina
  - ~One month lag
- Realized alumina price lags PAX by one month

#### Cost impact

#### Bauxite

- ~2.45 tonnes bauxite per tonne alumina
- Pricing partly LME-linked for bauxite from MRN

#### Caustic soda

- ~0.1 tonnes per tonne alumina
- Prices based on IHS Chemical, pricing mainly monthly per shipment

#### Energy

- ~0.11 tonnes coal per tonne alumina, Platts prices, one year volume contracts, weekly per shipment pricing
- ~0.11 tonnes heavy fuel oil per tonne alumina, prices set by ANP/Petrobras in Brazil, weekly pricing (ANP) or anytime (Petrobras)
- Increased use of coal as energy source in Alunorte

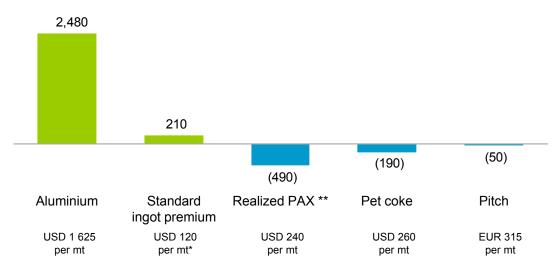
HYDRO

<sup>\* 2017</sup> Platts alumina index exposure Currency rates used: USD/NOK 8.30, BRL/NOK 2.60, EUR/NOK 9.30

### Primary Metal sensitivities

#### Annual sensitivities on underlying EBIT if +10% in price

NOK million



#### Currency sensitivities +10%

NOK million	USD	BRL	EUR
UEBIT	1 630	(350)	(130)

#### Revenue impact

- Realized price lags LME spot by ~1-2 months
- Realized premium lags market premium by ~1-2 months

#### Cost impact

#### Alumina

- ~1.9 tonnes per tonne aluminium
- ~14.5% of 3-month LME price per tonne alumina, increasing volumes priced on Platts index
  - ~ 2-3 months lag

#### Carbon

- ~0.35 tonnes petroleum coke per tonne aluminium,
   Pace Jacobs Consultancy, 2-3 year volume contracts, half yearly pricing
- ~0.08 tonnes pitch per tonne aluminium, CRU, 2-3 year volume contracts, quarterly pricing

#### Power

- 13.7 MWh per tonne aluminium
- Long-term power contracts with indexations



<sup>\*</sup> Europe duty paid. Hydro Q3'16 realized premium USD 251 per mt

<sup>\*\* 2017</sup> Platts alumina index exposure Currency rates used: USD/NOK 8.30, BRL/NOK 2.60, EUR/NOK 9.30

### Commodities and currencies need to be seen in tandem

Spot prices and currency rates indicate earnings upside

Underlying EBIT sensitivity to changes in LME and USD/NOK

Change in LME price

	Change in UEBIT (BNOK)	- 10%	0	+ 10%
JSD/NOK	+10%	(0.4)	2.8	6.0
Change in USD/NOK	0	(2.9)	0	2.9
ວົ	-10%	(5.4)	(2.8)	(0.2)

Key variables "run-rate"\* vs Q3-16 realized

				Annual effect		
	Q3-16 realized	Run-rate*	% change	Impact on UEBIT (BNOK)	Impact on UEPS (NOK/share)	
LME	1 625	1 770	9 %	2.6	0.9	
PAX	240	320	33 %	1.0	0.6	
USD/NOK	8.3	8.6	4 %	1.0	0.3	
BRL/NOK	2.6	2.5	(4) %	0.4	0.1	
Total				5.0	1.9	



<sup>\*</sup> Run rate - market rates as of November 25, 2016

### Improvement efforts lift EBITDA potential

Scenarios are not forecasts, but represent earnings potential based on sensitivities





#### Additional factors influencing earnings (not included in the scenarios):

Production volumes, alumina sales pricing on PAX, energy prices, downstream margin developments, raw material cost development, premiums, inflation, currency, depreciation, other

Last 4 quarters underlying EBITDA as basis. USD/NOK 8.5, BRL/NOK 2.5, realized premium above LME 275 USD/mt, PAX 300 USD/mt assumed for all scenarios. Other assumptions unchanged. Improvements used for scenarios exclude Sapa.



Incl. 5.6 BNOK in realized improvement programs 2009-2016

(as is)

5

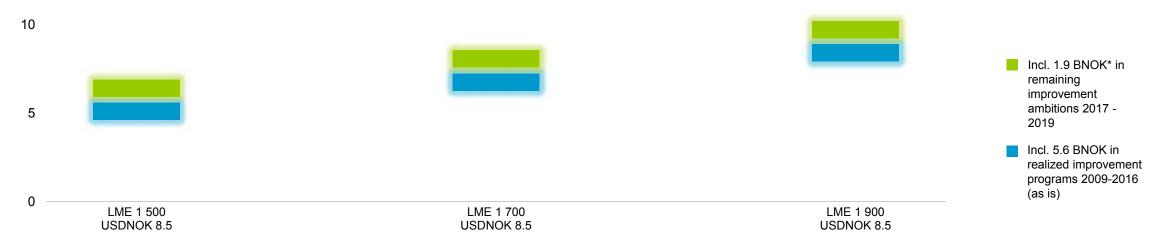
<sup>\*</sup> Future improvement efforts in real 2015 terms, before depreciation.

### Improvement efforts and capital discipline contribute to FCF growth...

Scenarios are not forecasts, but represent earnings potential based on sensitivities

Indicative Free cash flow (FCF) range in 3 scenarios NOK billion

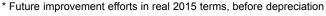
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#### Additional factors influencing earnings (not included in the scenarios):

Production volumes, alumina sales pricing on PAX, energy prices, downstream margin developments, raw material cost development, premiums, inflation, currency, taxes, investments, interest expense, depreciation, other

Last 4 quarters underlying EBITDA as basis. USD/NOK 8.5, BRL/NOK 2.5, realized premium above LME 275 USD/mt, PAX 300 USD/mt assumed for all scenarios. Long-term capex 4.0 BNOK per year. Other assumptions unchanged. Improvements used for scenarios exclude Sapa.

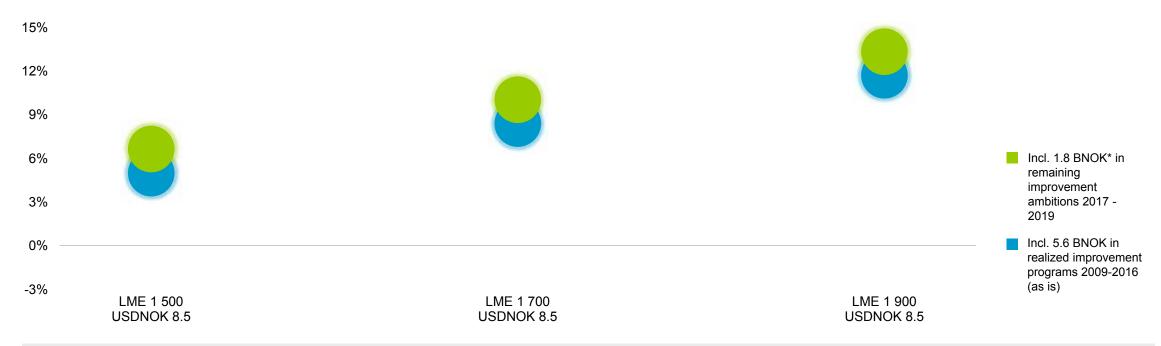




### ...and lift potential for competitive returns

Scenarios are not forecasts, but represent earnings potential based on sensitivities

#### Indicative RoaCE range in 3 scenarios



#### Additional factors influencing earnings (not included in the scenarios):

Production volumes, alumina sales pricing on PAX, energy prices, downstream margin developments, raw material cost development, premiums, inflation, currency, taxes, interest expense, other

Last 4 quarters underlying EBITDA as basis. USD/NOK 8.5, BRL/NOK 2.5, realized premium above LME 275 USD/mt, PAX 300 USD/mt assumed for all scenarios. Other assumptions unchanged. Improvements used for scenarios exclude Sapa.



<sup>\*</sup> Future improvement efforts in real 2015 terms, after depreciation





### Driving long-term shareholder value

Balancing capital allocation and financial strength

# Solid balance sheet and liquidity

Maintain financial flexibility
Enable access to capital markets
Navigate through the cycles
Manage business risks
Act on opportunities

### Capital expenditures

Sustaining capex to ensure operational excellence

Investments to keep market share, reduce costs, strengthen margins

#### Reliable and predictable dividend

Deliver competitive cash returns to shareholders

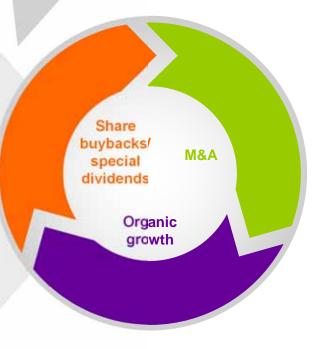
### Long-term shareholder value

 Reinvest in profitable growth

#### or

 Return to shareholders

Allocation based on best risk-adjusted returns





### Hydro's aspiration underpinned by firm financial targets

Medium and long-term

	Ambition	Timeframe	CMD 2016 status
Better improvement ambition	2.9 BNOK	2016-2019	1.1 BNOK 2016E
Sustaining capex	~ 4 BNOK	Over the cycle	5.3 BNOK 2016E
Average capex incl. growth	6.0 BNOK <sup>1)</sup>	2017-2019	7.8 BNOK 2016E
Dividend payout ratio	40% of net income	Over the cycle	~110% <sup>2)</sup> 2011-2015
FFO/adjusted net debt 3)	> 40%	Over the cycle	<b>85%</b> LTM Q3-16
Adjusted net debt/Equity	< 55%	Over the cycle	<b>17%</b> LTM Q3-16
RoACE	Competitive 4)	Over the cycle	5.4% <sup>5)</sup> LTM Q3-16





<sup>1)</sup> With Karmøy Technology Pilot net investment, after ENOVA support

<sup>2)</sup> Payout ratio 5 year average - dividend per share divided by earnings per share from continuing operations for the last 5 years

<sup>3)</sup> FFO – funds from operations

<sup>4)</sup> Measured against a relevant peer group

<sup>5)</sup> Underlying return on average capital employed after tax (RoACE)







### Market Outlook

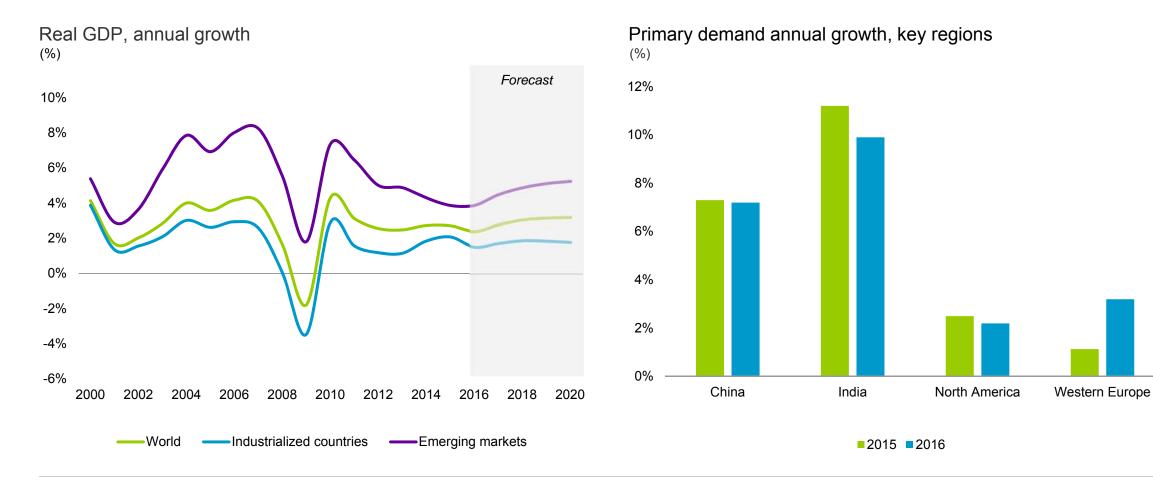
**Kathrine Fog**Capital Markets Day 2016

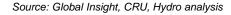




### Global macro development improving, uncertainty persists

Primary demand at or above GDP in key regions



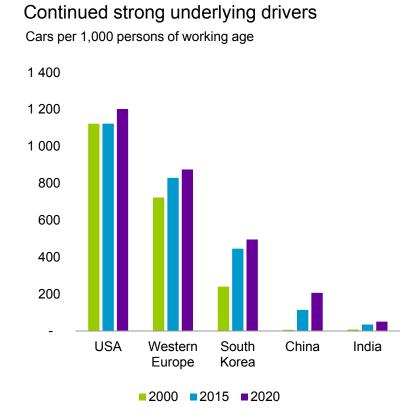


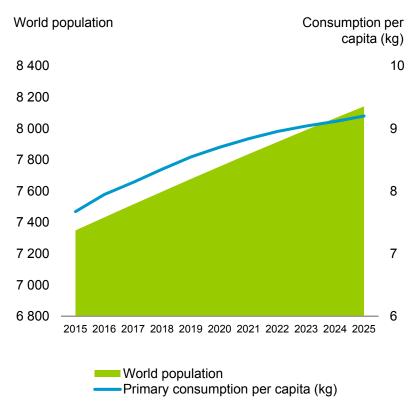


### Global aluminium demand prospects remain encouraging

Broad-based demand growth across segments, better growth outlook than other base metals

### Diversified consumption base Global semis demand per segment, 2015 Construction Transport Electrical Machinery & equipment ■ Foil stock Packaging





Source: CRU, UN, Hydro analysis

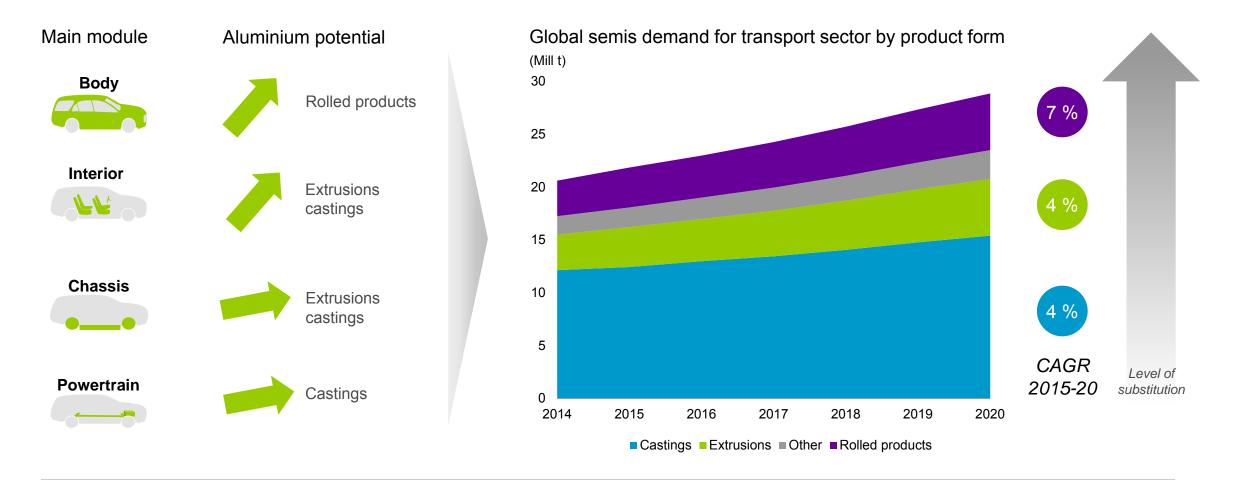
■ Consumer Durables

■ Other



### Strong substitution trend for aluminium in automotive

High demand within body-in-white driving rolled products demand







### Rolled products demand driven by transport segment

Transport share increasing in total rolled products demand

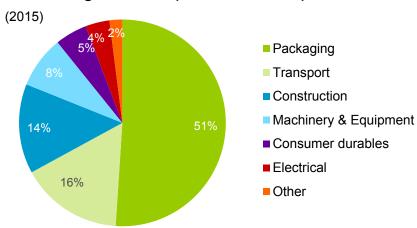
## General rolled products demand, selected regions



