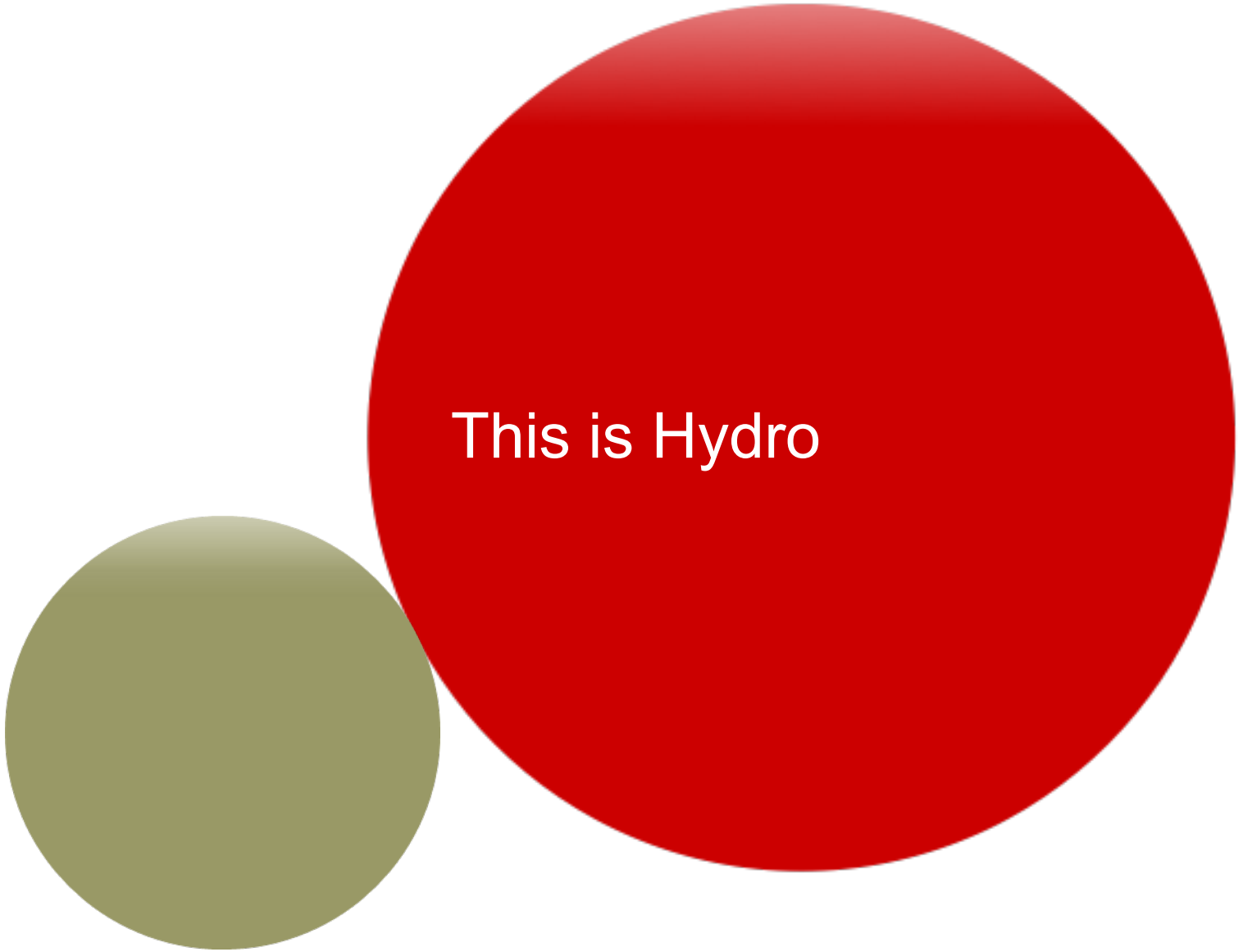
Is there a need for PhD-candidates in the traditional, Norwegian process industry?

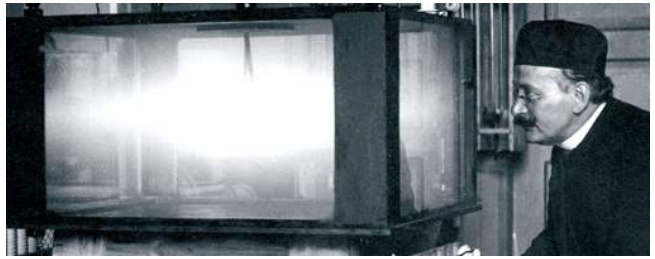
Hans Erik Vatne, Head of Technology
NTNU PhD conference, 2017-03-30

