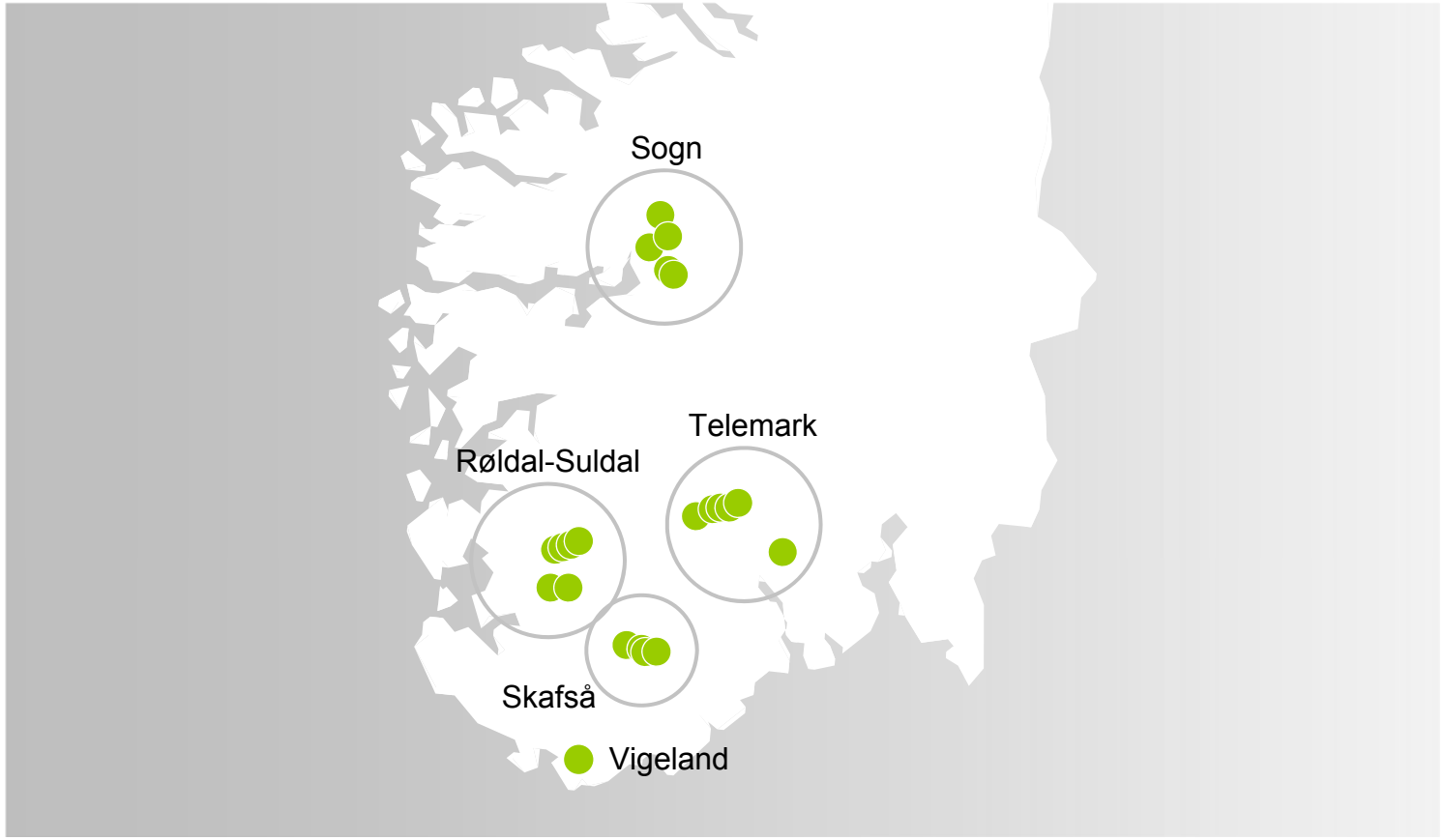
Energy

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

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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

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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

CMD 2016

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

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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