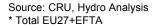
#### **Expected market development**

- 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









#### Continued growth in extrusion demand

Gradual improvement expected in Europe

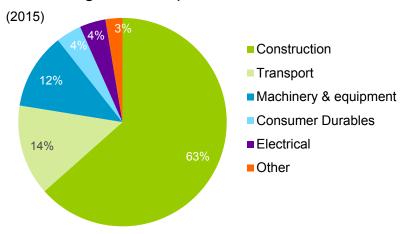
## Extrusion demand, selected regions



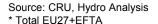
#### Expected market development

- 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



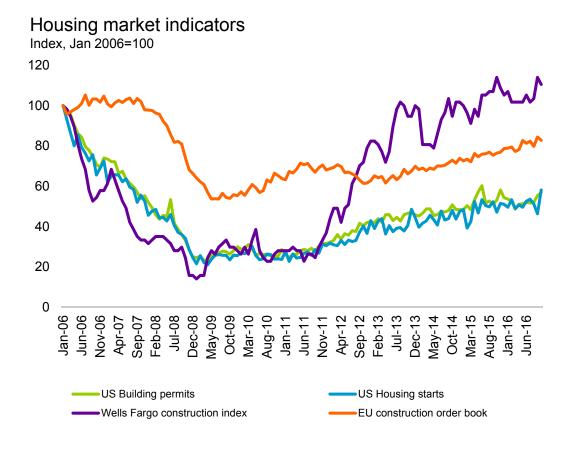






#### Extrusion market supported by continued momentum in B&C market

Trend towards Green buildings also shaping up





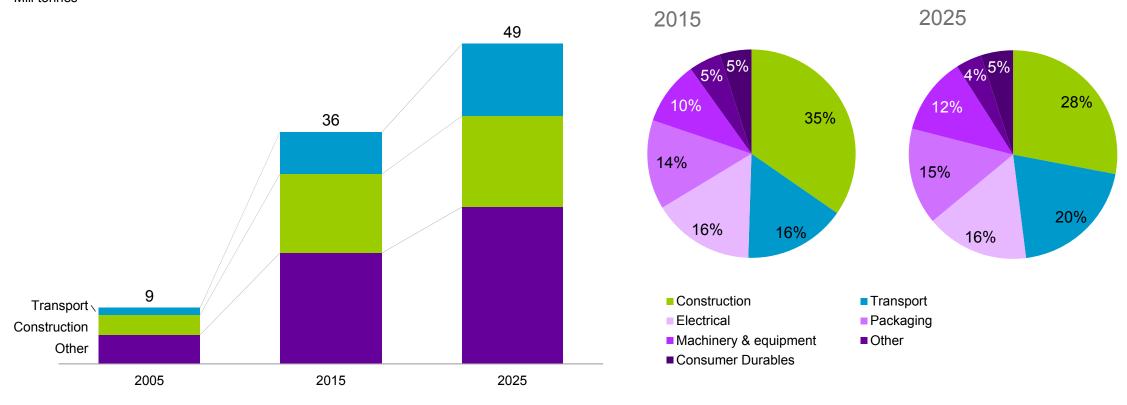
40 % of global energy use related to buildings



# China's consumption pattern changing, with transport emerging as a key engine of growth

Chinese semis demand per key segments

Mill tonnes

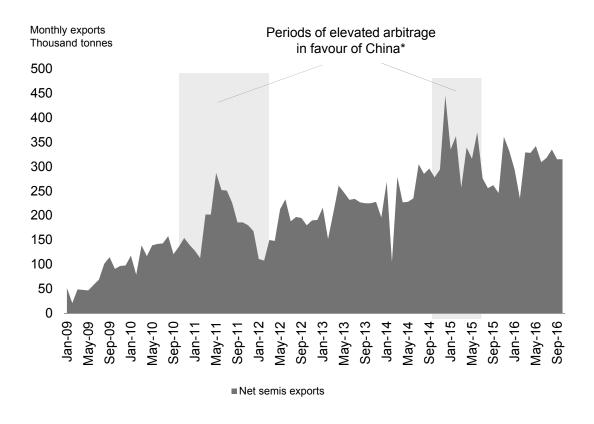




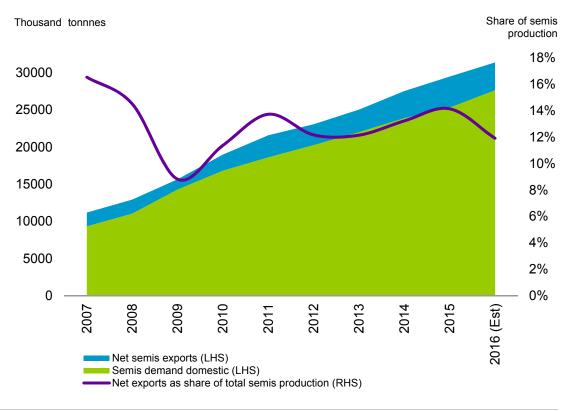
#### Growth in Chinese semis exports largely stable

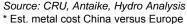
Periods of higher arbitrage leading to increased exports

#### Chinese semis exports



## Net semis exports as share of total semis production

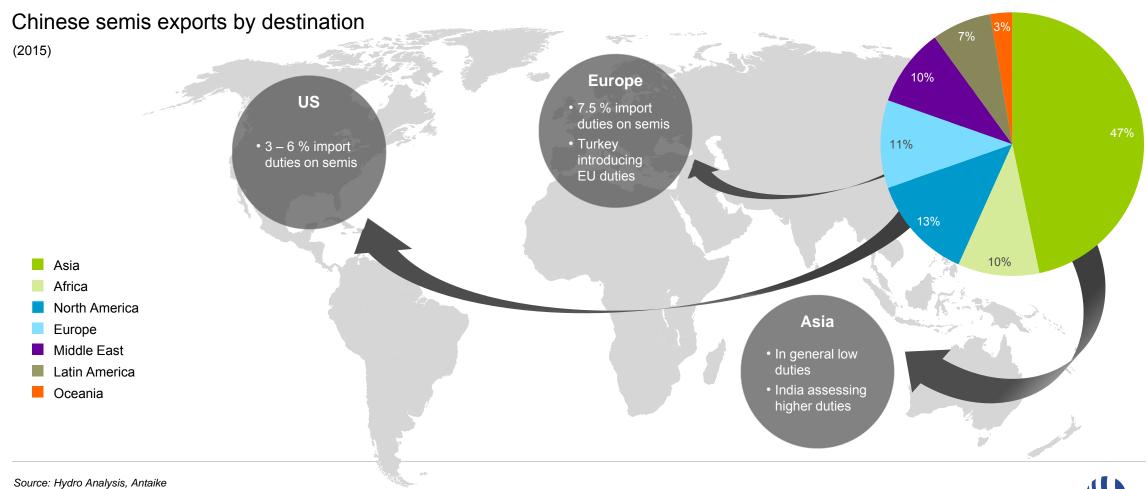


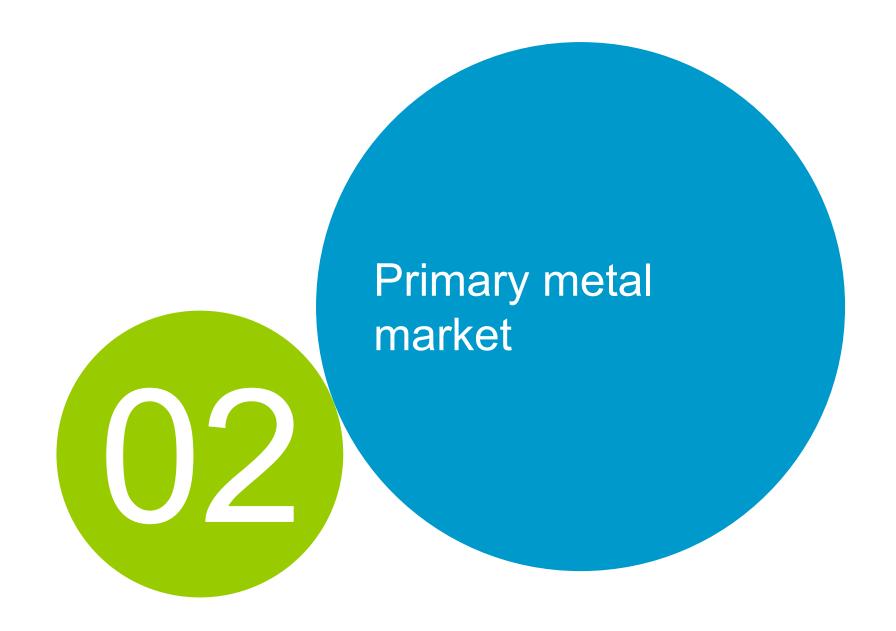


Europe: LME cash + European duty-paid standard ingot premium China: SHFE cash + avg. local premium + freight – export rebates (~13 %)



### Trade regulations and duties impacting trade flows

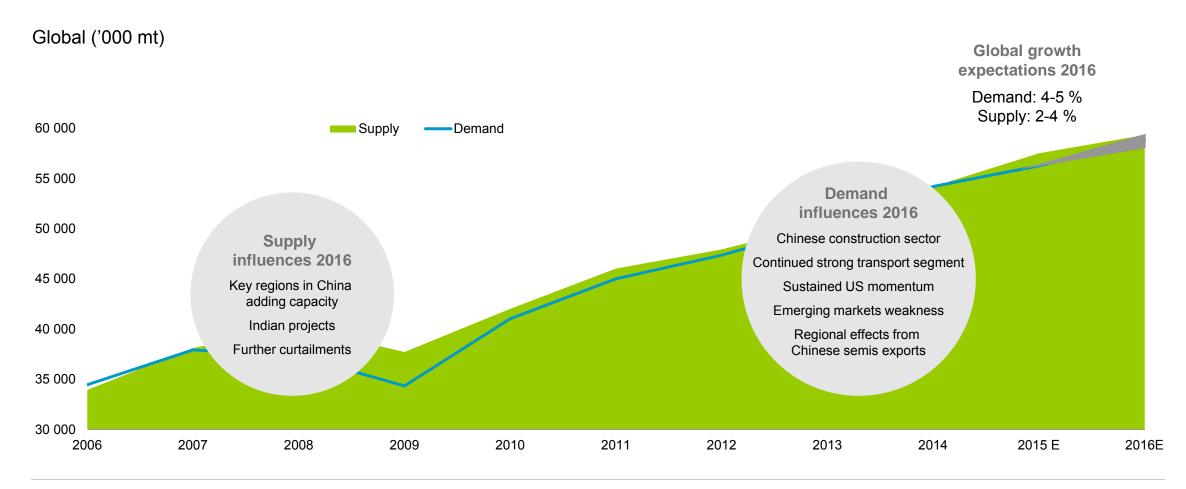






### Recap CMD 2015: Global surplus expected to moderate in 2016

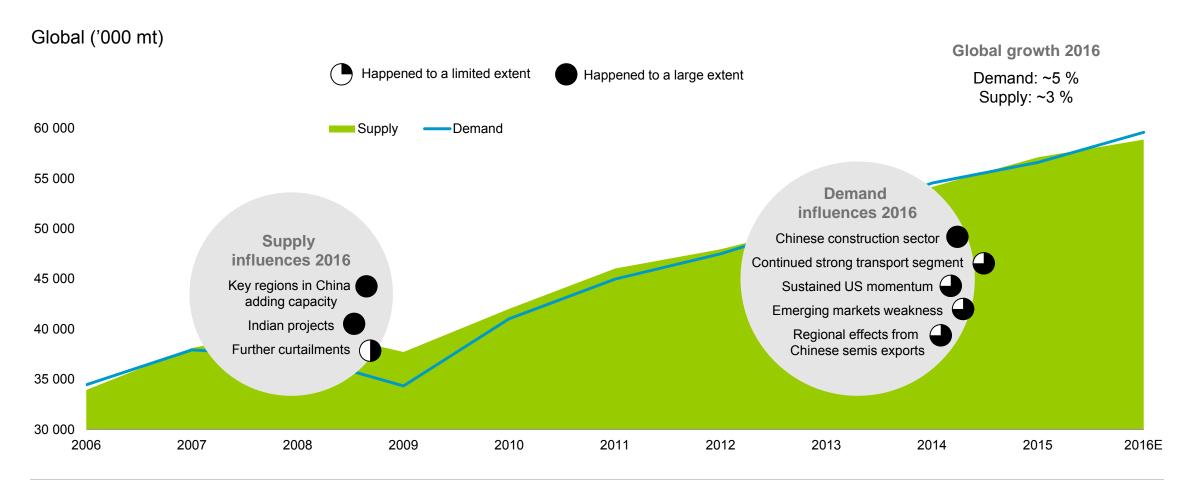
Surplus moderating from ~1 million tonnes to 0-1 million tonnes





#### Market balance progressing better than expected

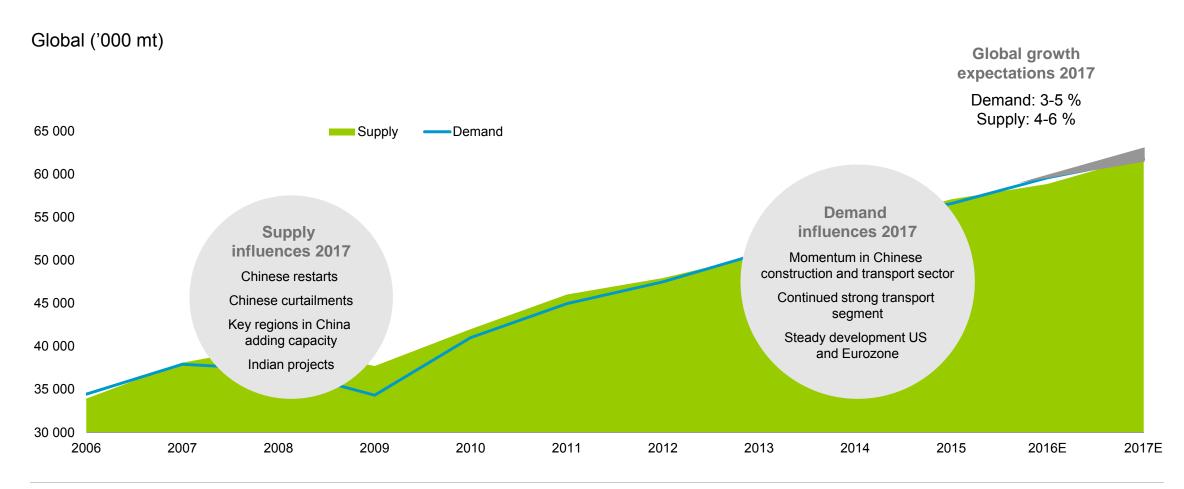
Surplus moderating from ~1 million tonnes to a small deficit





## Global primary market expected to be largely balanced also in 2017

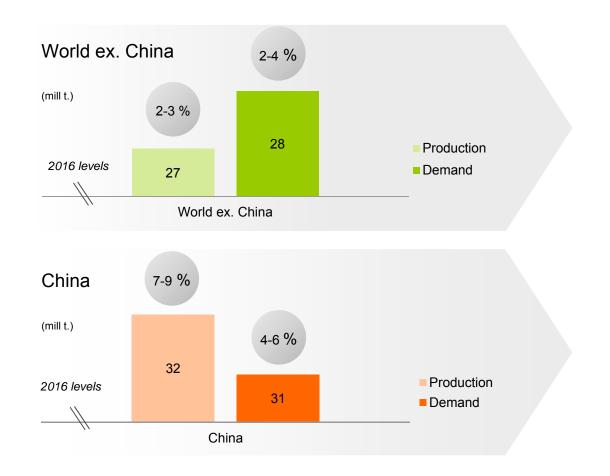
Supply growth in world ex. China driven by India, pace of Chinese restarts uncertain

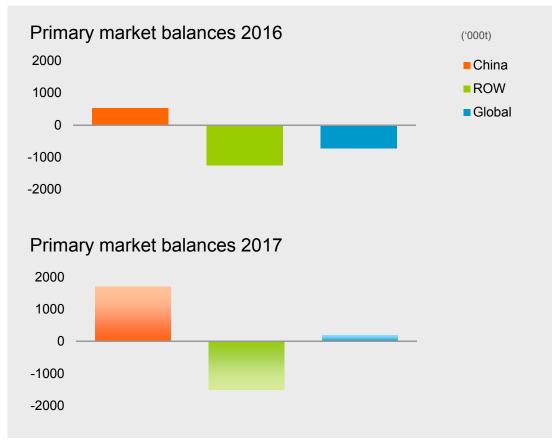


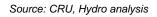


### Divergence in market balances continuing in 2017

Global demand growth largely stable, production increasing in China driven by new projects and restarts







