



Energy – competitive sourcing and new business opportunities

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Energy developments since last CMD



~2.2 TWh renewable power sourcing¹

→ Statkraft (hydro power)



Blakliden (wind power)



Tonstad (wind power)



Overtüringen (wind power)

CMD
2017

CMD
2018

Suldal power station upgrade



Røldal-Suldal dam upgrades



Investment in wind power development company Njordr



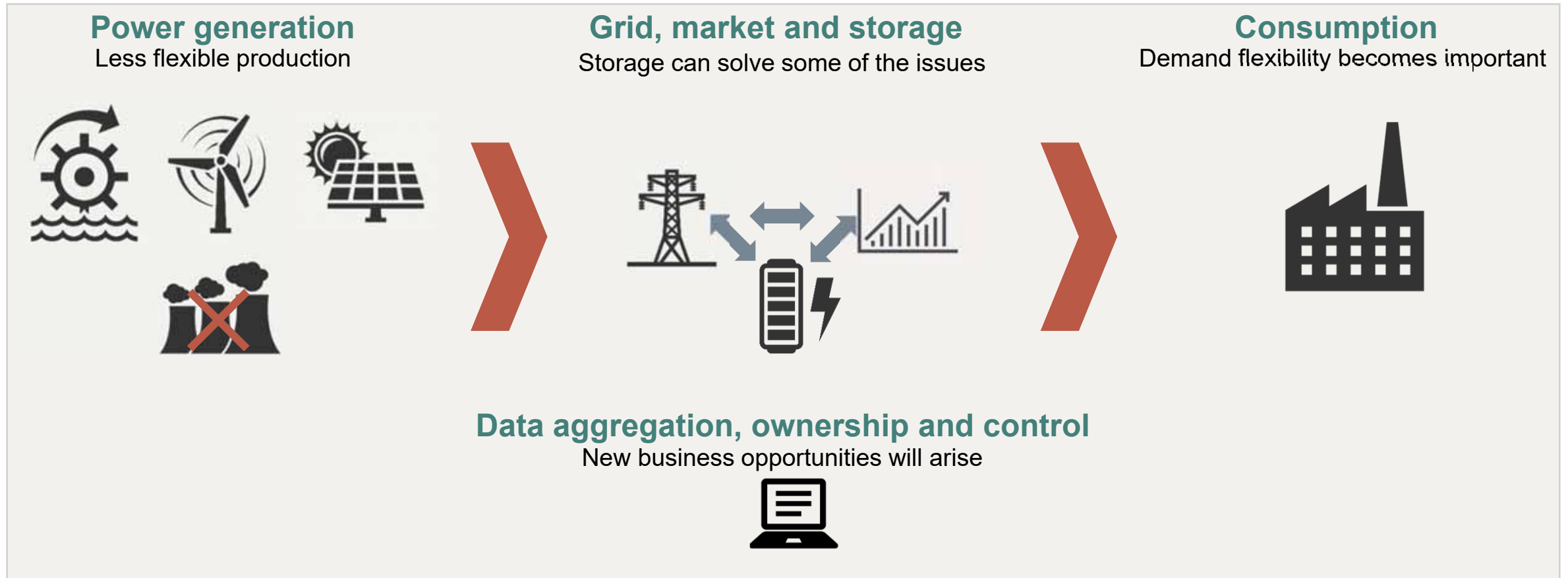
Build-decision made for new battery systems factory - Corvus



1) 2.2 Twh from 2021-30. Contracts expire between 2038 and 2050, somewhat lower off-take volume after 2030