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01

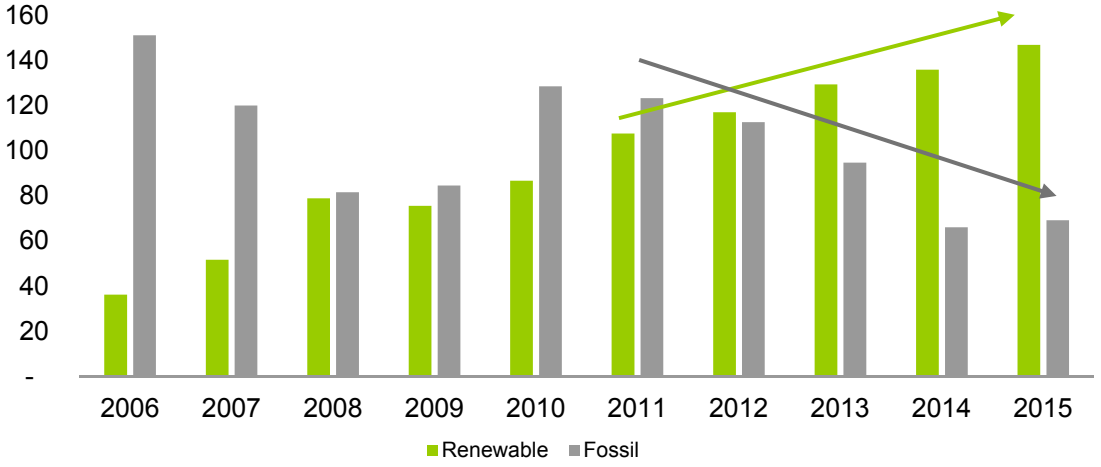
Power Markets

Impact of global «Energiewende» becomes evident

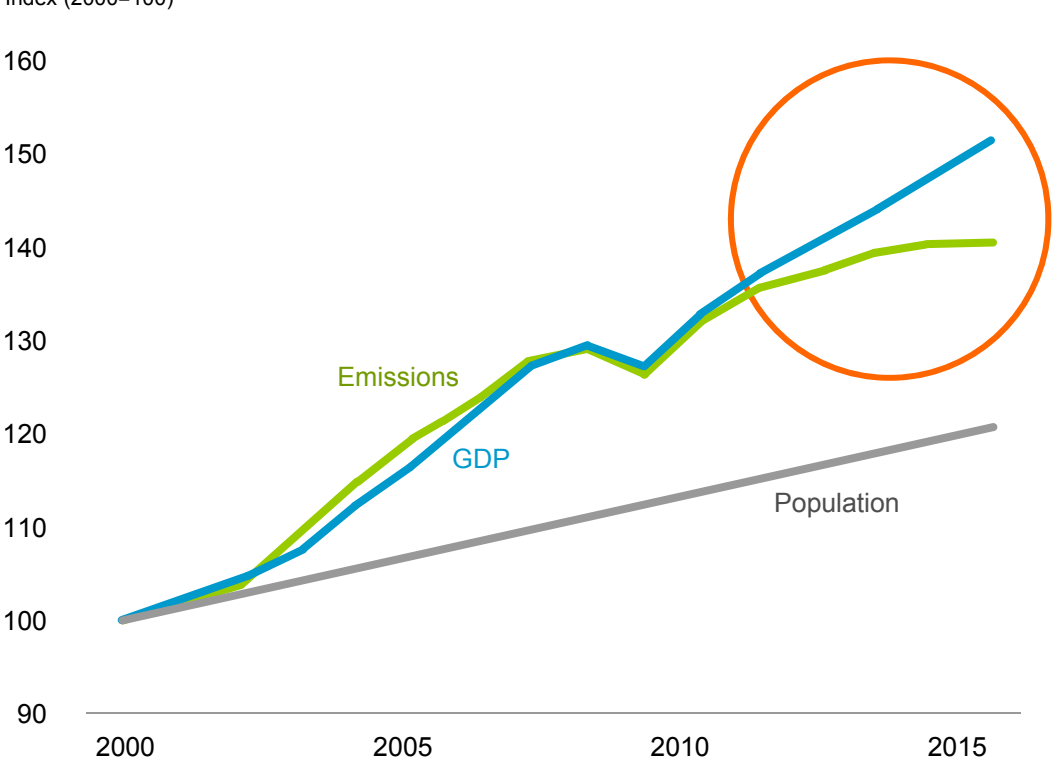
Transitioning to a low carbon, reliable and affordable energy supply

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

Net increase in global power generation capacity, in GW



Observed delink between global GDP and CO2 emissions



Source: BNEF, OECD, UN, UNFCCC

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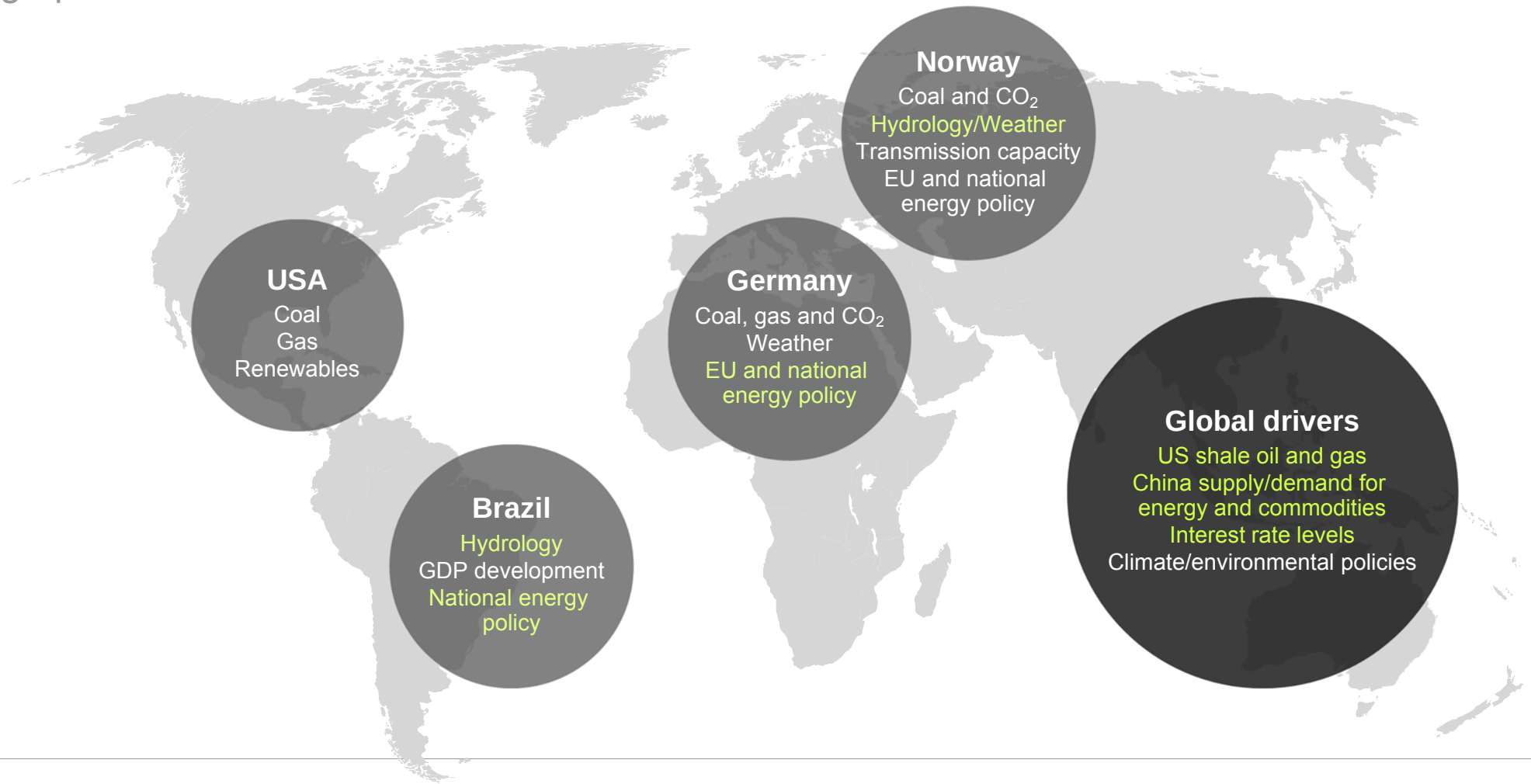
Main factors influencing the market prices for power