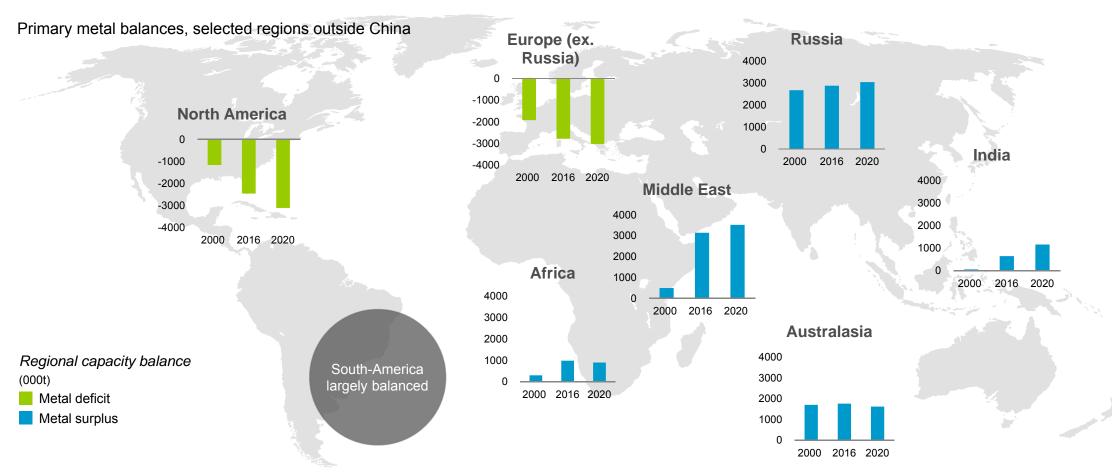


Growth from 2016 to 2017



#### Market deficits increasing in key consumer regions

Rising deficits in North America and Europe amid smelter curtailments and continued demand growth

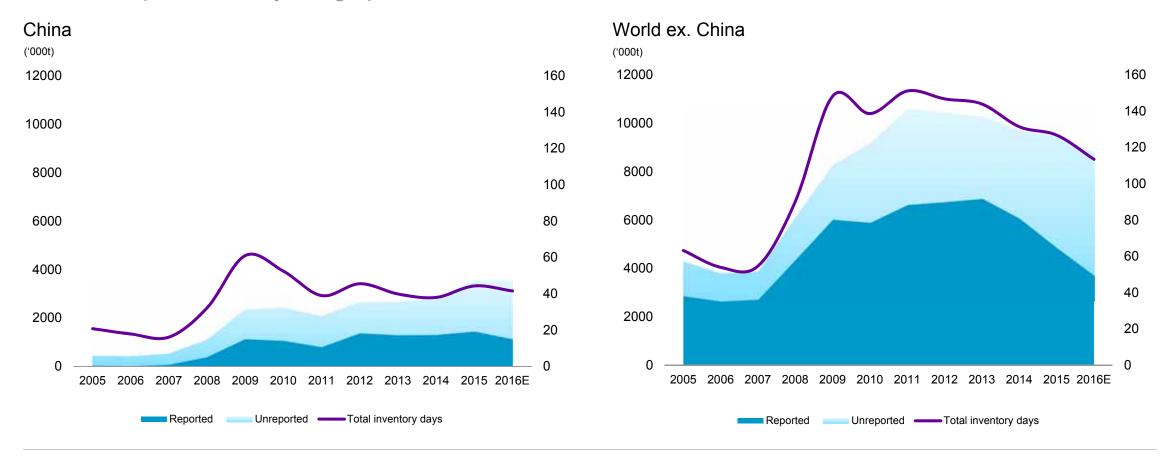


Source: CRU



# Chinese primary stocks largely stable in 2016, while total stocks outside China are decreasing

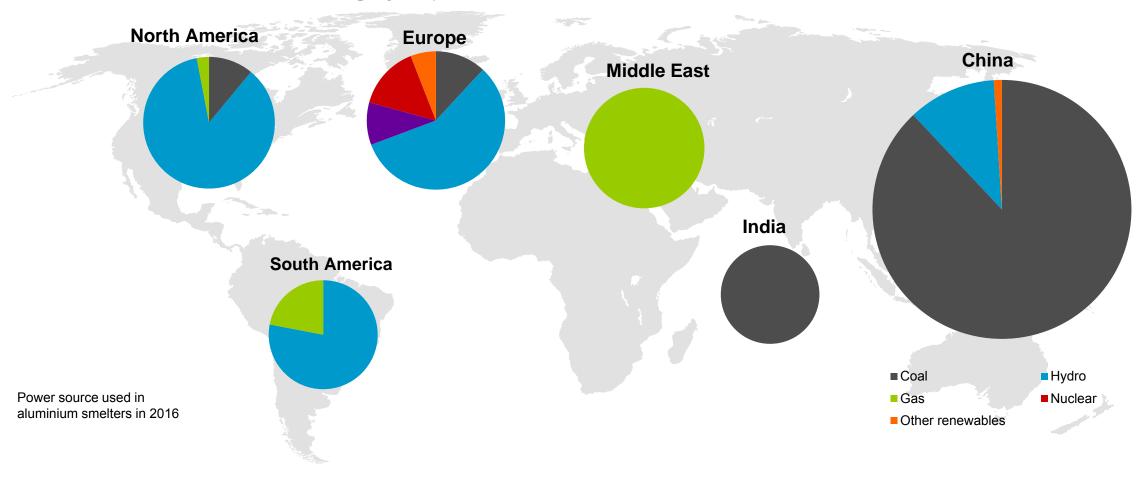
Chinese exports not fully filling up deficits outside China





### Energy source for primary production varies between regions

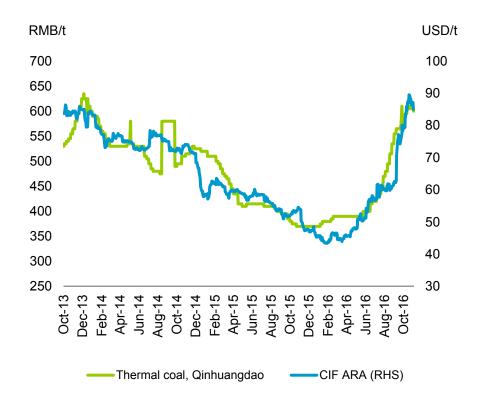
Chinese and Indian smelters largely dependent on coal



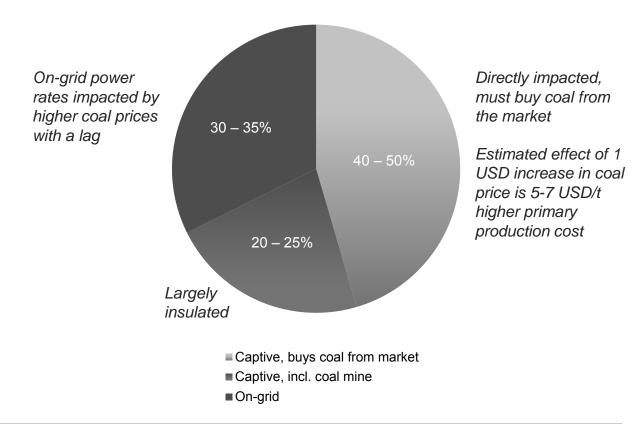


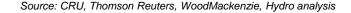
## Chinese smelters buying coal from market and on-grid smelters impacted by rising coal prices

Coal prices rising...



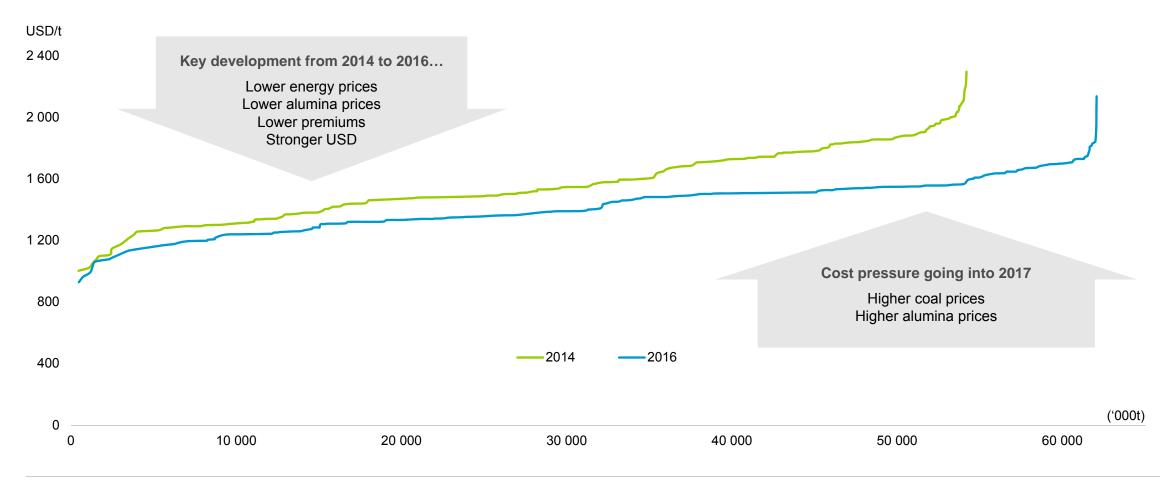
...but with varying impact on smelter cost





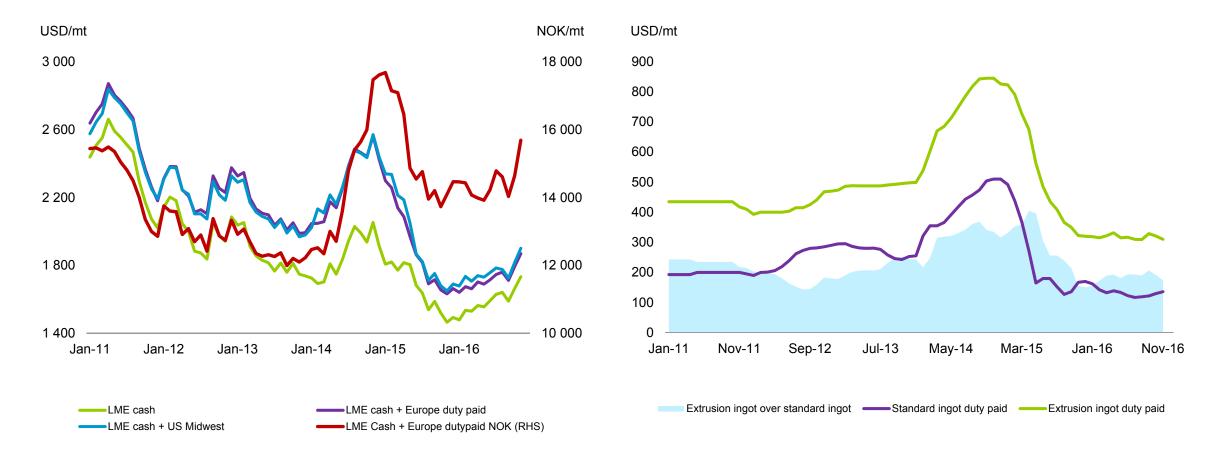


#### Global cost curve pressured by higher coal and alumina prices





# Regional standard ingot premiums falling back to historical levels, all-in price level supported by currency effect

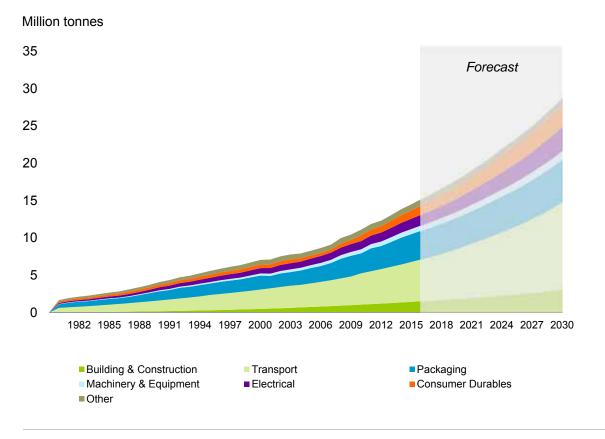




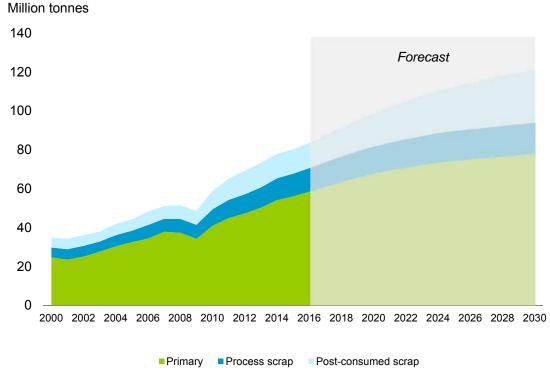


# Recycling is becoming more important as the generation of post consumed scrap material gains momentum

#### Estimatede recovery from post-consumed scrap collected



#### Primary demand versus recycled material, global



Source: GARC, CRU/Hydro analysis

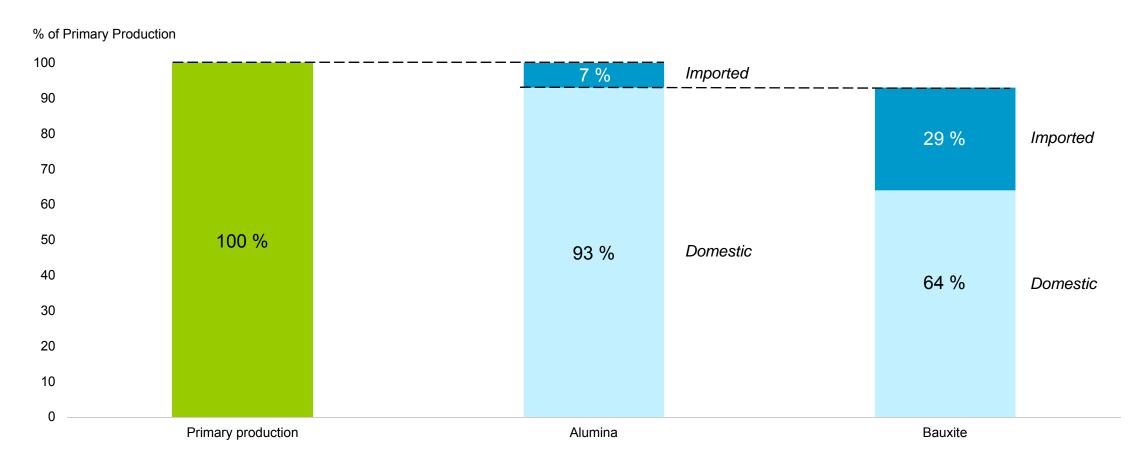






### Chinese primary production dependent on imported resources

Around 36% based on imported raw material (average 2013-2016)

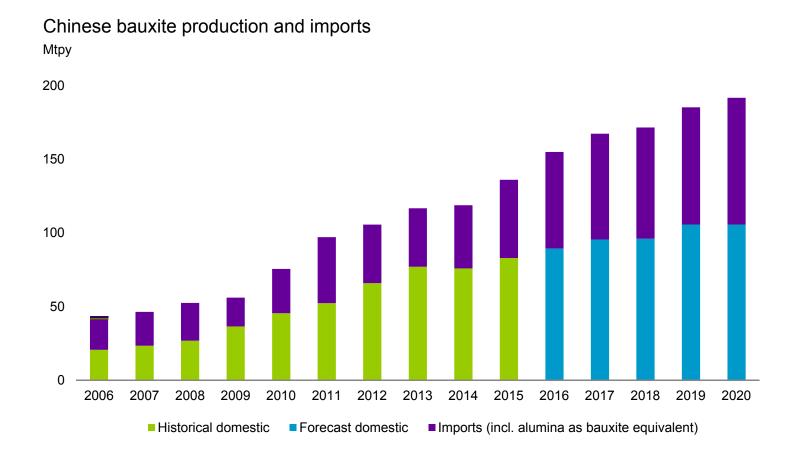


Source: CRU, China customs, 2016 forecast



#### Bauxite production in China to level off, triggering more imports

Chinese bauxite imports influencing price development



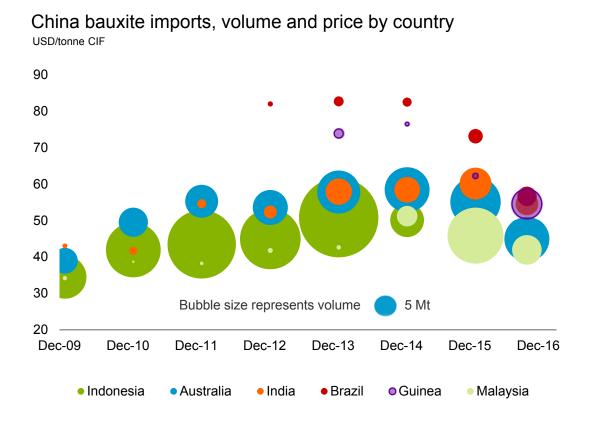
- Depleting resources and deteriorating quality, not sufficient to sustain operations in key provinces, triggering:
  - increasing refinery conversion costs
  - inland refineries could convert to imported bauxite (additional inland freight of >\$20/t)
  - relocation to southern provinces, Guangxi and Guizhou
  - new refinery capacity in coastal areas, dependent on imported bauxite
  - development of refinery capacity outside of China
- Bauxite (equivalent) imports could increase from ~65 Mtpy in 2016 to ~85 Mtpy in 2020
  - increasing freight exposure