The European power sector is changing

Hydro well-positioned to capitalize on structural changes



01

Power generation



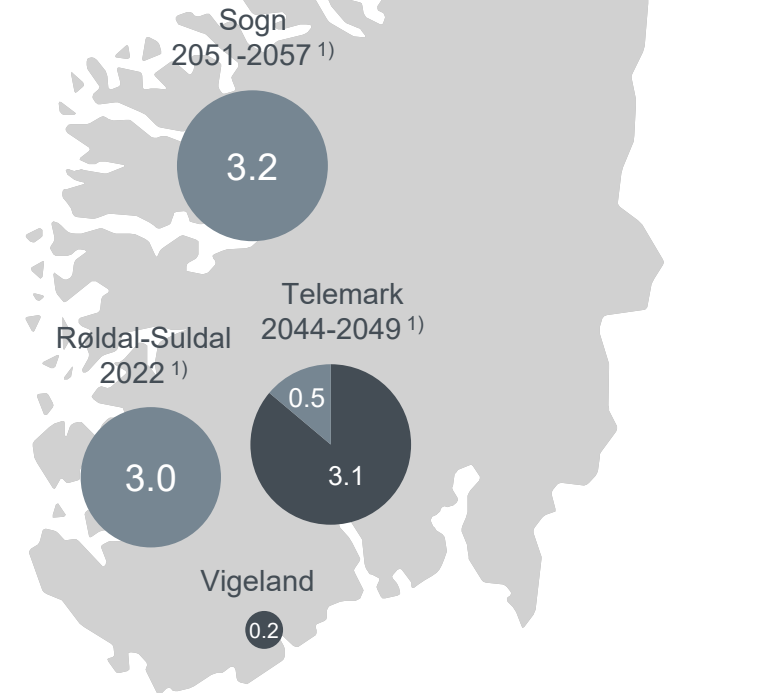
Captive hydropower production of 10 TWh per year

Power production capacity (TWh), per region and reversion year

Normal annual production

10 TWh

- No reversion
- Subject to reversion
- Bubble size = production in TWh



1) Reversion year

Strategic perspective on new power generation

Hydropower



Wind power



Solar power



Important attributes for Hydro:

Low carbon footprint – Sustainability – Long term – Solid counterparts – Low cost