A geographical break-down



Based on consolidated figures mid-2015

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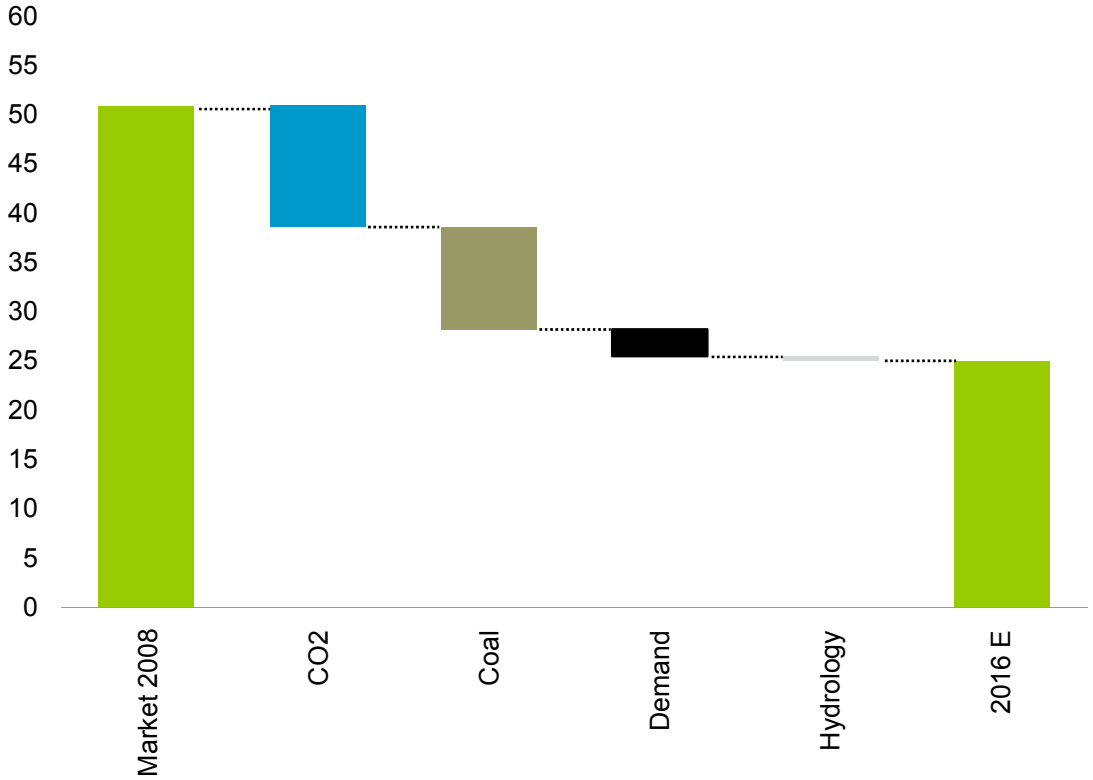
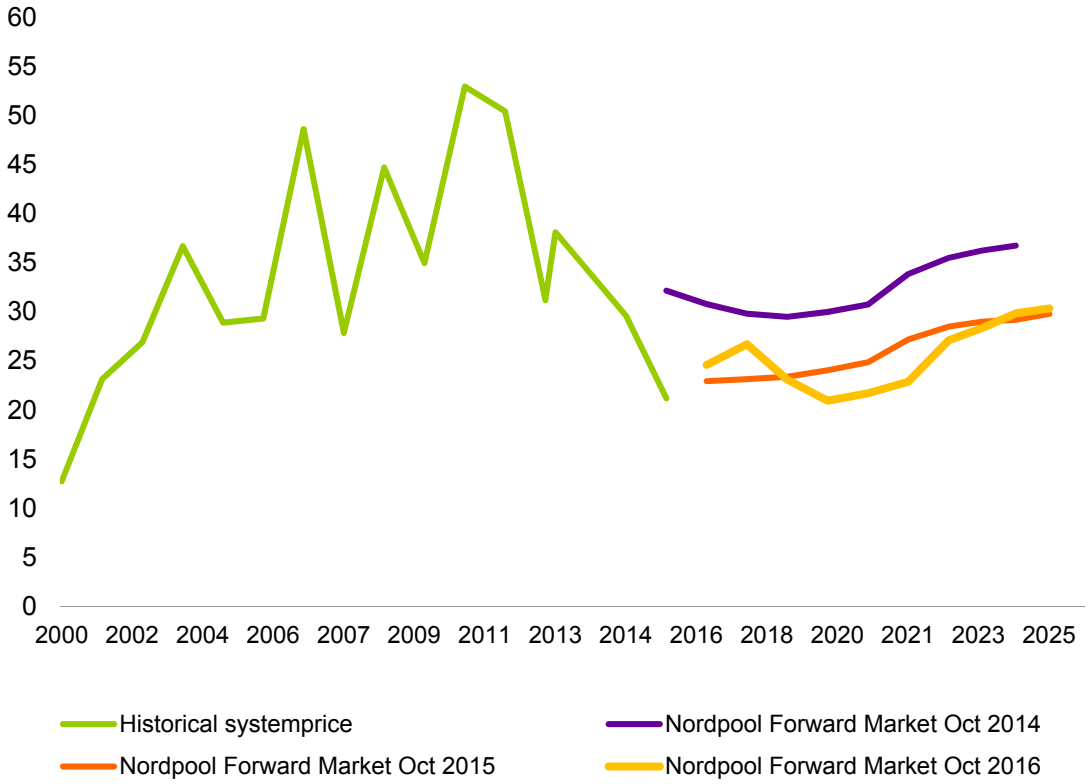
Nordic power prices decline over the last years