Source: CM Group

#### Chinese bauxite imports – a dynamic landscape

Malaysia ban continues, Guinea emerges as major supplier, increased exposure to freight, prices decreasing and converging



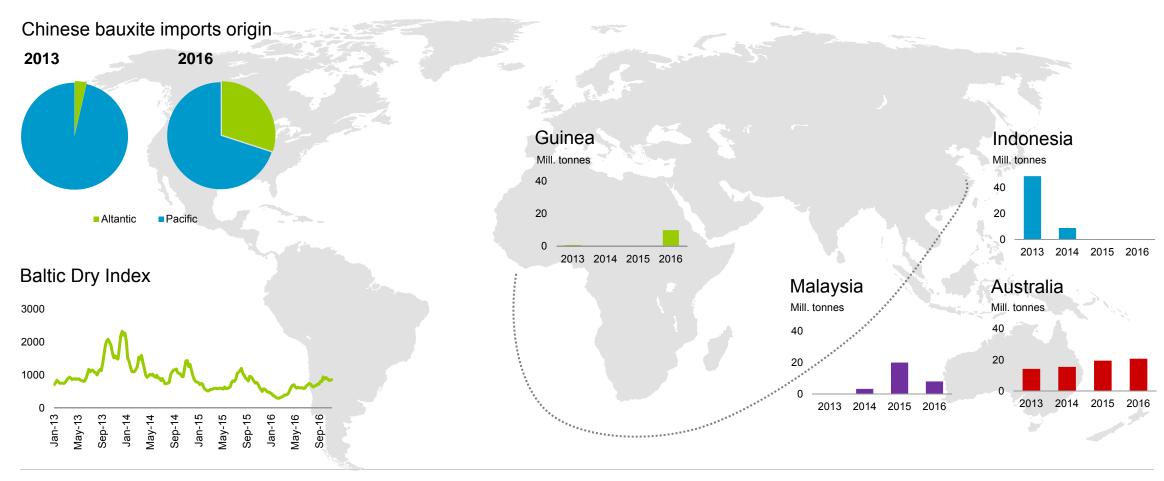


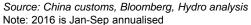
Source: China Customs



### Chinese bauxite imports increasingly exposed to freight

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

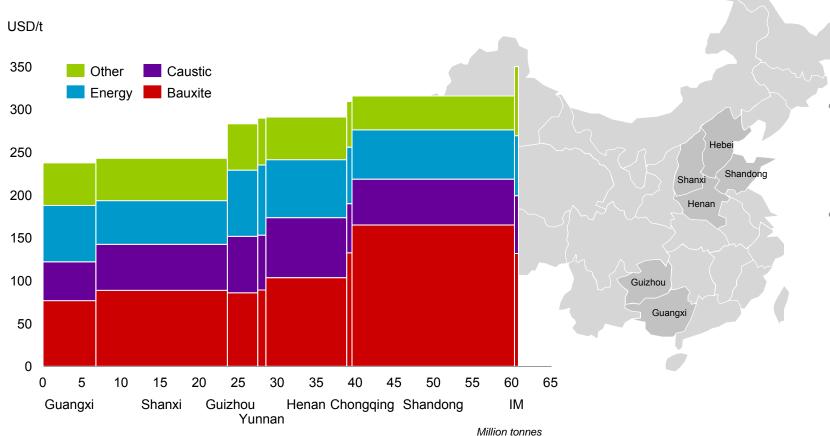






### Higher cost Chinese refineries impacted by imported bauxite prices

20 Mtpy of high cost alumina capacity in Shandong, still growing



- Shandong refineries exposed to bauxite import prices
- but necessary capacity, as domestic bauxite is insufficient
- Additional capacity planned during next 3 years in China;

Shandong3 Mtpy

Hebei 2-4 Mtpy

Guizhou2 Mtpy

Shanxi1.8 Mtpy

Yunnan 0.6 Mtpy

Source: CM Group, CRU



#### 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 prices rising amid smelter restarts and cost inflation

#### Recent alumina price drivers

#### Market balances

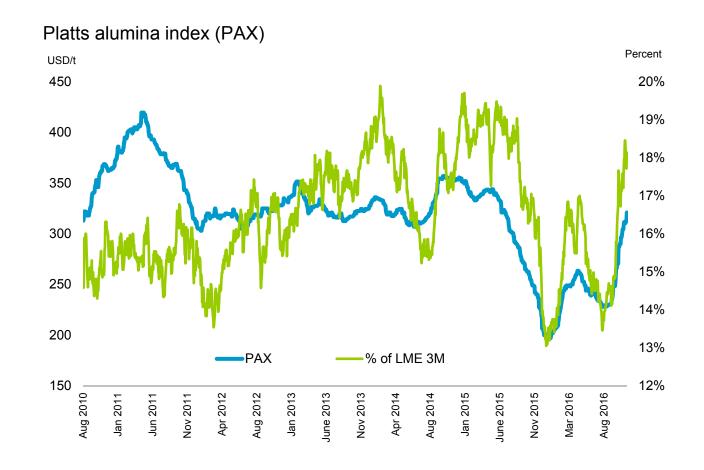
- Smelter restarts and new projects ramping up in China
- Tight markets ex. China amid curtailments

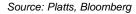
#### Cost inflation

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

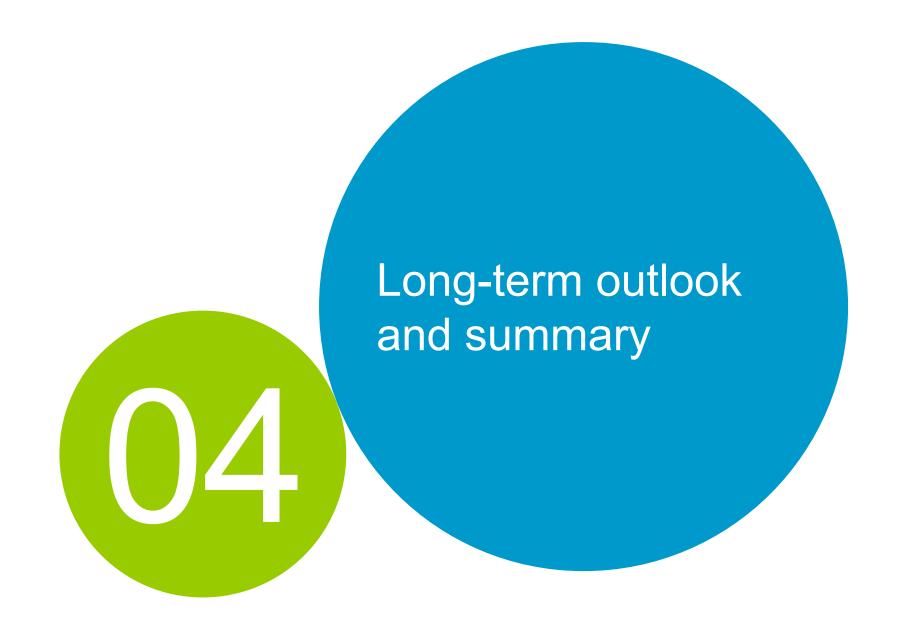
#### Other factors

- Transport bottlenecks
- Environmental issues











## Strong growth drivers across segments providing solid demand outlook

Short-term macroeconomic volatility, long-term fundamentals still in place

#### Strong demand drivers in key aluminium segments

Semis demand CAGR 2016 - 2025

Transport	Growth in automotive vehicle production Aluminium content in cars increasing Growth in other transport modes, e.g. railway	4 – 5 %
Construction	Urbanization Housing market recovery in mature regions Energy neutral buildings	2-3%
Electrical	Urbanization Copper substitution	3 – 4 %
Machinery & equipment	Improving industrial sentiment in mature regions Manufacturing activity and industrial growth in emerging countries	3 – 4 %
Packaging	Urbanization Environmentally-friendly solutions	3 – 4 %



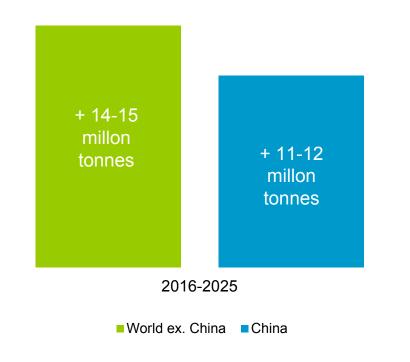


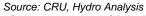
# Growth in global semis demand creates opportunities for both primary and recycled material

World outside China semis demand growth exceeding Chinese growth rates into next decade

CAGR 2016 - 2025 Recycling Semis Primary 3-4 % 2-3 % 4-5 %

Estimated semis demand growth, 2025 vs 2016

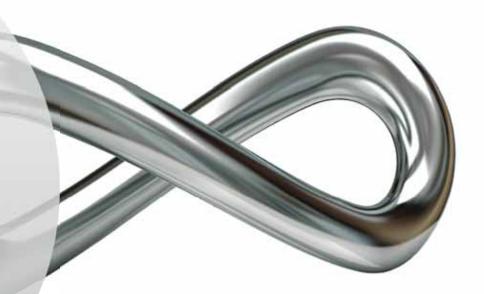




<sup>\*</sup> Post-consumed and fabrication scrap



- Macro drivers and substitution effects supporting underlying aluminium demand growth
- Limited primary supply growth outside China and India
- Global primary market largely balanced this year and next
- Cost curve pressured upwards by rising alumina and coal prices, with regional differences
- Recycling growth accelerating with increased generation of post-consumed scrap
- Chinese bauxite import dependency continues to increase
- Solid long-term demand outlook supported by strong growth drivers across segments



Better Bigger Greener



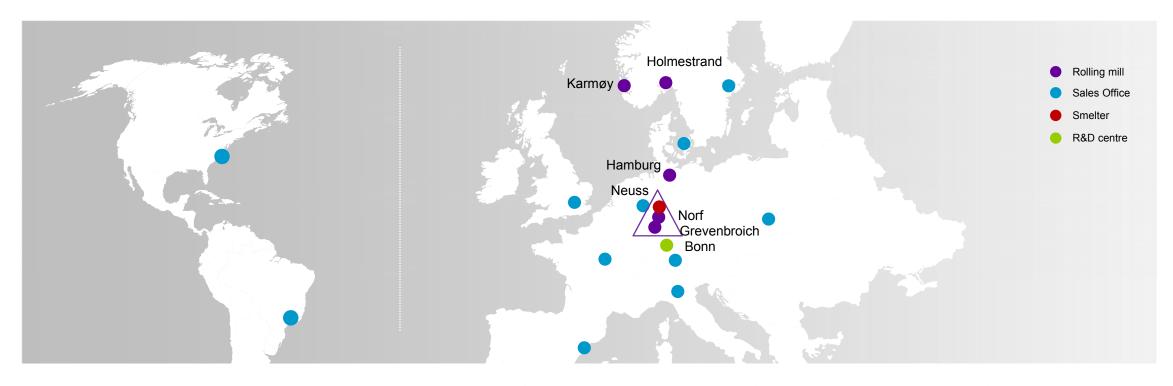




## Rolled Products

**Kjetil Ebbesberg**Capital Market Day 2016

#### Hydro Rolled Products



Strong European production base and global sales force

1 million tonnes of flat rolled products per year

Unique integrated aluminium cluster:

- Dedicated smelter
- World's largest rolling mill
- Dedicated conversion mills

Casthouse network and integrated recycling capacity

Industry-leading R&D facility



#### Rolled Products: High-grading portfolio and improving cost position



Multi-year contract signed with Jaguar Landrover



Opening of UBC processing line

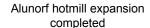


Trial production started at new automotive line 3



Cooperation agreement with Austin Al on scrap sorting solution for automotive

CMD 2015





Completion of power sourcing for Neuss smelter



1 year since launch of cultural enhancement program Renew



Ball supplier award for best Can Body supply



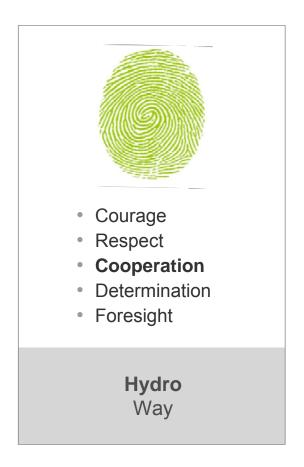


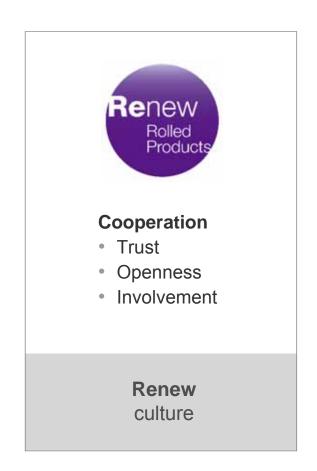


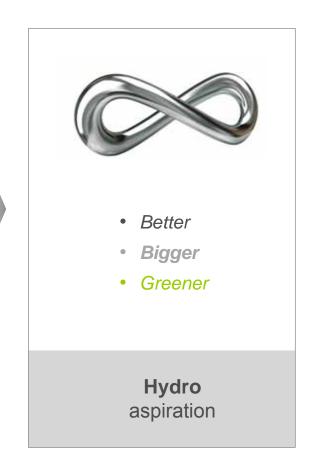
CMD 2016

#### Cultural enhancement program to lift cooperation and engagement

"Renew" Rolled Products to enable Better, Bigger, Greener targets









#### Rolled Products strategic priorities

Building on solid foundation, pursuing attractive opportunities

## Better

- Improve safety performance and drive for operational excellence
- Differentiate through innovation, quality, service and lead time

## Bigger

- Enhance market positions through product high-grading
- Strengthen relative industry position in our home markets and beyond
- Expand recycling
- Evaluate global automotive position

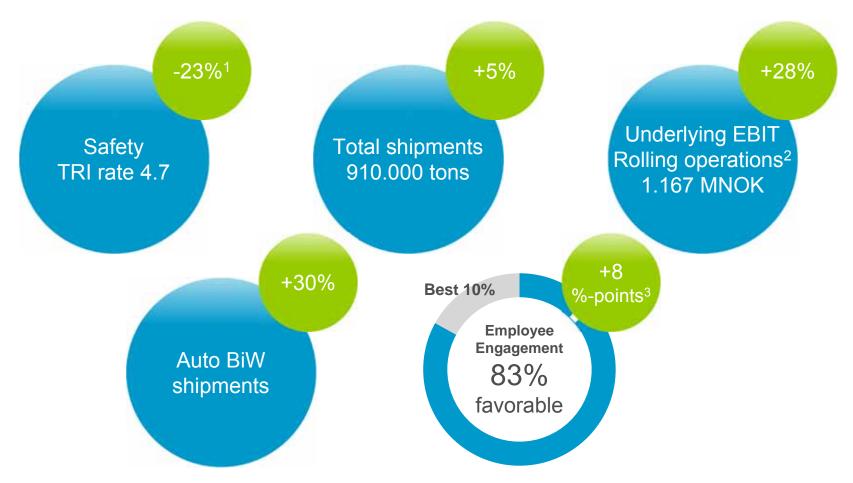
## Greener

- Leading provider of sustainable solutions to customers
- Comply with environmental requirements
- Key contributor to Hydro's overall carbon-neutrality ambition



#### Improvements in Rolled Products

Q3 2016 - Q4 2015 vs Q3 2015 - Q4 2014



<sup>1)</sup> YTD 2016 vs YTD 2015



<sup>2)</sup> Rolling operations = Rolled Products area without Neuss smelter

<sup>3)</sup> Hydro internal monitor survey results 2016 vs 2014

## Strong positions in market segments

Portfolio high-grading and strong focus on quality and service as key elements for success









Ambition

Automotive
Gain No.2 position
in European BiW

**Foil**Strengthen global No. 1 in high-end plain foil

**Beverage can**Grow No.3 position in Europe

**Lithography**Strengthen global
No.1 position

Special products
Strengthen No.1
positions in Europe

Market growth\* & drivers

- World ~12%
- Europe ~9%
- Steel substitution
- World ~2%
- Europe ~0-1%
- · Follows population growth
- World ~2-3%
- Europe ~2-3%
- Material substitution
- World ~0%
- Europe ~-3%
- Declining printing