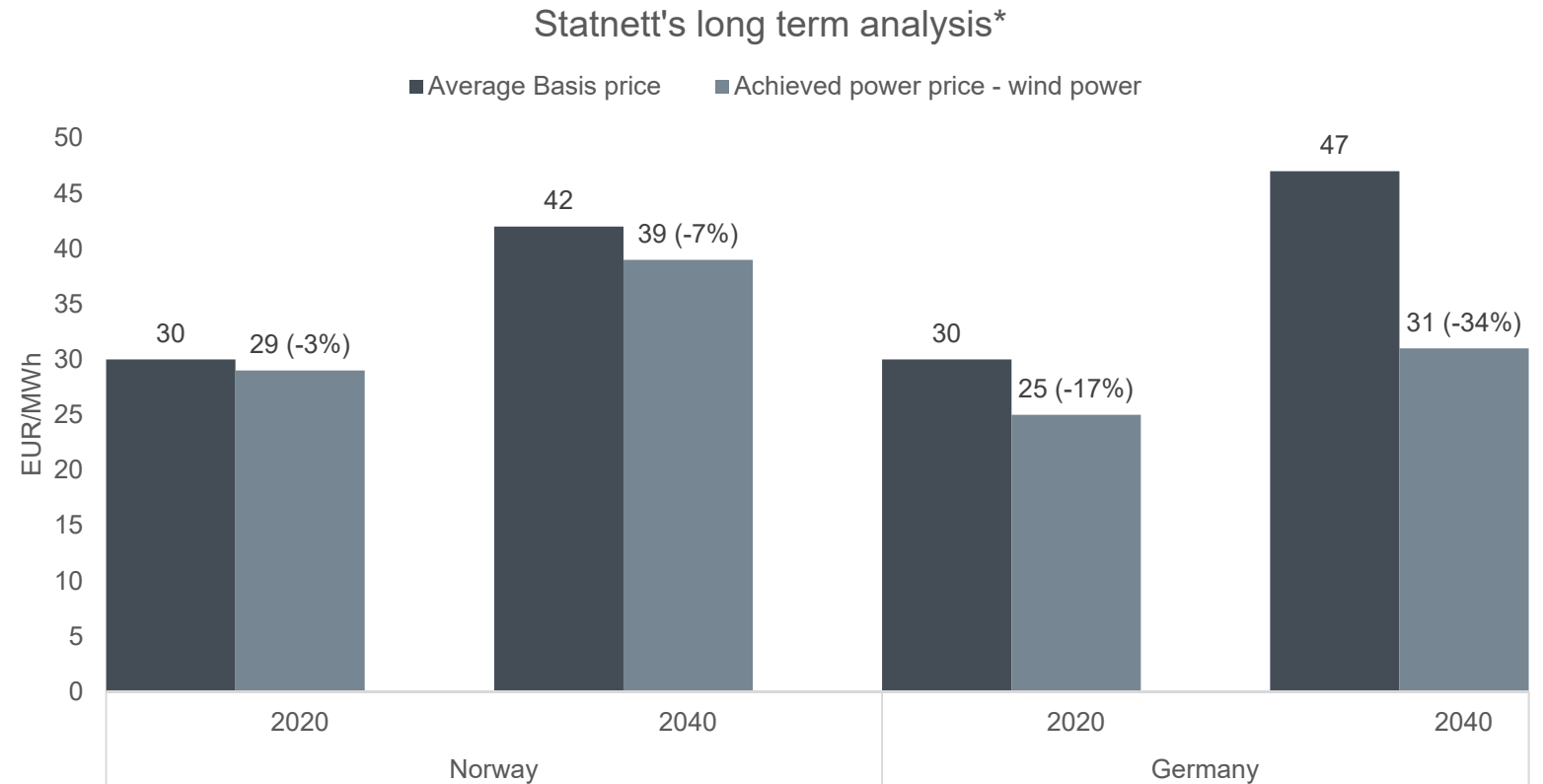
Value of Nordic wind power higher than in Germany



Wind power analysis indicating increasing differentials

Key characteristics of Nordic wind power

- High capacity factor
 - Excellent wind conditions
- Low degree of cannibalization
 - Flexible hydropower balancing fluctuations
- Normally higher production during winter period
 - Correlates with higher consumption for heating



* Based on Statnett's *Langsiktig markedsanalyse, Norden og Europa 2016–2040*, published October 2016. All figures are denoted in 2016-value. In their 2016 publication Statnett assumes around 7 TWh p.a. (~5%) and 16 TWh p.a. (~11%) wind power in Norway for 2020 and 2040, respectively. For Germany, Statnett assumes around 80 TWh p.a. (~15%) and above 200 TWh p.a. (~35%) for 2020 and 2040, respectively.

Well-positioned for competitive PPA¹ terms

~8.5 TWh power secured since 2014, 50% wind



Market attributes, Norway & Sweden:

Good wind quality

- + Low «cannibalization» of price at high wind production
 - + Large wind farms, good ground conditions (lower CAPEX)
 - + Long term PPAs for «green power» enables lower financing cost
-
- = Low cost PPA and acceptable returns to developer/owner
-
-

Attributes of Hydro:

Large power consumer and producer

- + Market and risk understanding, able to handle wind as produced
 - + Solid financial balance, attractive partner
 - + Long term
-
- = An attractive counterpart for wind farm developers
-
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1) Power purchase agreement