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

Nordic power prices halved from 2008 to 2016, EUR/MWh (real 2016)



Nordic system price, EUR/Mwh (nominal)



Source: Nordpool Spot. Prices expressed in yearly averages

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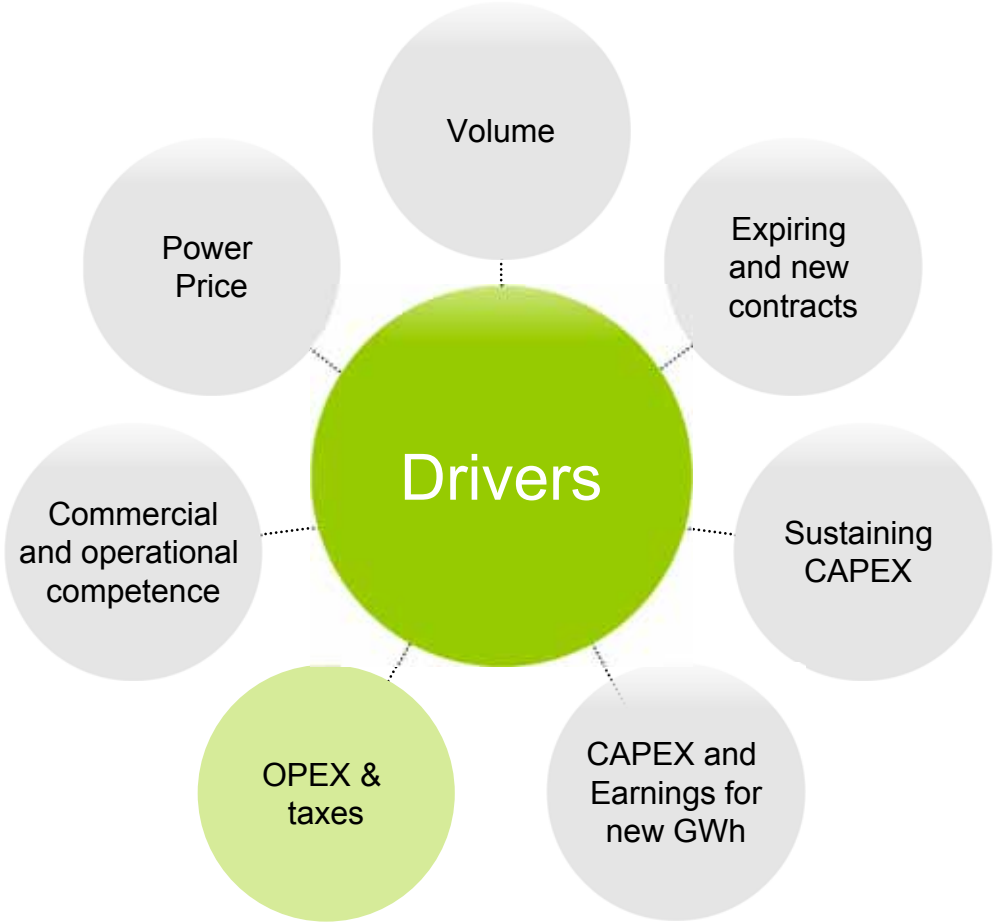
02