- Europe ~2-3%
- Building, renewables and other potentials













Source: CRU / Hydro analysis

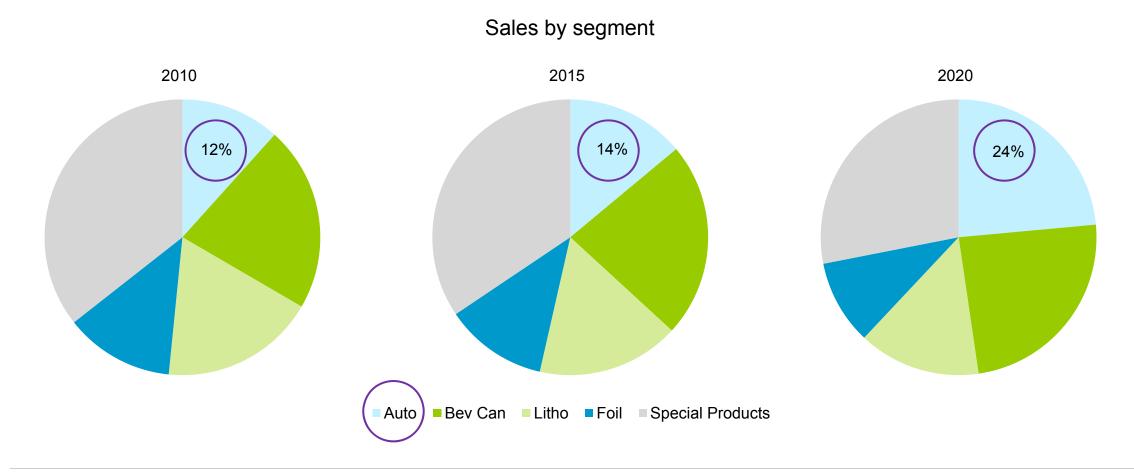


<sup>\*</sup> Market growth as compound annual growth rate 2015 - 2020 in %

<sup>\*\*</sup> Now Ardagh

## Expanding in higher-margin segments with increased ambition level

Pursuing attractive automotive growth opportunity





## It's all about serving our customers

Differentiation as key element of our strategy

#### Parameters for differentiation

- Quality
- Service
- Supply Chain
- Innovation
- Recycling / Carbon footprint
- Long-term reliability



#### Customers view on us

- Ball\* Vendor Rating 2015 TCS:
   Best in Class can body stock
- Alufoil Trophy 2016:
   Award for battery foil solution
- Agfa Graphics: Hydro as partner for end-of-life recycling solution
- ECCA Premium for HydroCoat Polyester
- Materialica Design + Technology Award for all-alu E-car body













<sup>\*</sup> Now Ardagh

## Quality and service improvement for our customers

Global market leadership in lithographic sheets driven by quality and service







#### Innovation as strong driver for increased competitiveness

Innovative solutions for automotive customers

Copper free
header material
for heat-exchanger –
Creating a unique selling
proposition by significantly
enhancing corrosion
resistance

Scrap sorting –
Solution for Automotive
developed by Austin Al
(USA) and Hydro: sorting
5.xxx and 6.xxx alloys
based on LIBS\*
technology



<sup>\*</sup> Laser induced breakdown spectroscopy

### Production of used beverage can recycling started

Lowering the metal cost and contributing to Hydro's carbon neutrality target



- Opening ceremony May 3<sup>rd</sup> 2016
- Ramp-up ongoing
- Delay due to equipment performance issues
- Operations in stable mode, further improvement program ongoing
- Output of > 40kt/year liquid aluminium expected by second half 2017



# Automotive line 3 moves Hydro towards No. 2 position in European Body-In-White

Realizing an attractive growth opportunity



- EUR 130 million investment, on time and budget
- Trial production started in October 2016
- Ramp-up to total nominal capacity of 200,000 mt/year in 2017
- Includes dedicated skin pass mill for special surfaces, resulting in enhanced formability
- Contracting ahead of planned schedule

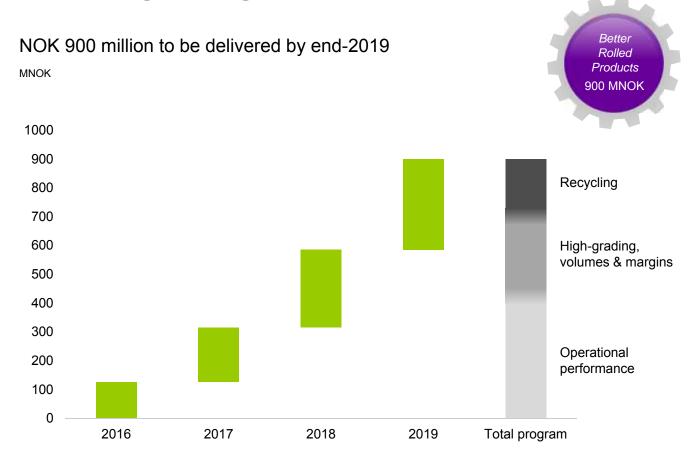


## NOK 900 million improvement ambition on track for 2019

Delayed UBC line ramp-up in 2016, however not affecting final target

#### Improvement driven by

- Automotive growth
- Recycling
- Operational performance
- Supply chain management
- Product high-grading
- Margin and portfolio mix
- Open and engaged culture





#### Rolled Products mid-term goals

Creating shareholder value with technology, product innovation and customer relations

Ambitions	Target	Timeframe	Progress <sup>1</sup>	Status	
Improve safety performance, strive for injury free environment	TRI <2	2020	4.72	•	
Realize ongoing improvement efforts Better Rolled Products	900 MNOK	2019	130 MNOK		
Differentiate through product innovation, quality and service	Min.1 step change	Annually	Cu-free header for HeX <sup>3</sup>		
<ul> <li>Increase nominal automotive Body-in-White capacity</li> </ul>	200,000 mt/yr	2017	Trial production started		
Complete ramp-up of UBC recycling line	>40,000 mt/yr	2017	Started, delayed ramp-up		
Increase post-consumed scrap recycling	>100,000 mt/yr	2020	41,000 mt/yr		

## Better Bigger Greener



<sup>1)</sup> Based on 2016 estimate unless stated otherwise

<sup>2)</sup> YTD Oct-2016, own employees

<sup>3)</sup> Heat-exchanger

Ambition on track and on target

Ambition behind plan, but on target

Ambition will not meet the target

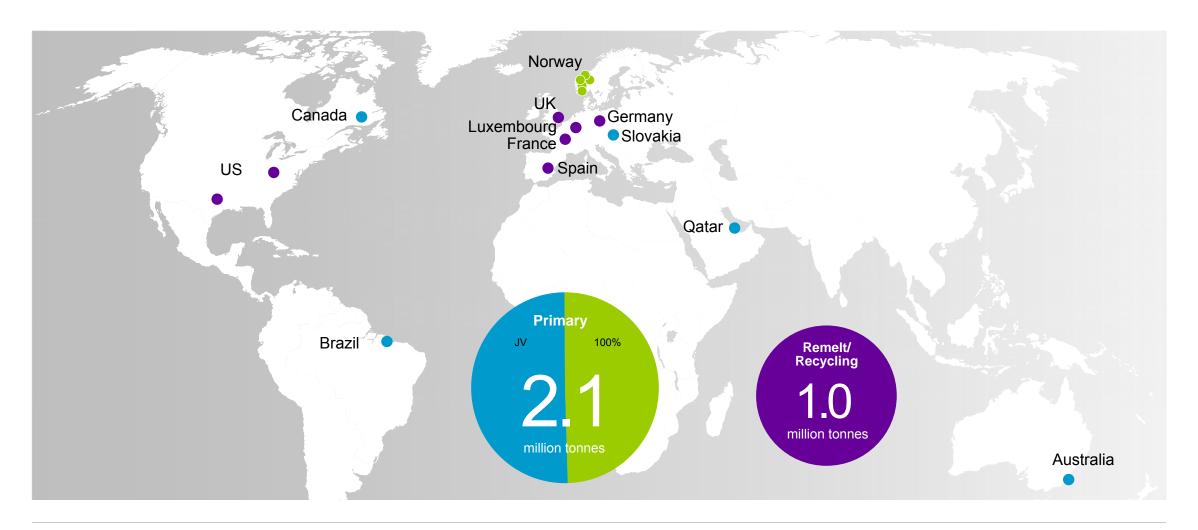




## **Primary Metal**

Hilde Merete Aasheim Roland Scharf-Bergmann Capital Markets Day 2016

## Primary Metal and Metal Markets production portfolio



<sup>2.1</sup> million mt is consolidated capacity. Slovalco and Albras are fully consolidated, Tomago and Alouette are proportionally consolidated and Qatalum is equity accounted. 90.000 mt of capacity is currently mothballed in Hydro Husnes. Neuss, which is a part of Rolled Products, is not included. 1.0 million mt includes stand-alone remelters, recycling facilities and additional casthouse capacity at primary plants.



# Primary Metal: Extending the technology lead and driving improvements



Karmøy Technology Pilot ~70% completed at year-end 2016



Digitization initiatives gaining momentum



The JV 180 USD/t improvement programs finalized as planned\*

CMD 2015

Product development for advanced customers intensified



New supply agreement with SAPA signed



~1 TWh new power contracts secured from 2021-39 in Norway



Clervaux remelter – new facilities in operation





**CMD** 

2016

<sup>\*</sup> Expectation for 2016

## Primary Metal strategic priorities

World-leading aluminium producer

## Better

- Strive for an injury-free environment
- Deliver on improvement programs
- Secure competitive power sourcing
- Develop products and services towards advanced customers to improve margins

# Bigger

- Realize 200,000 mt creep
- Extend technology lead with Karmøy Technology Pilot
- Further mature smelter growth options
- Grow recycling business

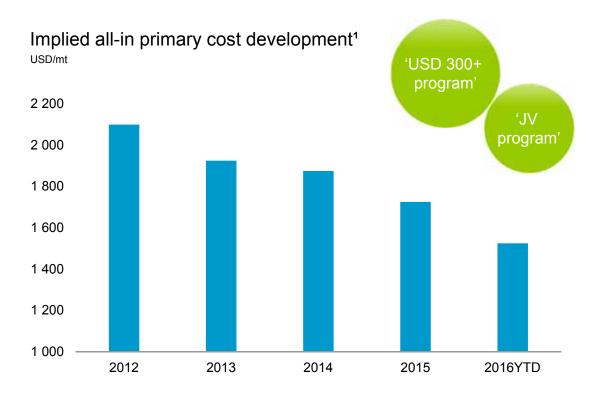
## Greener

- Growing recycling business will improve environmental footprint
- Reduce energy consumption and emissions in all processes
- Develop products and solutions to help customers reduce energy consumption and emissions

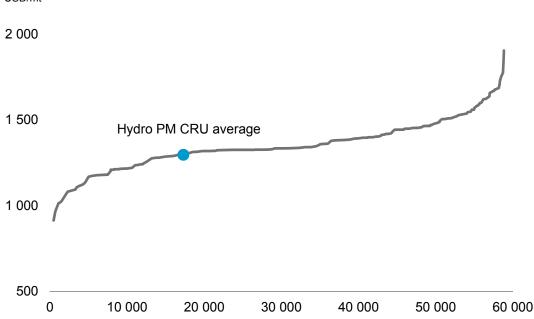


#### Strengthening relative position

#### Improvements keep Hydro competitively positioned on the CRU cost curve



2016 CRU<sup>2</sup> global business operating cost curve by smelter USD/mt



Benchmark improvement efforts

• Lean operations, operational improvements, fixed cost reductions

Significant cost curve developments over last years

 Including portfolio changes, Hydro Primary Metal fixed costs per tonne are reduced by around 50 % and productivity increased by around 30 % since 2008



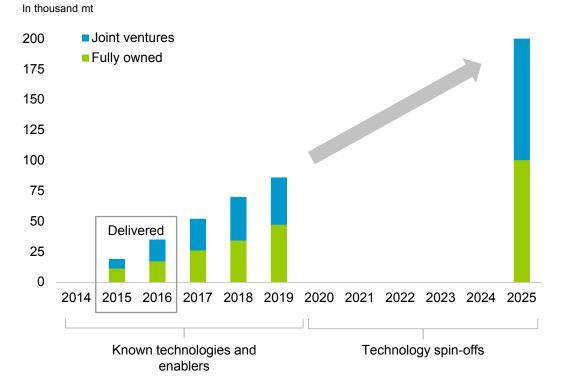
<sup>1)</sup> Realized all-in price minus Underlying EBITDA margin (incl. Qatalum) per mt primary aluminium sold. Includes net earnings from primary casthouses.

<sup>2)</sup> Source: CRU

## Long history of improvements continues

Delivering on creep program and NOK 1 billion improvement ambition

#### Production for Fully Owned and Joint Venture smelters 2014-2025



#### NOK 1 billion to be delivered by end-2019



#### Primary Metal Better ambition

- Technology driven capacity creep
- Operational/technical improvements
- Fixed cost reduction



Better Primary Metal BNOK 1.0

Creep volume realization requires some capex, and is dependent on positive business cases reflecting market conditions and outlook

## Karmøy Technology Pilot advancing toward 2017 start-up

#### Construction

- Project budget NOK 4.3 billion, net project costs of NOK 2.7 billion and NOK 1.6 billion in Enova support
- Estimate ~70% physical completion at year-end 2016
- The project is on budget and on time for first metal in 2nd half 2017
- Operational Preparedness project running according to schedule

#### Spin-off effects

- ~50% of 200 000 mt creep ambitions based on spin-offs from the Pilot estimated annual EBITDA effect of NOK ~300 million\*
- Technology implementation program established to tailor-make spin-off packages/solutions for other electrolysis lines

Potroom erection, incl. steel structure

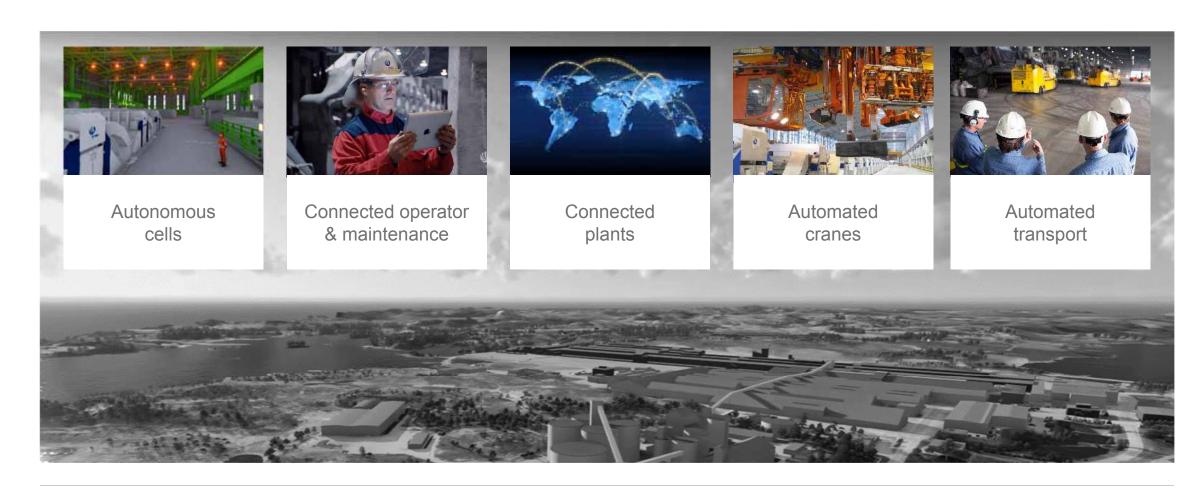




<sup>\*</sup> Calculation based on actual EBITDA margin in 2015

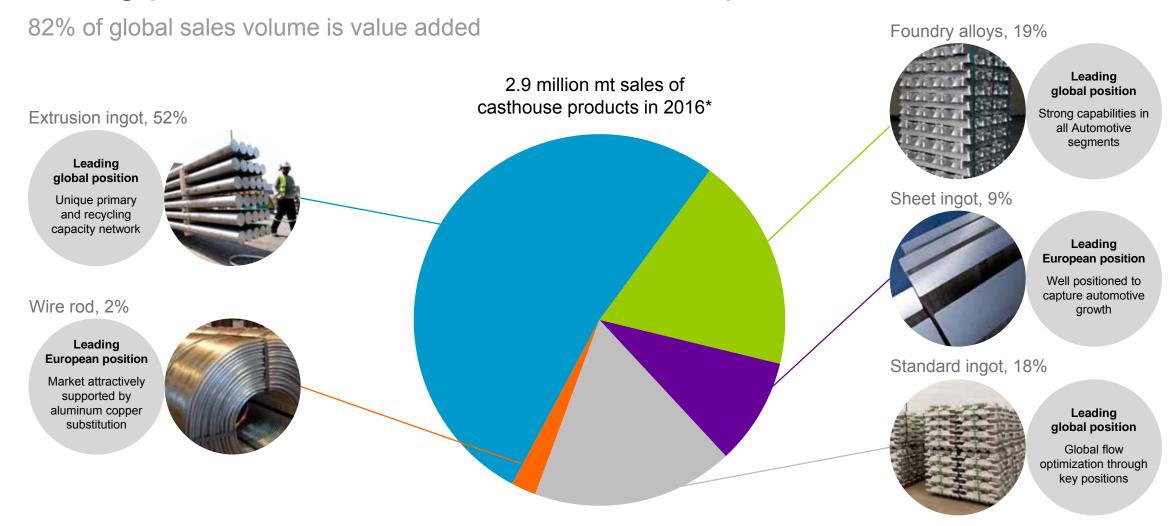
## Karmøy Technology Pilot: a step on the way to a digital future