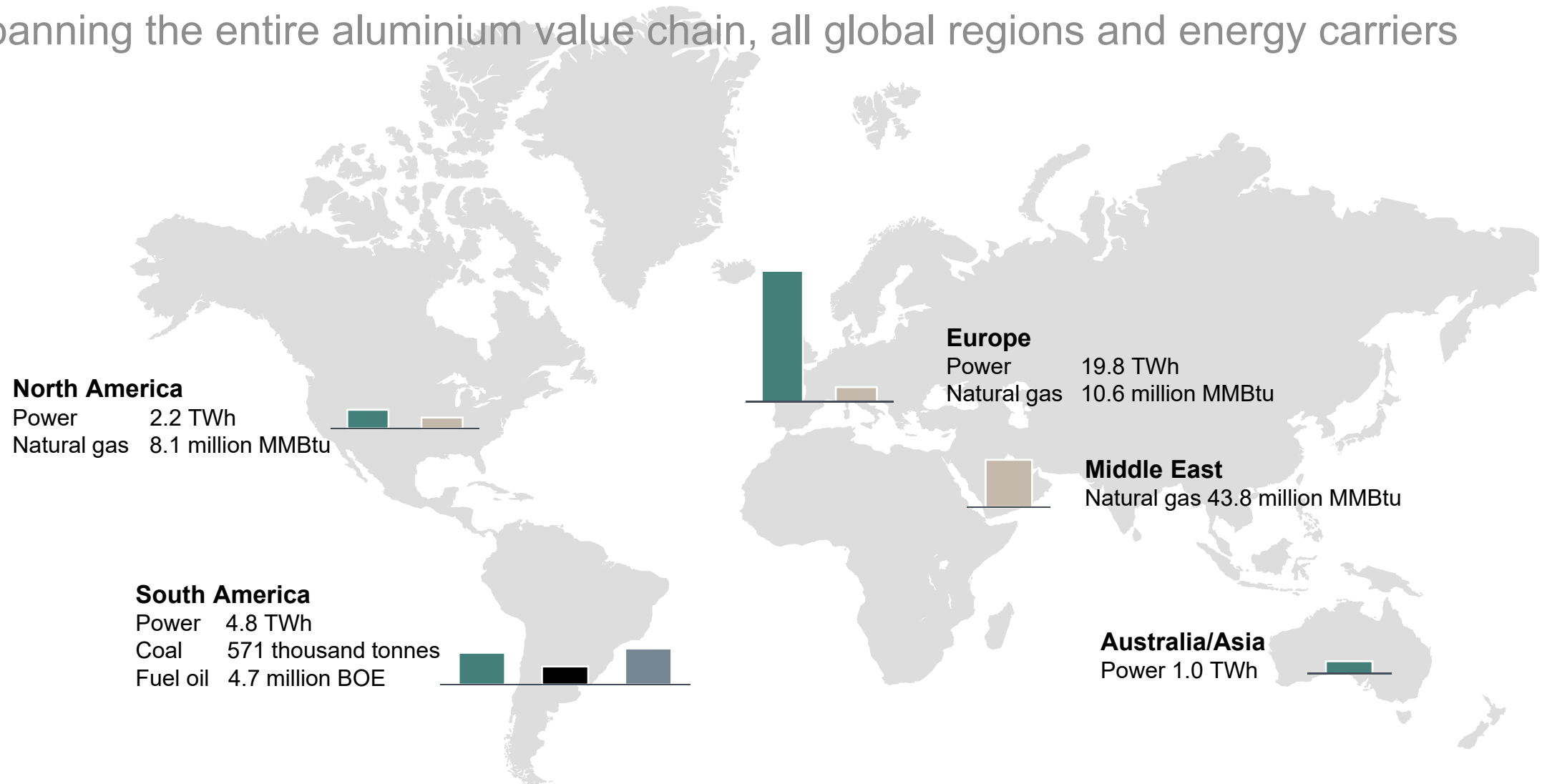
02

Energy Consumption

Hydro's global primary energy demand



Spanning the entire aluminium value chain, all global regions and energy carriers

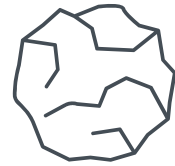


Values are listed in its conventional trading unit. TWh=10¹² Joule electrical energy, MMBtu= Million British thermal units, ton=metric ton thermal coal, BOE= Barrel of Oil Equivalent.
Bar charts are represented in the equivalent primary energy size for each category. Primary energy follows IEA's definition.
Based on equity-adjusted 2017 values for Norsk Hydro's bauxite mines, alumina refineries, smelters, remelters, rolling mills and 2018 estimate for extrusion plants.