Energy in Hydro - Update on selected topics

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 long-term 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

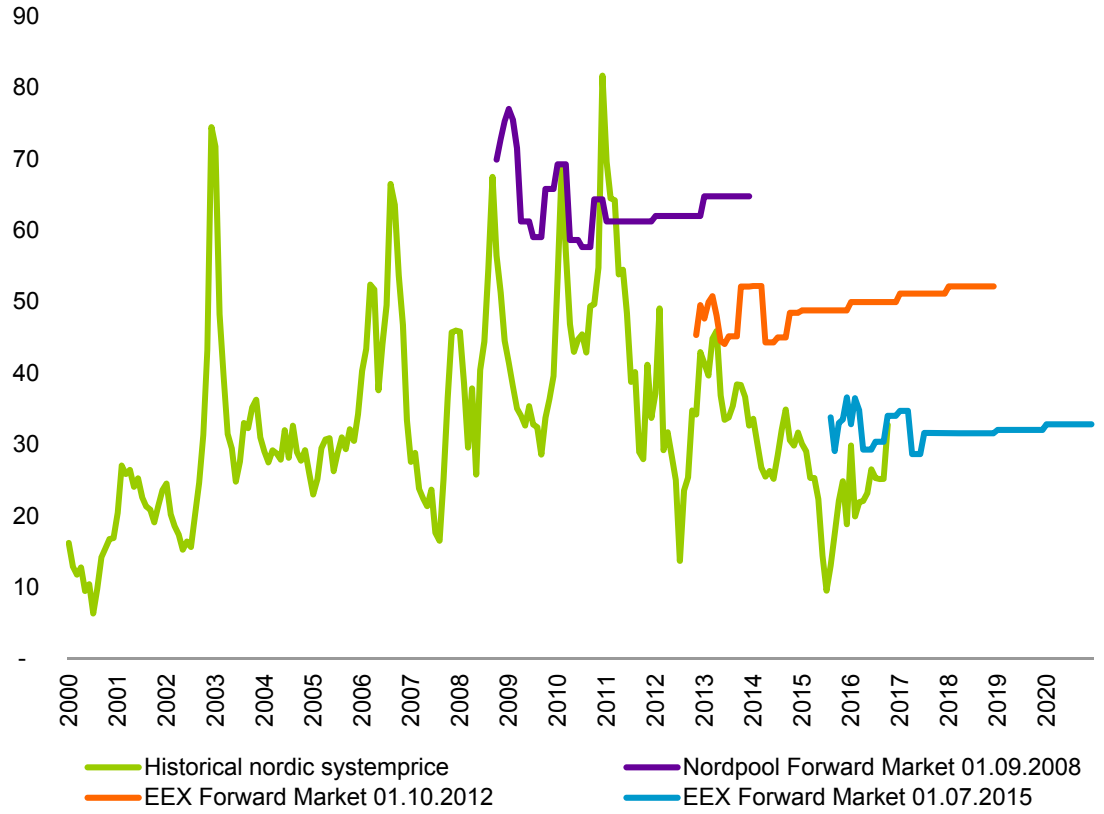
2015:

- 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

Nordic system prices and EEX forward curves, in EUR/MWh (nominal)



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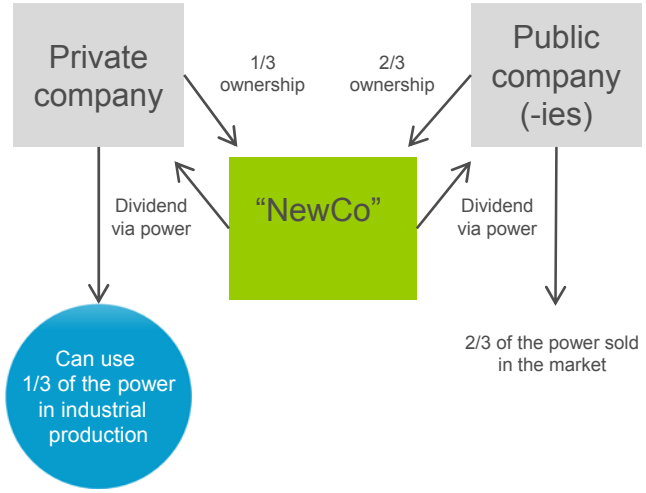
Maintaining industrial ownership of RSK volumes and value within the reversion regime

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

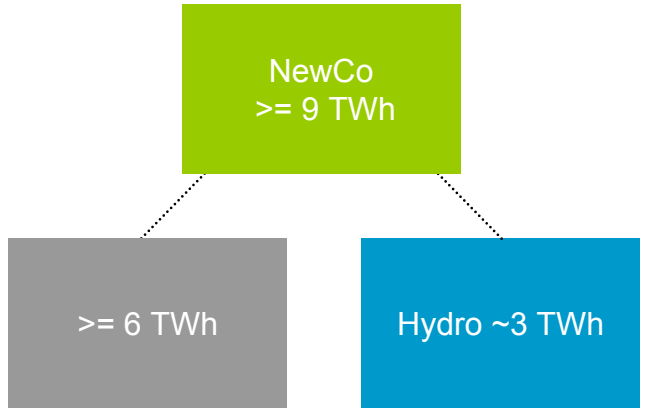
Model for industrial ownership (ANS/DA)