Smelter 4.0





## Strong position in value-added casthouse products

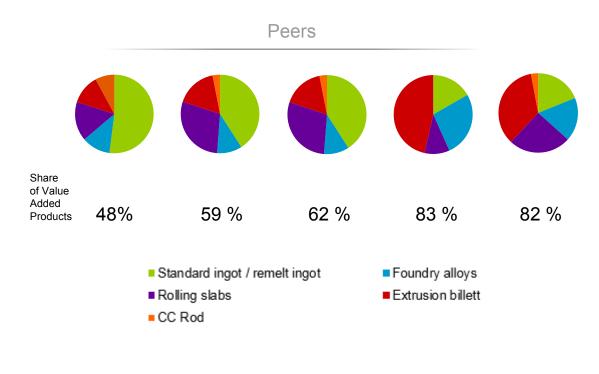


<sup>\*</sup> Metal Markets casthouse products sales estimated for 2016, excluding ingot trading from primary and remelt sources



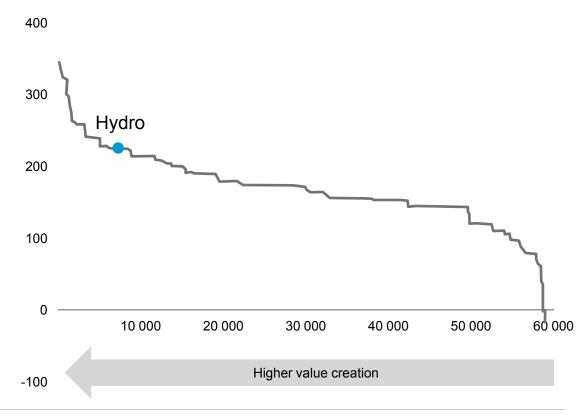
# Value added products strategy creates substantial value and supports competitive cash cost position for smelters

Share of 2016 value added production\* in % of total primary casthouse production\*\*

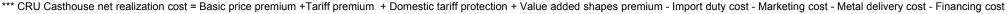


CRU Casthouse value creation curve 2016 (net realisation)\*\*\*

By company, USD per mt



<sup>\*\*</sup> Source: For peers CRU figures, Hydro own figures for Hydro (equity 2016 estimated production, including sheet ingot production at Neuss). Peers include Rusal, RTA, Alcoa, EGA. Primary casthouse production is defined as casthouse production at smelters.





<sup>\*</sup> Casthouse products ex. standard ingot defined as value added products

#### Market differentiation to further grow value added products position

Core differentiators

- Quality Leadership
- Lead Time and Delivery Performance
- Commercial & Technical Services
- R&D Development and Cooperation

Automotive feasibility studies



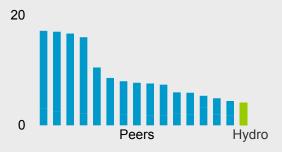
Crash alloy development



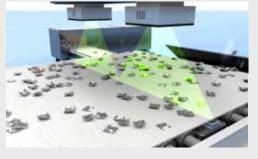
Differentiation factors trending upwards

- Low Carbon Footprint
- Recycling capabilities for post consumed scrap

Primary total emissions, in tonne CO<sub>2</sub>/t al\*



Hydro scrap sorting technology

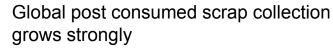


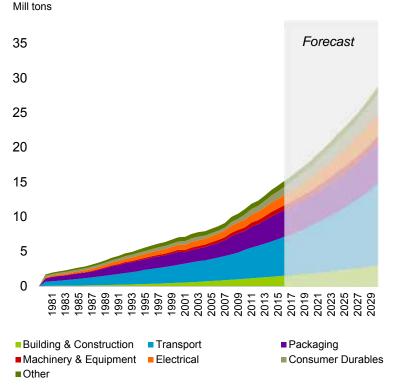


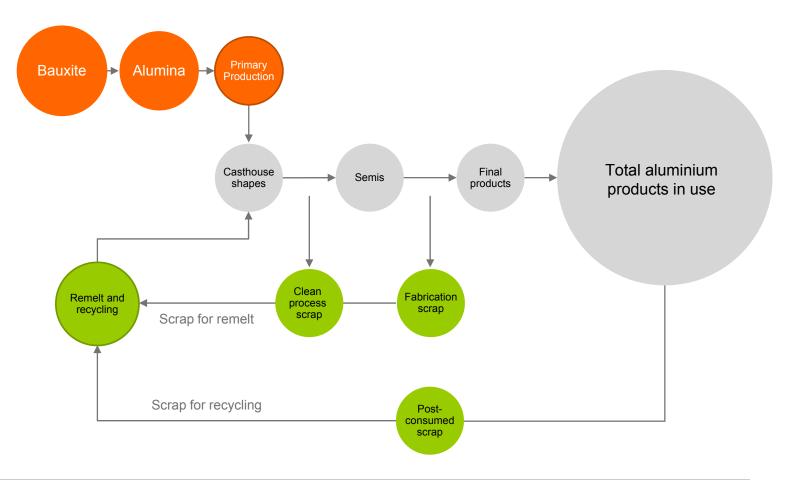
<sup>\*</sup> Source: CRU, Hydro's consolidated share

## Recycling - increasingly important part of the aluminium value chain

Identified scrap forms: clean process scrap, fabrication scrap, post-consumed scrap



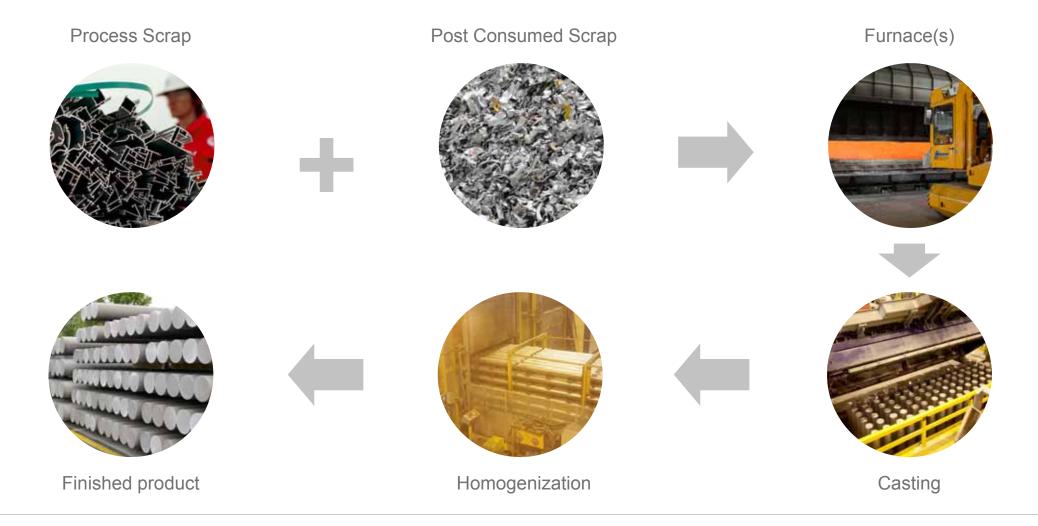






<sup>\*</sup> Source: GARC

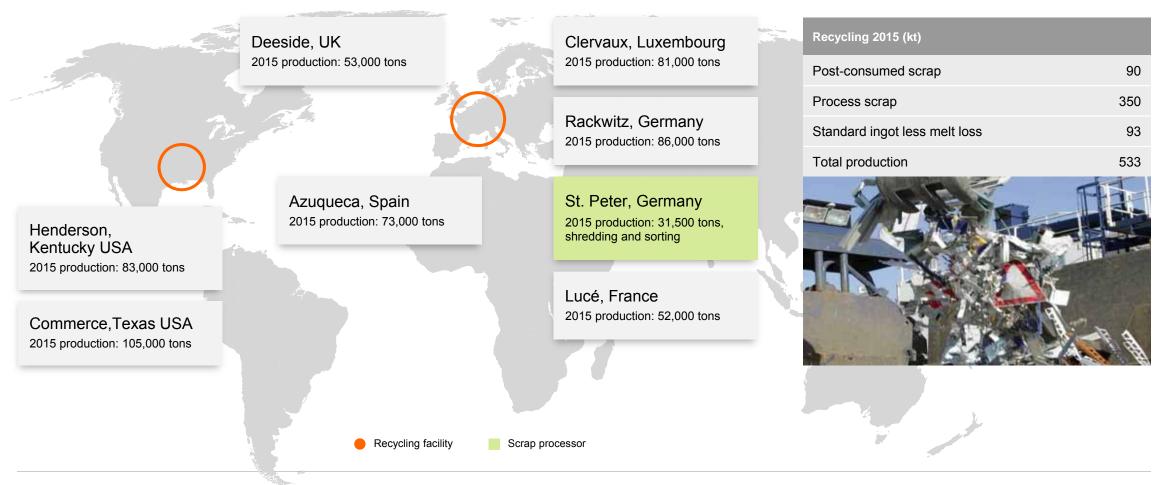
## Recycling process - from scrap to finished products





## Developing remelters into recycling plants

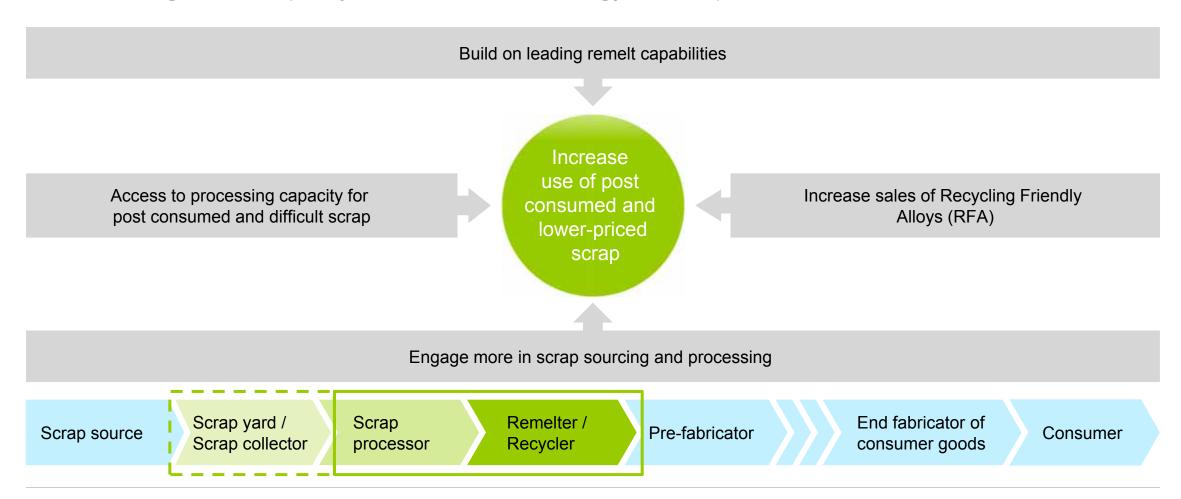
Expanding the use of post consumed and lower priced scrap





### Recycling strategy in Primary Metal

Increase margins and capacity utilization, reduce energy consumption and emissions





#### Key drivers in Primary Metal recycling

Post-consumed-scrap usage and RFA sales

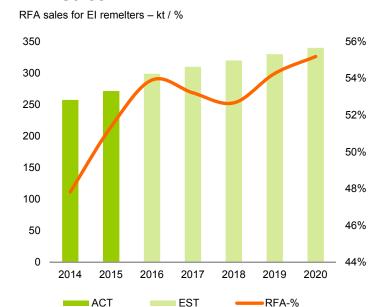
## Targeting 100% increase in post consumed scrap usage

Post Consumed Scrap Usage - ktons / %



Usage of post consumed scrap to increase from ~75 000 mt in 2014 to ~150 000 mt in 2020 (~23% of total)

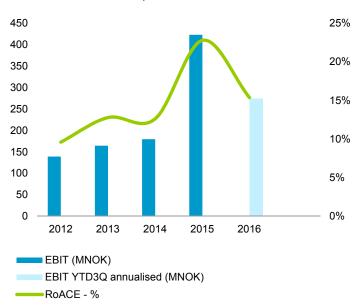
## Targeting 40% increase in RFA Sales



Sales of Recycling Friendly Alloys (RFAs) from remelters to increase by  $\sim \! 100$  kt from 2014 to 2020 (more than 50% of total)

## Positive earnings development in Recycling

EBIT and RoaCE for remelt portfolio - MNOK/%



Remelters generated an average EBIT of almost 250 MNOK and a RoaCE of ~15% during the last 5 years



## Primary Metal mid-term goals

Creating shareholder value by strengthening relative cost position through lean operations and technology

Ambitions	Target	Timeframe	Progress <sup>1</sup>	Status
Improve safety performance, strive for injury-free environment	TRI <2	2020	2.72	•
Realize ongoing improvement efforts Better Primary Metal	BNOK 1	2019	~300 MNOK	
Realize technology-driven smelter capacity creep	200,000 mt/yr	2025	35,000 mt/yr	
<ul> <li>Verify world's most energy efficient primary technology, including spin-off elements, with the Karmøy technology pilot</li> </ul>	Start production	2H 2017	~70% complete	•
<ul> <li>Increase post-consumed scrap recycling to improve margins and environmental footprint</li> </ul>	150,000 mt/yr	2020	88,000 mt/yr	

## Better Bigger Greener



<sup>1)</sup> Based on 2016 estimate unless stated otherwise 2) YTD Oct-2016, own employees

Ambition on track and on target

Ambition behind plan, but on target

Ambition will not meet the target





## Bauxite & Alumina

Eivind Kallevik Simon Storesund Capital Markets Day 2016

## Hydro is Brazil's #1 aluminium company

No.1 in bauxite No.1 in alumina No.1 in aluminium

Hydro owns 5% of Brazil's largest bauxite mine and 86,3% of Brazil's second largest bauxite mine

Hydro owns 92.13% of Brazil's and the world's largest alumina refinery

Hydro owns 51% of Brazil's and South-America's largest aluminium smelter in operation

Hydro has 50% market share in Brazilian bauxite trading and refines more than half of Brazil's alumina





## Bauxite & Alumina: Accelerating performance



Participation in Barcarena Urban Development Plan



Paragominas awarded as best Brazilian mine by EXAME



Commissioning of press filters at Alunorte

CMD 2015

All-time low implied alumina cost



Vale/Hydro negotiations on MRN halted



Ball mill and pipeline repairs completed



Highest 12-month average production





CMD 2016

### Bauxite & Alumina strategic priorities

Aiming for operational and commercial leadership

## Better

- Strive for an injury free environment
- Continue operational improvement drive, ensure world class operations
- Price bauxite and alumina on own fundamentals

# Bigger

- Secure and develop resources for future decades
- Further mature CAP project and Paragominas expansion
- Develop production creep potential at Alunorte

## Greener

- Further improve organizational capabilities and HSE performance
- Deliver on reforestation ambition 1:1 in 2017



Improvement program ahead of 2016 plan, 2019 target unchanged

Strong progress on operational and commercial efforts

#### Improvement categories

#### Alunorte

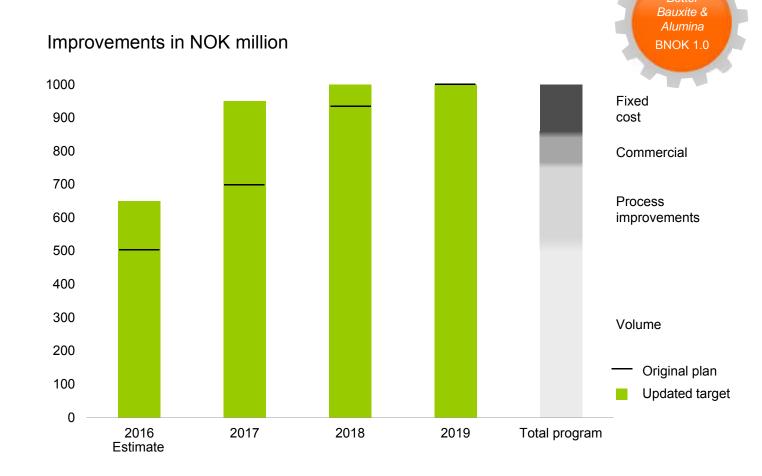
- Debottlenecking Alunorte to above nameplate capacity
- Improve energy consumption and matrix
- Reduce fixed costs