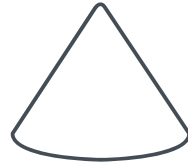
Energy is a key differentiator in the aluminium industry



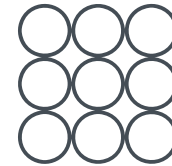
Center of energy excellence in Hydro



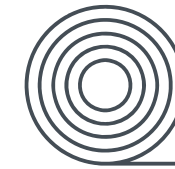
Bauxite



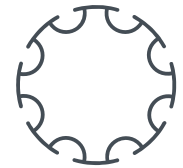
Alumina



Primary



Rolling



Extrusion

Energy cost*

~25%

~35%

~35%

~10%

~8%

~50%

Energy business area's contribution to Hydro

- Power sourcing

- Power sourcing
- Fuel switch project (LNG)
- Energy mix long term, renewables, storage

- Power sourcing and production
- Gas sourcing

- Power sourcing
- Gas sourcing

- Power sourcing
- Gas sourcing

Market understanding. Framework advocacy. «Greener» support & energy efficiency support. Security of supply

*Share of Business Operating Cash Cost

03

Grid, market and storage

Energy markets have trended upwards



Coal API2 forward 2019

USD/t



— Coal-2019

CO2 EUA forward 2019

EUR/t



— EUA-2019

Nordic power forward 2019

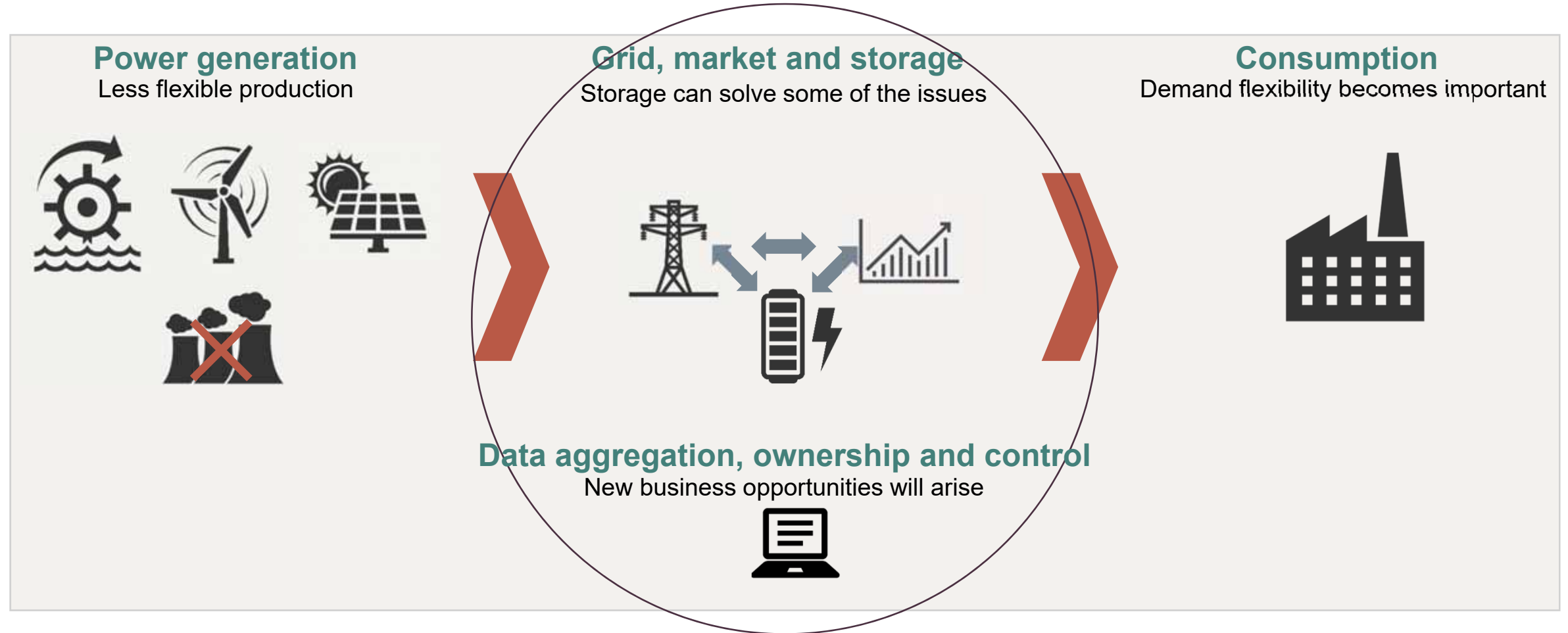
EUR/MWh



— Nordic power-2019

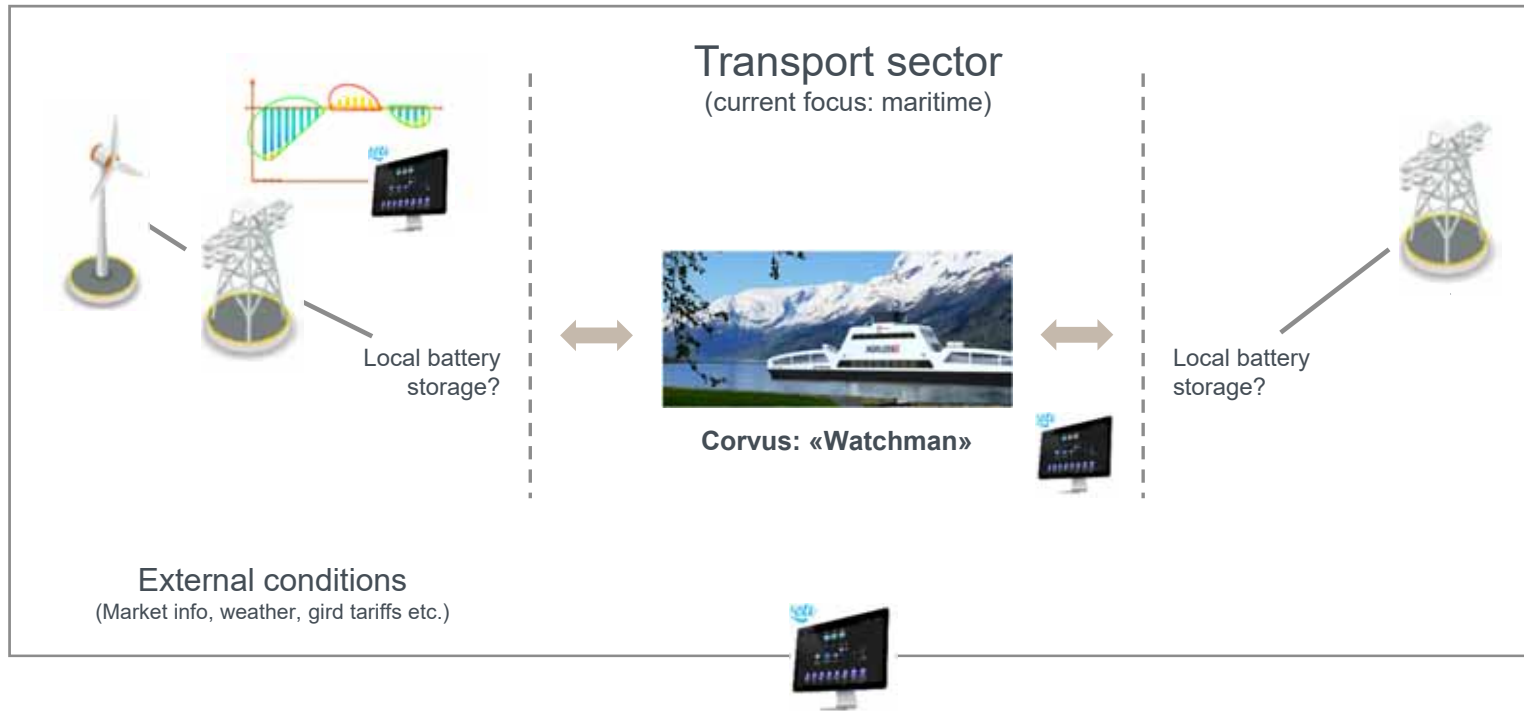
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The Corvus investment in a wider context