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

The diagrams on this slide are simplified for illustration purposes

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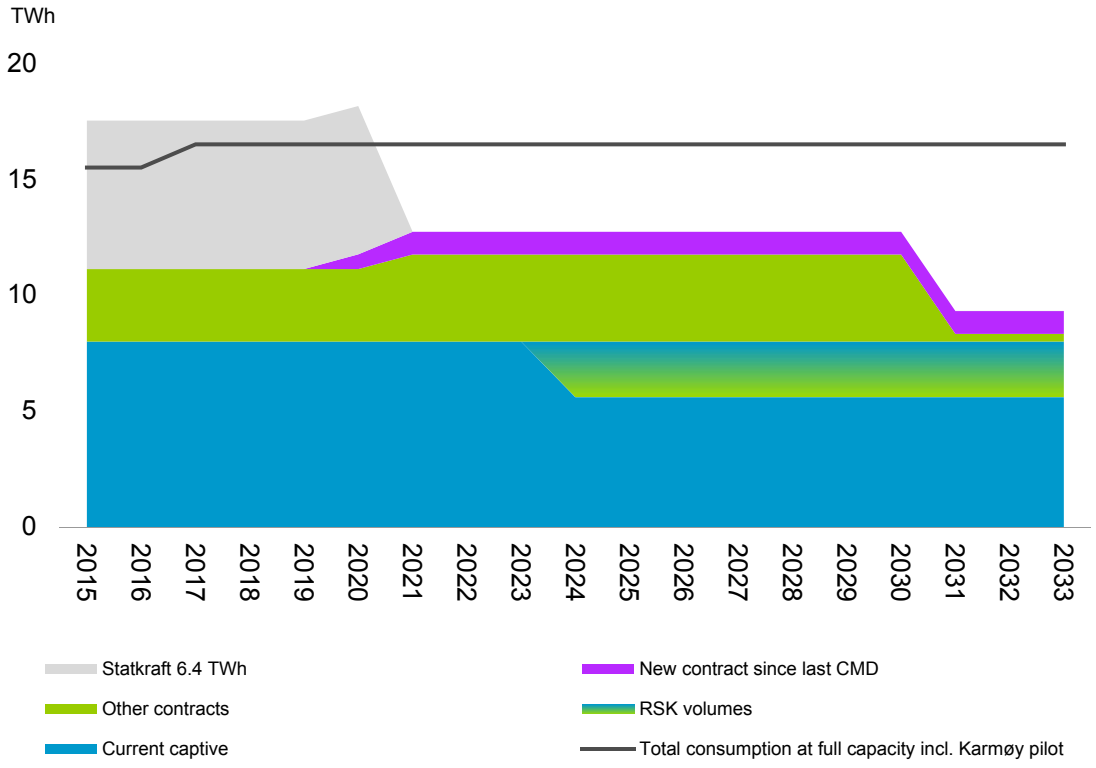
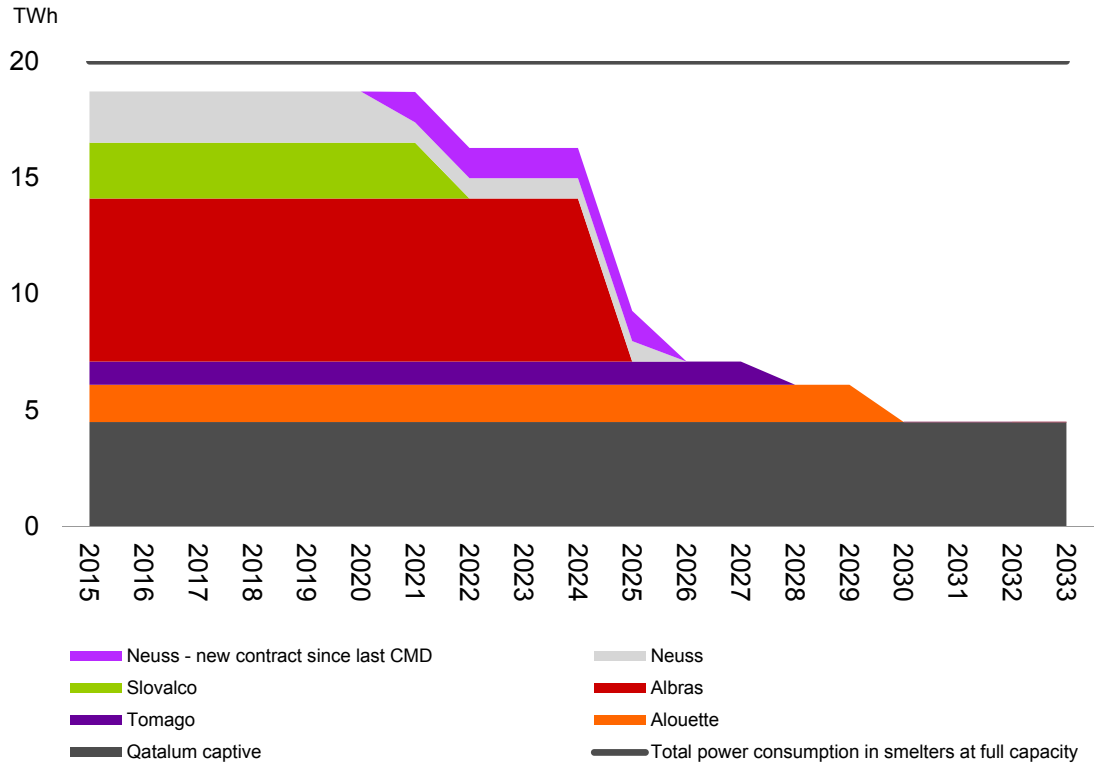
Securing long-term competitive power sourcing for smelters