#### Paragominas

- Support production above nameplate capacity
- Reduce fixed costs

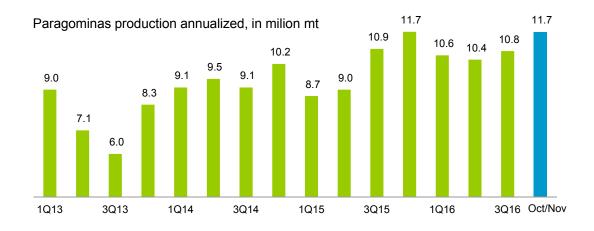
#### Commercial

- Reduce demurrage costs
- Lift optimization margin





## Paragominas: Supporting production above nameplate capacity



YTD 2016 production up 5% from strong 2015

- Successfully implemented Bauxite & Alumina Business System
- Improved equipment conditions, operating standards and process control
- Improved ore quality control in the mining process

#### Tailing dam investments on track



- BRL 600 million investment on time and budget
- Improved safety of disposal areas, reduced environmental footprint and cost due to higher solid concentration of tailings

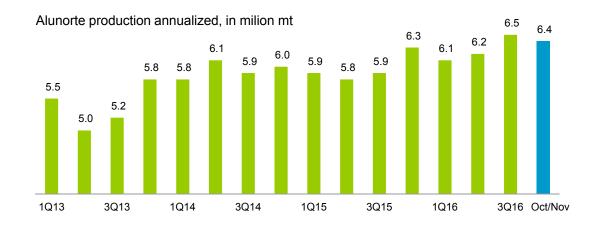
#### Reforestation ambition well on track



- 1:1 reforestation by 2017, progressing according to plan
- Research partnerships creates basis for state-of-the-art approach to mining rehabilitation



#### Alunorte: Record run-rate production above nameplate capacity



#### Significantly improved production stability

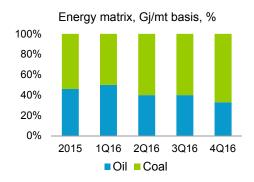
- 6.3 million mt last 12 months production at nameplate capacity
- Improved equipment effectiveness and process stability based on Bauxite & Alumina Business System
- Further debottlenecking needed for 6.6 million mt target

#### Red mud deposit investments on track



- BRL 1 billion investment on time and budget
- State-of-the-art dry disposal of bauxite residue using press filtration
- Reduced required storage area, environmental footprint and cost

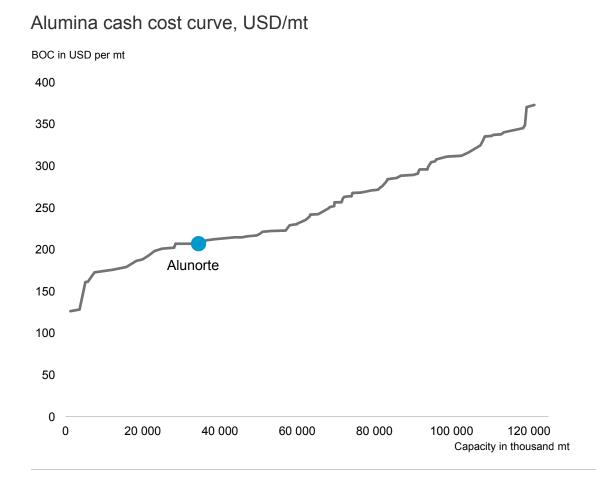
#### Optimized energy mix and raw material efficiency



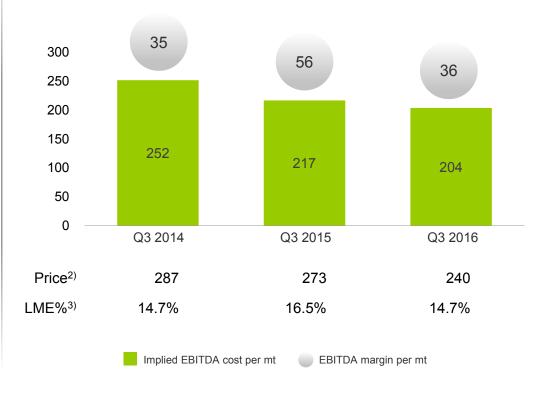
- Energy cost improved by 8% compared to Q3 2015
- Completed retrofit of 2 coal boilers
- Evaluating potential for usage of gas



#### Competitive alumina cost position



Implied alumina cost and margin, USD/mt 1)



Source: CRU, Hydro



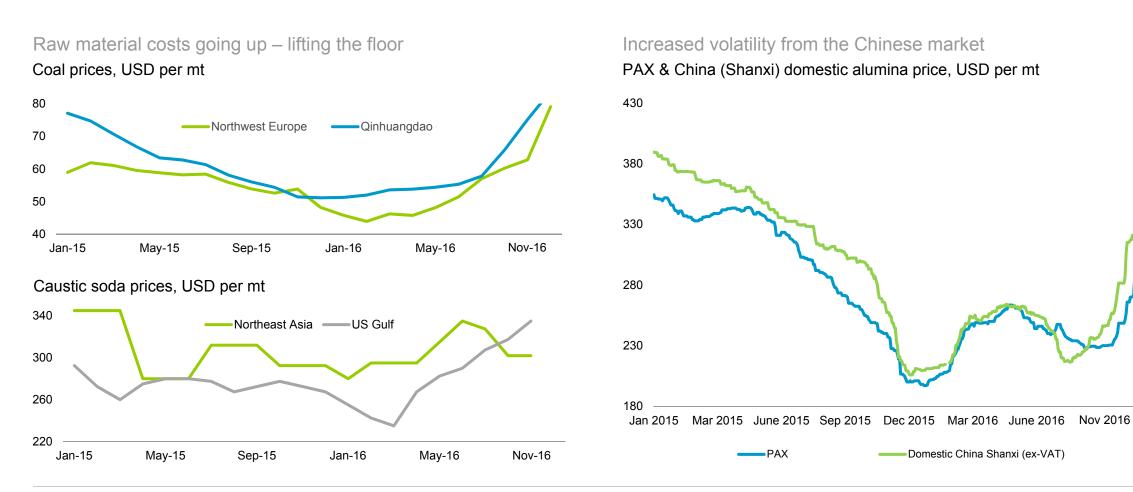
<sup>1)</sup> Realized alumina price minus underlying EBITDA for B&A, per mt alumina sales

<sup>2)</sup> Realized alumina price

<sup>3)</sup> Realized alumina price as % of three month LME price with one month lag

## China driving alumina prices up

Key factors: Chinese smelter restarts on higher metal prices and seasonal inventory build-up



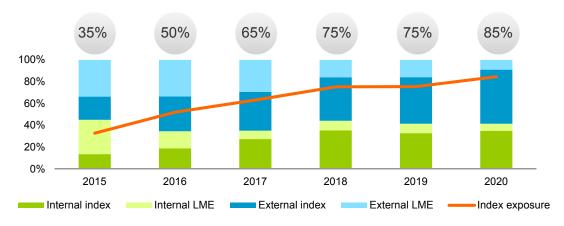
Source: Platts, IHS



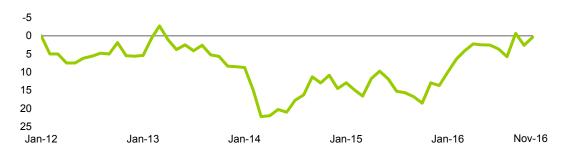
## Pricing alumina and bauxite on own fundamentals

Platts alumina index well established as the common pricing mechanism

#### Hydro alumina sales exposure to index pricing



#### Alumina Atlantic discount\*, USD per mt



#### **Alumina**

- New contracts: 100% sold on index, except Hydrate and short-term contracts, normal terms 2-10 years
- LME-linked contracts: priced at 14-15% of LME 3M
- External sales 3-4 million mtpa: ¾ Atlantic and ¼ Asia

#### Bauxite

- Mostly 3-4 year contracts based on % of PAX + fixed USD/mt element
- Premium quality bauxite
- External sales 2.5-3.5 million mtpa: ¾ Atlantic and ¼ Asia

#### Atlantic Alumina market

Discount to Pacific market reduced due to refinery closures in the Atlantic

Source: CRU



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

### Strong commercial organization maximizing the value of B&A assets

Strategic sales and purchases to capture long-term value



- Secure LT-sales contracts (Index & CIF terms)
- Increased focus on the Hydrate market
- 3<sup>rd</sup> party sourcing to strengthen global market share and optimization potential

Utilizing China domestic entity



- Established in May 2015
- Improved market intelligence and customer insight due to proximity to the Chinese market
- Potential to increase margins

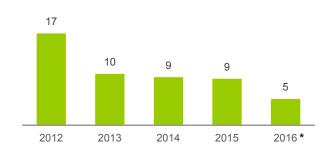
#### Supply chain optimization



- Maximize value of large shipment sizes
- Trading & swapping to reduce logistical cost
- Freight optimization

#### Reduced demurrage cost on optimized scheduling

#### Demurrage costs Alunorte, USD million



- Close cooperation between operations and commercial
- Focus on improved scheduling



<sup>\*</sup> YTD October 2016 annualized

### Two key focus areas for commercial in 2016

Pursuing attractive market opportunities to lift margins

#### Hydrate alumina market (chemical grade)

- Hydrate alumina before the calcination process
- More stable hydrate prices compared to metal grade alumina
- US: price negotiated annually fixed in USD/mt
- New long-term sales contracts established in the US
- Shipments to Japan & US in 2016: 600-750,000 tons\*

#### Examples of products









#### Utilizing China domestic entity

- Gaining market intelligence and customer insight
- Taking advantage of price arbitrage between China and rest of the world
- Warehousing capability and increased flexibility
- Selling in smaller lots & local currency more than doubling number of customers
- Total sales to China 2016:
  - Alumina: ~0.5 million mt
  - Bauxite: ~1.4 million mt







<sup>\*</sup> In alumina equivalent tons. Total sales of hydrate: 600-750,000 tons, equivalent to 400-500,000 tons of alumina using a factor of 0.654

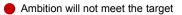
### Bauxite & Alumina mid-term goals

Creating shareholder value through efficient and commercial use of raw materials

Ambitions	Target	Timeframe	Progress <sup>1</sup>	Status
Improve safety performance, strive for injury free environment	TRI <2	2020	1.42	
Realize ongoing improvement efforts Better Bauxite&Alumina	BNOK 1.0	2019	650 MNOK	
<ul> <li>Lift alumina production through stabilization and debottlenecking</li> </ul>	6.6 mill mt/yr	2018	6.3 mill mt/yr <sup>3</sup>	
Lift bauxite production through debottlenecking	11 mill mt/yr	2018	10.8 mill mt/yr <sup>3</sup>	
Shift alumina sales to PAX-based pricing	>85 % PAX <sup>4</sup>	2020	~50% PAX <sup>5</sup>	
Deliver on reforestation ambition	1:1	2017	On track	

## Better Bigger Greener

Ambition behind plan, but on target





<sup>1)</sup> Based on 2016 estimate unless stated otherwise

<sup>2)</sup> YTD Oct-2016, own employees

<sup>3)</sup> YTD 2016 annualized

<sup>4)</sup> Based on annual sourced volumes of 2.3 million tonnes

<sup>5)</sup> Based on sourcing volumes of 2.5 million tonnes for 2016

Ambition on track and on target



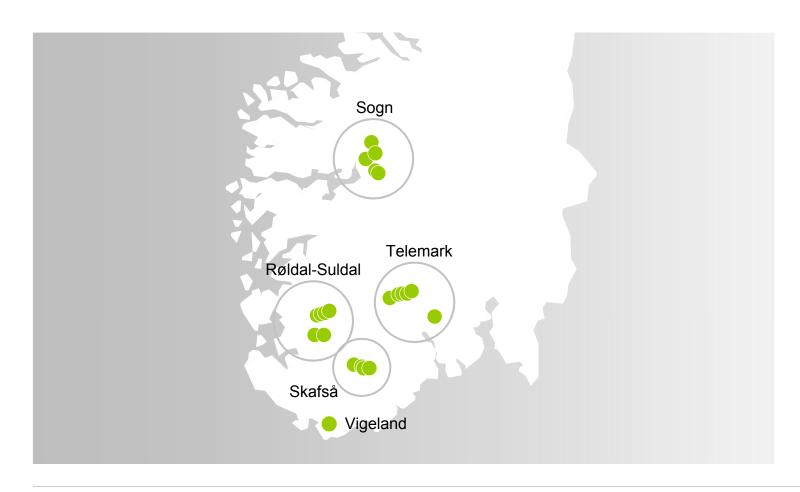


# Energy

**Arvid Moss**Capital Markets Day 2016

### Energy asset overview

The second largest hydropower operator in Norway



- 3 production areas
- 26 power stations
- Annual production 10 TWh
- Net spot sales 2-6 TWh
- 41 generators/2260 MVA/ 2040 MW
- 190 employees
- Competence center on energy for Hydro's aluminium business



### Energy has a dual mission in Hydro

Strong, sustainable value creator and energy provider throughout the value chain



To own, operate and maximize value of Hydro's energy assets



To provide competitive power sourcing and global energy competence



### Energy: Securing power supply, maximizing asset value



Signed wind power contract with Nordic Wind Power DA, Norway



New power contracts to Neuss, Germany. Fully supplied until 2025



Increased activities to improve industrial framework conditions in Brazil

CMD 2015

Hydro Energia in operation in Brazil



Amendment to law on ANS/DA Industrial ownership approved in Parliament



Midtlæger power plant in operation



Mannsberg power plant in operation





CMD

### Energy strategic priorities

## Better

- Realize full potential of strong asset base and competencies
- Further improve operational and commercial performance
- Provide competitive global energy sourcing and competence

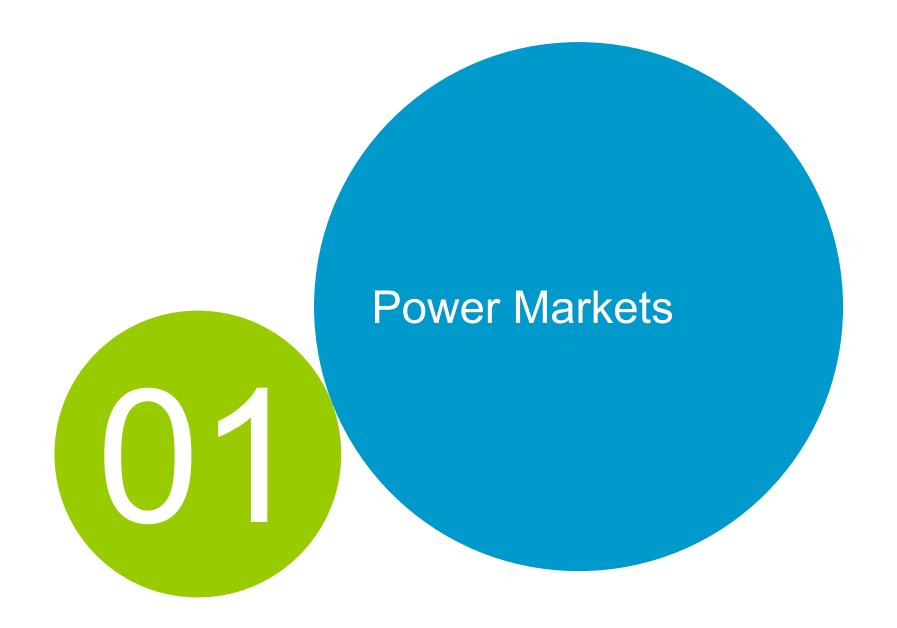
# Bigger

- Mature captive growth opportunities
- Raise income potential from market operations and commercial optimization
- Leverage value from Nordic power surplus

# Greener

- Capitalize on strong climate position over time
- Capture value of the green certificate scheme in new growth projects
- Promote responsible energy policy in the regions where Hydro operates