Data ownership and management even more important when sector coupling

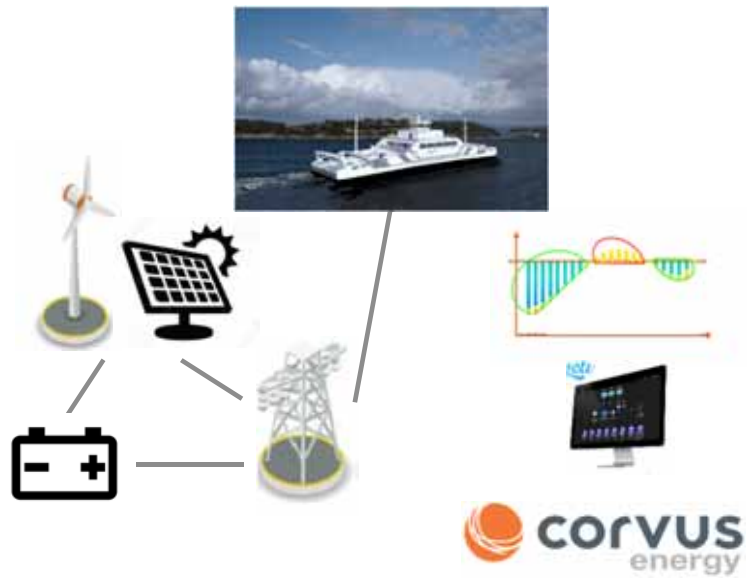
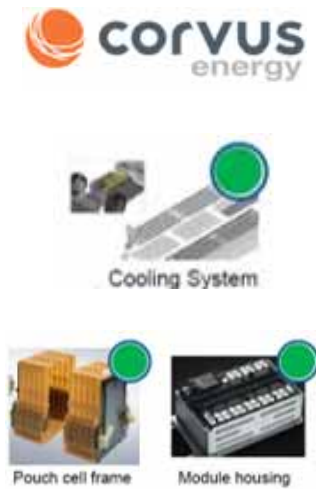
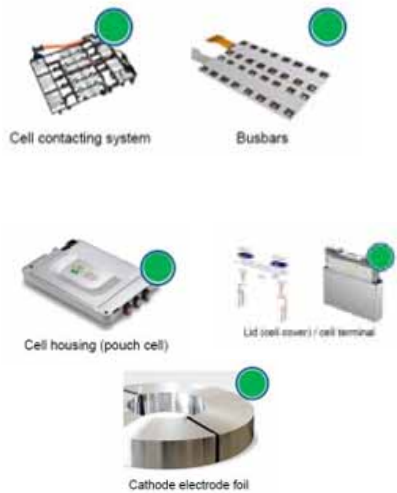


Possibility to deliver energy solutions in the future?

Why invest?