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

Sourcing platform for fully-owned smelters, Norway**



Sourcing platform for JVs and Neuss smelter***



* 1 TWh from 2021 relates to fully-owned smelters, Norway, 1.3 TWh to Neuss, Germany
** Net 8 TWh captive assumed available for smelters
*** Albras and Slovalco on 100% basis

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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		
• Overall energy matrix optimization • Increased Energy presence in Brazil to lead the sourcing processes and explore commercial opportunities • Alunorte fuel switch evaluations further matured • Extensive work on the Brazilian regulatory framework • Strengthening Norsk Hydro Energia Ltda to support the B&A activity	• 4.7 TWh power sourcing secured for the Norwegian smelter portfolio 2021-30 • 1.3 TWh power sourcing for the Norwegian smelter portfolio 2031-40* • Increased focus on security of supply globally • Remelter sourcing strategy for gas and power	• Execution of hedging strategy • Gas and power sourcing for rolling mills • Rheinwerk fully supplied up to 2025

* Nordic Wind Power with volumes until 2039. In 2040 330 GWh is sourced

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

Better **Bigger** Greener

1) Based on 2016 estimate unless stated otherwise
2) YTD Oct-2016, own employees
3) 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

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03

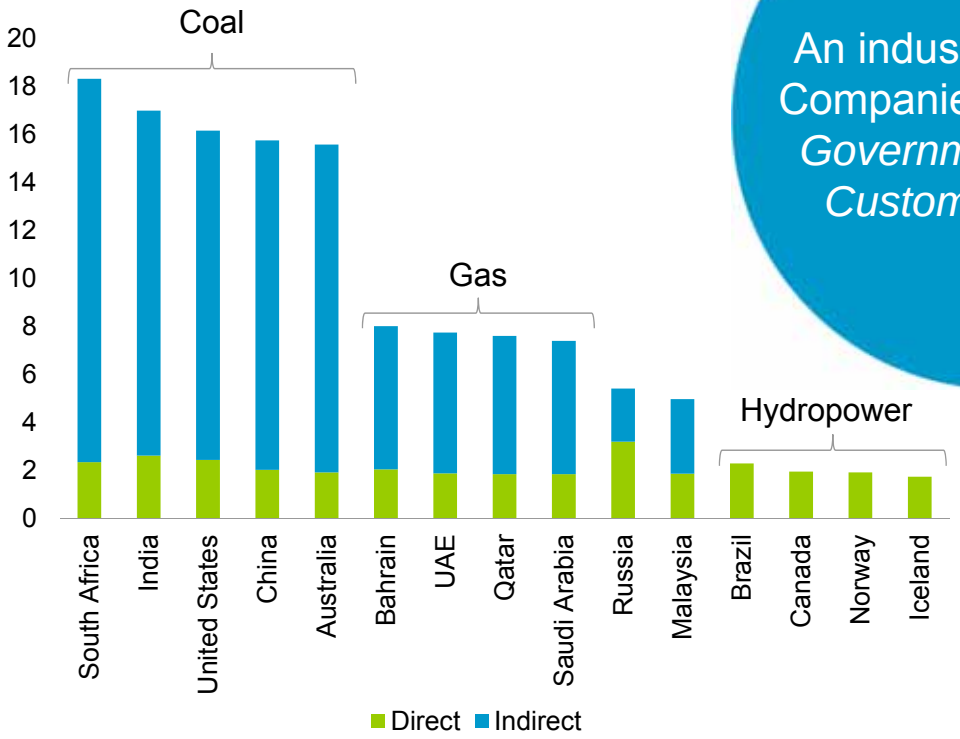
Sustainability and climate agenda