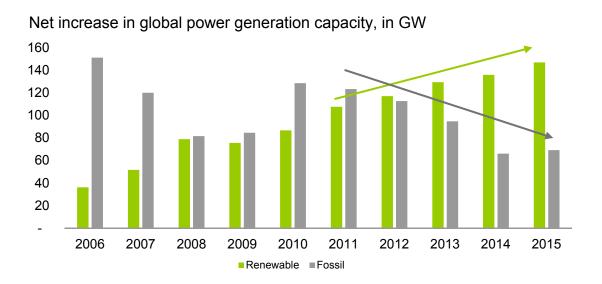


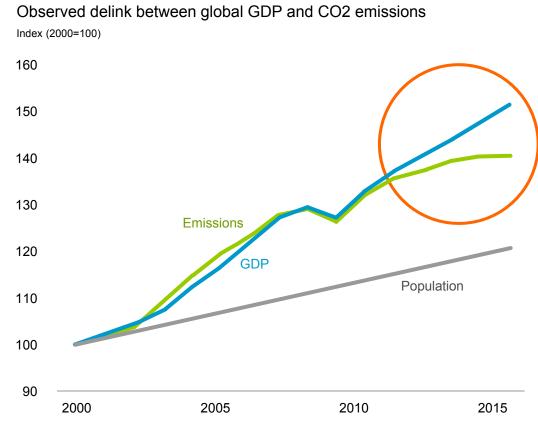


### Impact of global «Energiewende» becomes evident

Transitioning to a low carbon, reliable and affordable energy supply

- New renewable generation continues to surprise
- Unsubsidized solar and wind power cost projects at record-low 30 USD/MWh
- Change of behavior among power industry players globally continues after Paris-agreement





Source: BNEF, OECD, UN, UNFCCC



### Main factors influencing the market prices for power

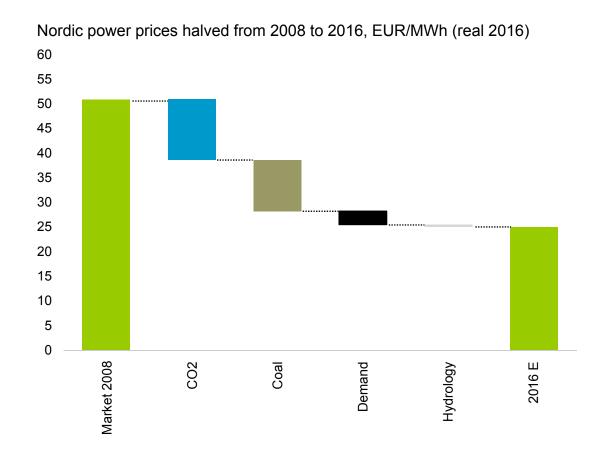
A geographical break-down

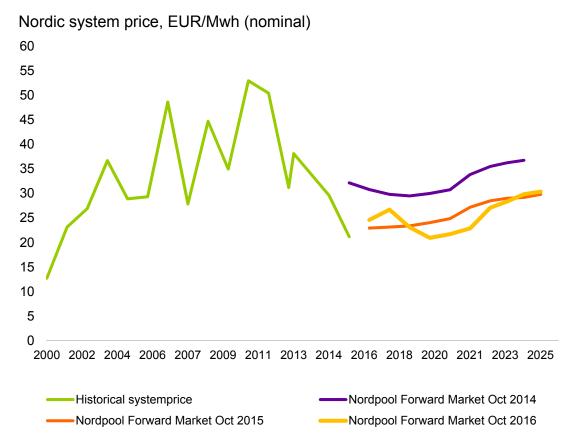




### Nordic power prices decline over the last years

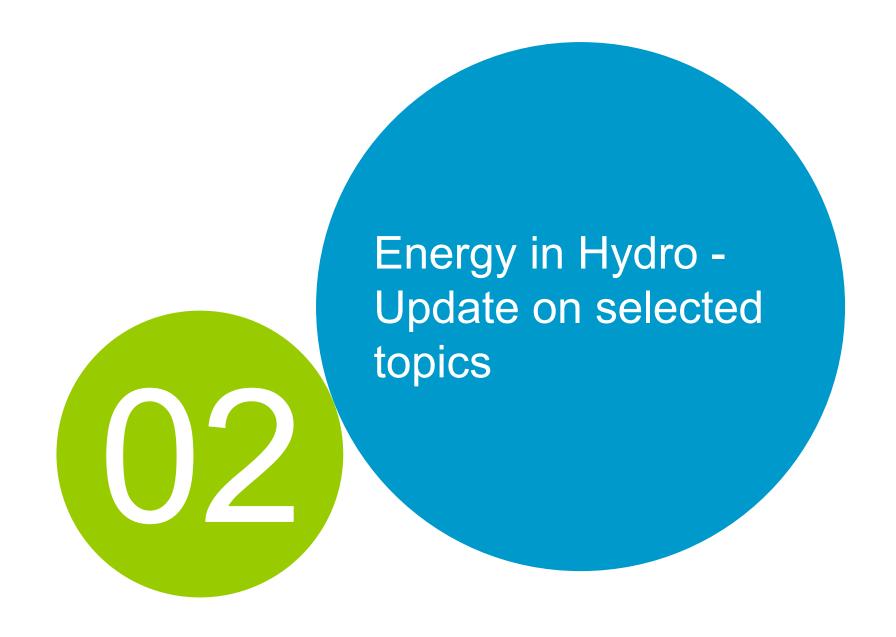
Lower CO2 and coal prices as key factors. Forward curve reflects current coal, CO2, gas prices and supply side





Source: Nordpool Spot. Prices expressed in yearly averages







### Value creation in Energy dependent on wide array of factors





### Contractual obligations impacting Energy figures

#### Repricing of internal contracts incurs losses

#### 2008:

 Hydro entered into a 250 MW contract for 2013-2020 as part of longterm sourcing efforts to Norwegian smelters (incl Husnes),

#### 2012:

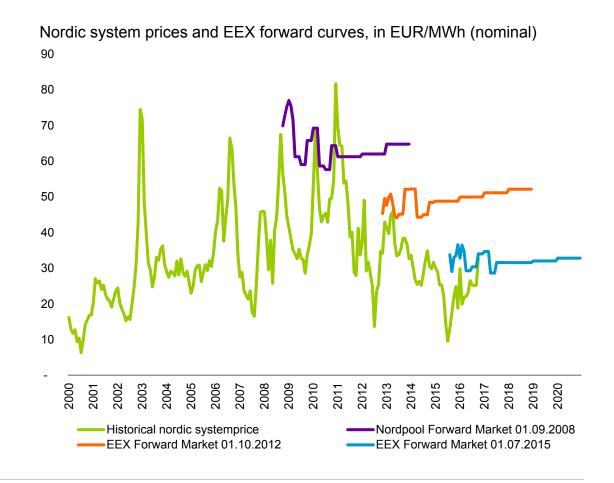
- Geographically optimization of power contract, distributing volumes to Germany (Neuss) and Norway
- Contract volumes allocated to Neuss from 2013-2017 priced at levels achieved in external long term contract
- Current realized losses in Energy of ~200 MNOK pa

#### 2015:

- New external sourcing to Neuss for 2018 and forward internal contract allocated to Neuss priced at similar levels
- Losses in Energy increasing with ~250 MNOK from 2018, similar improvement in Rolled Products

#### 2021:

 Expiry of contract, improvement of 4-500 MNOK in Energy's result\* without other negative effects for other business areas

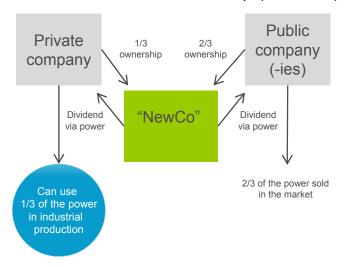




# Maintaining industrial ownership of RSK volumes and value within the reversion regime

June law amendment allows private industrial ownership and physical hydropower offtake from minority stakes

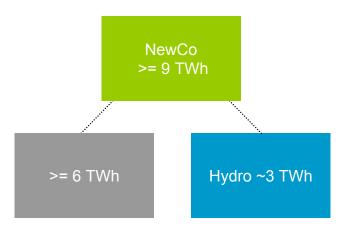
#### Model for industrial ownership (ANS/DA)



Approved model for hydropower JVs:

- Maximum 1/3 private ownership maintained
- Allow private owners access to physical power
- Pro-rata power offtake in line with ownership share

Merge into a larger publicly-owned asset with one or several owners

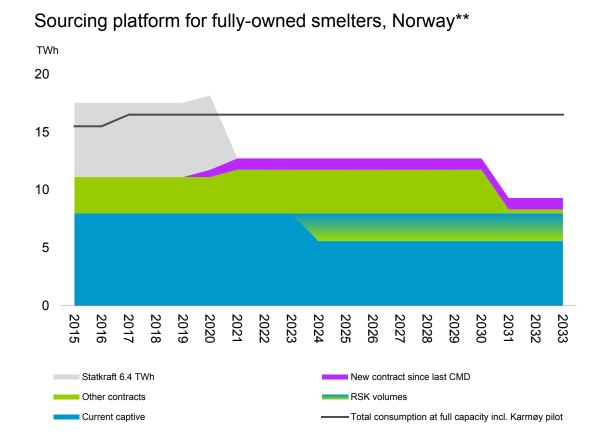


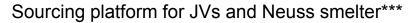
- Retain full production as part of a larger asset
- Max 1/3 Hydro (private) ownership
- No reversion after such a transaction
- Need partner(s) with min 6 TWh to maintain equity volume

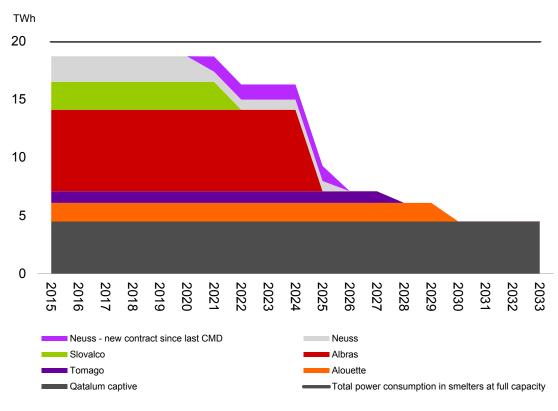


### Securing long-term competitive power sourcing for smelters

2.3\* TWh/year from 2021 sourced in Norway and Germany since last CMD









<sup>\* 1</sup> TWh from 2021 relates to fully-owned smelters, Norway, 1.3 TWh to Neuss, Germany

<sup>\*\*</sup> Net 8 TWh captive assumed available for smelters

<sup>\*\*\*</sup> Albras and Slovalco on 100% basis

### Providing competitive global energy sourcing and competence

Commercial competence, analytical capability and market insight

B&A	Primary Metal	Rolled Products				
Assist with updating of energy sourcing strategies						
	Analyze energy markets and provide insight					
	Optimize electric power portfolio					
	Lead power sourcing negotiations					
Improve security of power supply and manage grid agendas						
<ul> <li>Overall energy matrix optimization</li> <li>Increased Energy presence in Brazil to lead the sourcing processes and explore commercial opportunities</li> </ul>	<ul> <li>4.7 TWh power sourcing secured for the Norwegian smelter portfolio 2021-30</li> <li>1.3 TWh power sourcing for the Norwegian smelter portfolio 2031-40*</li> </ul>	<ul> <li>Execution of hedging strategy</li> <li>Gas and power sourcing for rolling mills</li> <li>Rheinwerk fully supplied up to 2025</li> </ul>				
Alunorte fuel switch evaluations further matured	<ul> <li>Increased focus on security of supply globally</li> </ul>					
<ul> <li>Extensive work on the Brazilian regulatory framework</li> </ul>	<ul> <li>Remelter sourcing strategy for gas and power</li> </ul>					
<ul> <li>Strengthening Norsk Hydro Energia Ltda to support the B&amp;A activity</li> </ul>						



<sup>\*</sup> Nordic Wind Power with volumes until 2039. In 2040 330 GWh is sourced

### Energy mid-term goals

Creating shareholder value by maximizing value of own hydropower assets and ensuring reliable and competitive energy supply for Hydro

Ambitions	Target	Timeframe	Progress <sup>1</sup>	Status
Improve safety performance, strive for injury free environment	TRI <2	2020	0 YTD <sup>2</sup>	•
<ul> <li>Robust industrial ownership for RSK – maintain physical power offtake post 2022</li> </ul>	3.0 TWh	2022	In progress	•
<ul> <li>Deliver additional production volumes through upgrades/sustaining investments</li> </ul>	~0,1 TWh	2020	~50%	
<ul> <li>Secure new competitive sourcing contracts in Norway post 2020<sup>3</sup></li> </ul>	4-6 TWh	2020	1 TWh	
<ul> <li>Support competitive energy supply as well as energy policy and framework development for other business areas</li> </ul>	Progress	Continuous	In progress	•

## Better Bigger Greener



<sup>1)</sup> Based on 2016 estimate unless stated otherwise

<sup>2)</sup> YTD Oct-2016, own employees

<sup>3)</sup> The target of 4-6 TWh reflects the remaining sourcing need for the Norwegian smelters at Capital Markets Day 2015. Since then a sourcing contract of TWh has been entered into. Prior to CMD2015 sourcing contracts of 3.7 TWh were signed for the period 2021-2030 reflecting a total sourcing need of 8-10 TWh, and an additional contract for 0.33 TWh/yr for 2031-2040

Ambition on track and on target

Ambition behind plan, but on target

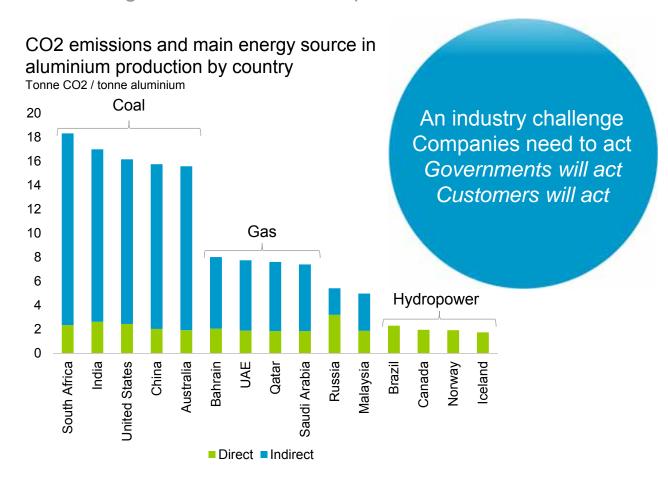
Ambition will not meet the target

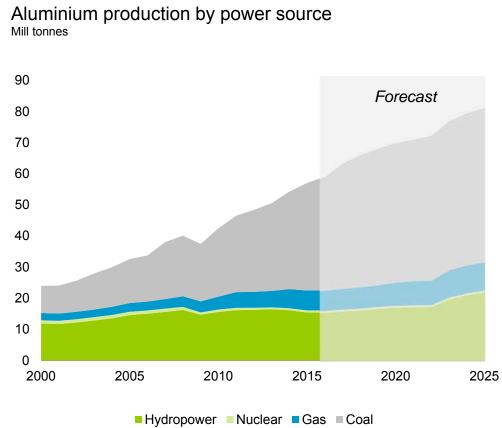




### The climate paradox

Increasing share of aluminium production is coal-based





Source: CRU



### Our global industry's most ambitious climate strategy

Carbon-neutral from a life-cycle perspective by 2020





### Lowering our life-cycle emissions through several measures



### World-class technology pilot and renewable energy

- Support for technology pilot
- Increased share of hydropower
- Improvement mapping



### Meeting the needs of the automotive industry

- New casting technology in Norway
- New automotive sheet line in Germany



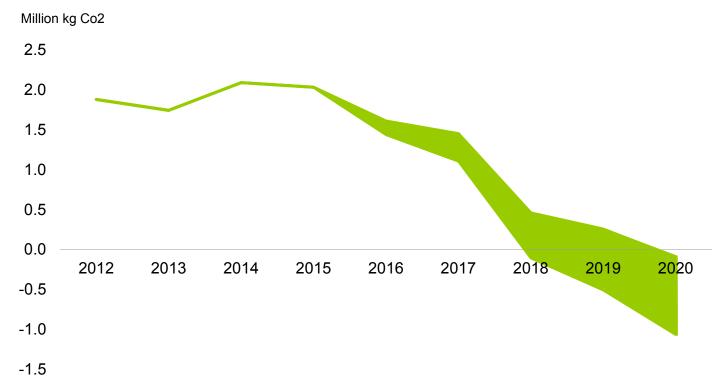
#### Strengthened position

- New used beverage can recycling line in Germany
- Recycling moved from France to Norway
- New and unrivalled sensor technology developed by Hydro ensures circular product loops
- Increasing post-consumed scrap recycling



### Hydro on track for 2020 target

Hydro's CO2 emissions from a life-cycle perspective



# Most important factors affecting 2020 target:

- Use phase benefits
- Recycling of post consumed scrap
- Own reductions in emissions



### Sustainability will become more and more important

Competitiveness and sustainability can go hand-in-hand





#### **Producers**







#### Users











#### Civil society















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Next event

Fourth quarter results
February 9, 2017

For more information see www.hydro.com/ir