- Attractive market and future returns
- Hydro competence and industrial ownership should add value
- Obtain key learnings by understanding a rapidly changing energy market from within
- Beneficial to existing or future business

The value chain perspective



04

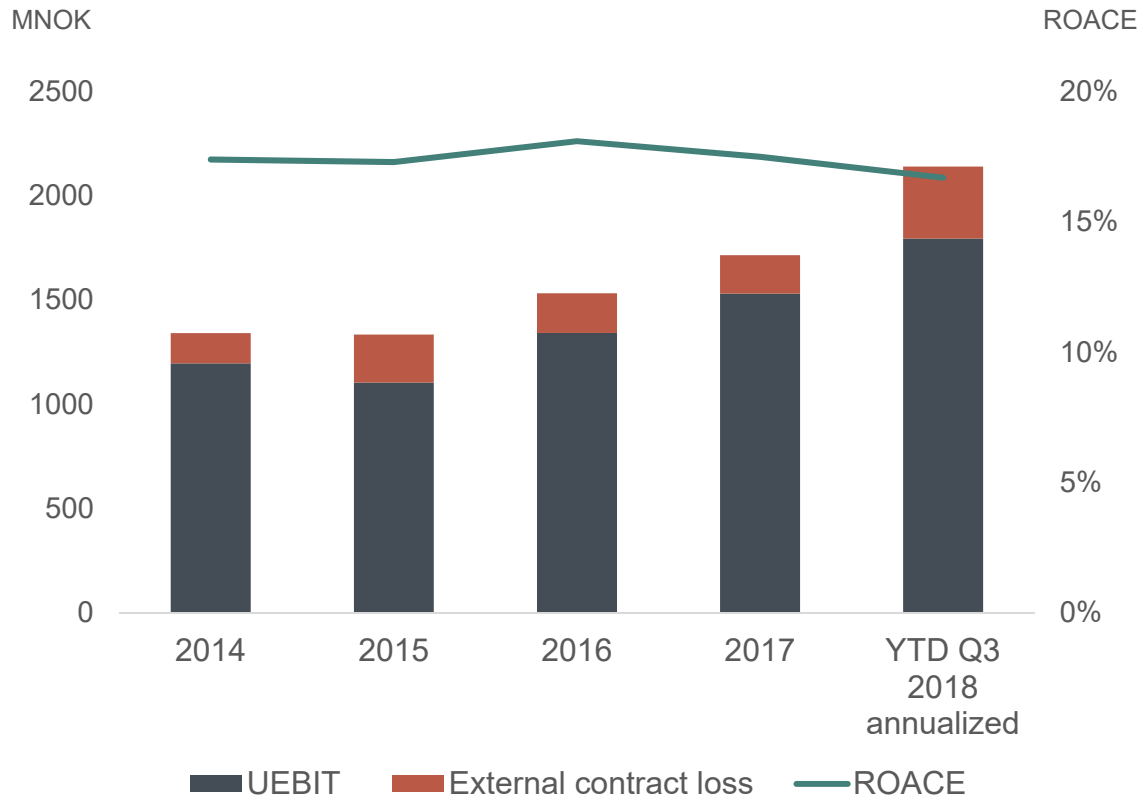
Financials and way forward

Historical EBIT Development




Strong development mainly due to higher prices

Energy - Historical underlying EBIT and ROACE



- Positive EBIT development on high prices
 - ROACE affected by increased effective tax rate
- Expiry of legacy supply contract entered in 2008 will have positive effect of NOK 400-500 million from 2021
 - No negative effect in other BAs
- New 8 TWh internal contract for power sales to Primary Metal in Norway effective from 2021-30
 - Priced in accordance with average external contract prices
 - Positive EBIT effect to Energy approximately NOK 300 million
 - Net power sourcing cost, internal and external, to Primary Metal largely unchanged

• ROACE tax 55% for 2014 & 2015, 60% for 2016, 65% for 2017 and 70% estimated for 2018



Energy key focus areas

- Safe and stable operations
- Commercial excellence
- Energy center of excellence
- Develop solution to secure continued RSK production
- Develop New Business portfolio