The climate paradox

Increasing share of aluminium production is coal-based

CO2 emissions and main energy source in aluminium production by country

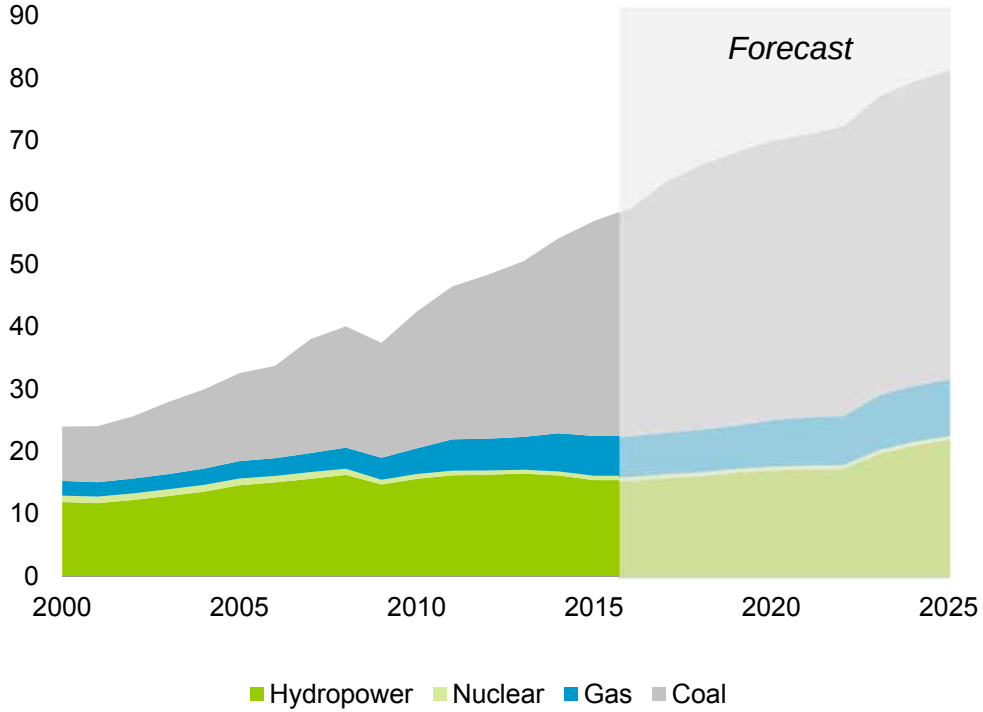
Tonne CO2 / tonne aluminium



An industry challenge
Companies need to act
Governments will act
Customers will act

Aluminium production by power source

Mill tonnes



Source: CRU

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Our global industry's most ambitious climate strategy

Carbon-neutral from a life-cycle perspective by 2020

Production

Products

Recycling

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Lowering our life-cycle emissions through several measures

Production

World-class technology pilot and renewable energy

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

Use phase

Meeting the needs of the automotive industry

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

Recycling

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

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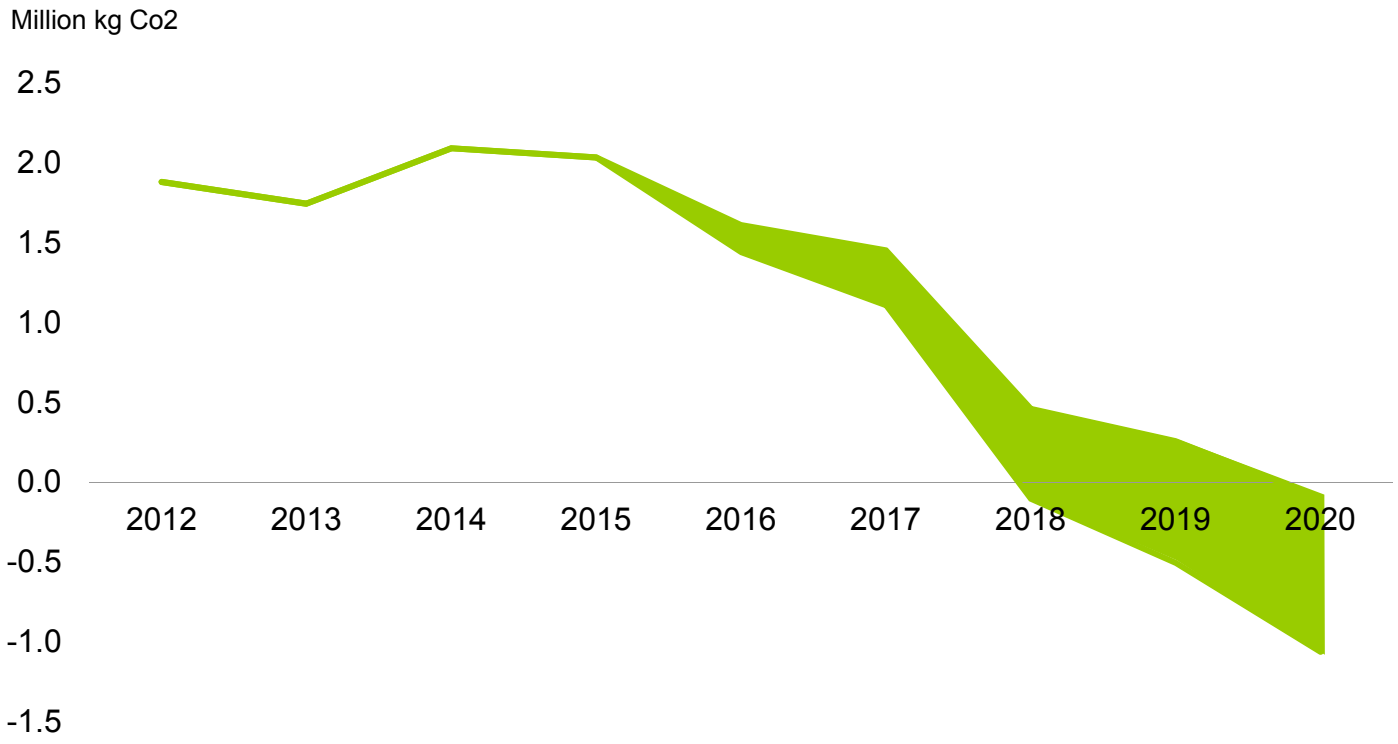
Hydro on track for 2020 target

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

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Sustainability will become more and more important

Competitiveness and sustainability can go hand-in-hand

Aluminium Stewardship Initiative

Producers

HYDRO ALCOA Constellium

Users

BMW Audi Tetra Pak Coca-Cola NESPRESSO

Civil society

WWF IUCN FAUNA & FLORA INTERNATIONAL

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