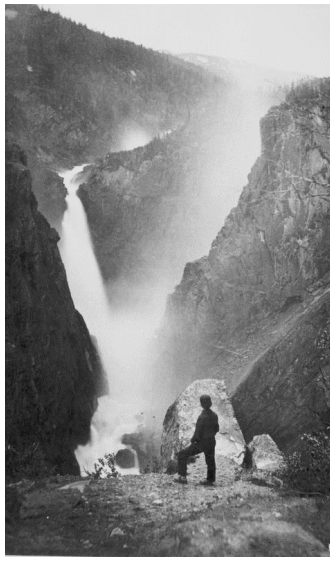


HYDRO

111 years of industrial and sustainable development

Hydro has led the industrialization of Norway for more than a century



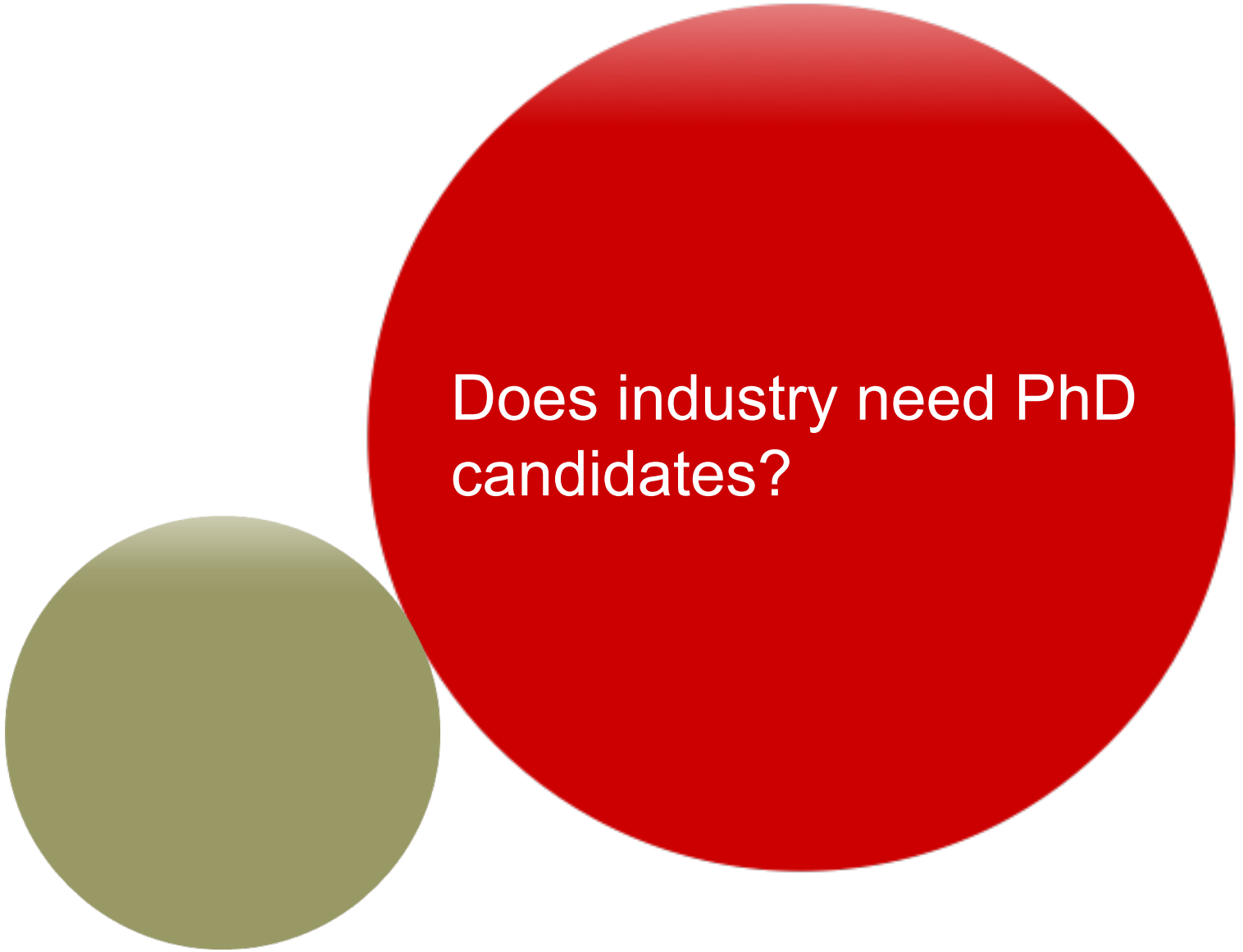


Turning science and natural resources into products, contributing to viable societies

Fertilizer, aluminium, magnesium, oil & gas, polymers, fish farming, pharmacy, investments...

A world-leading aluminium company

HYDRO



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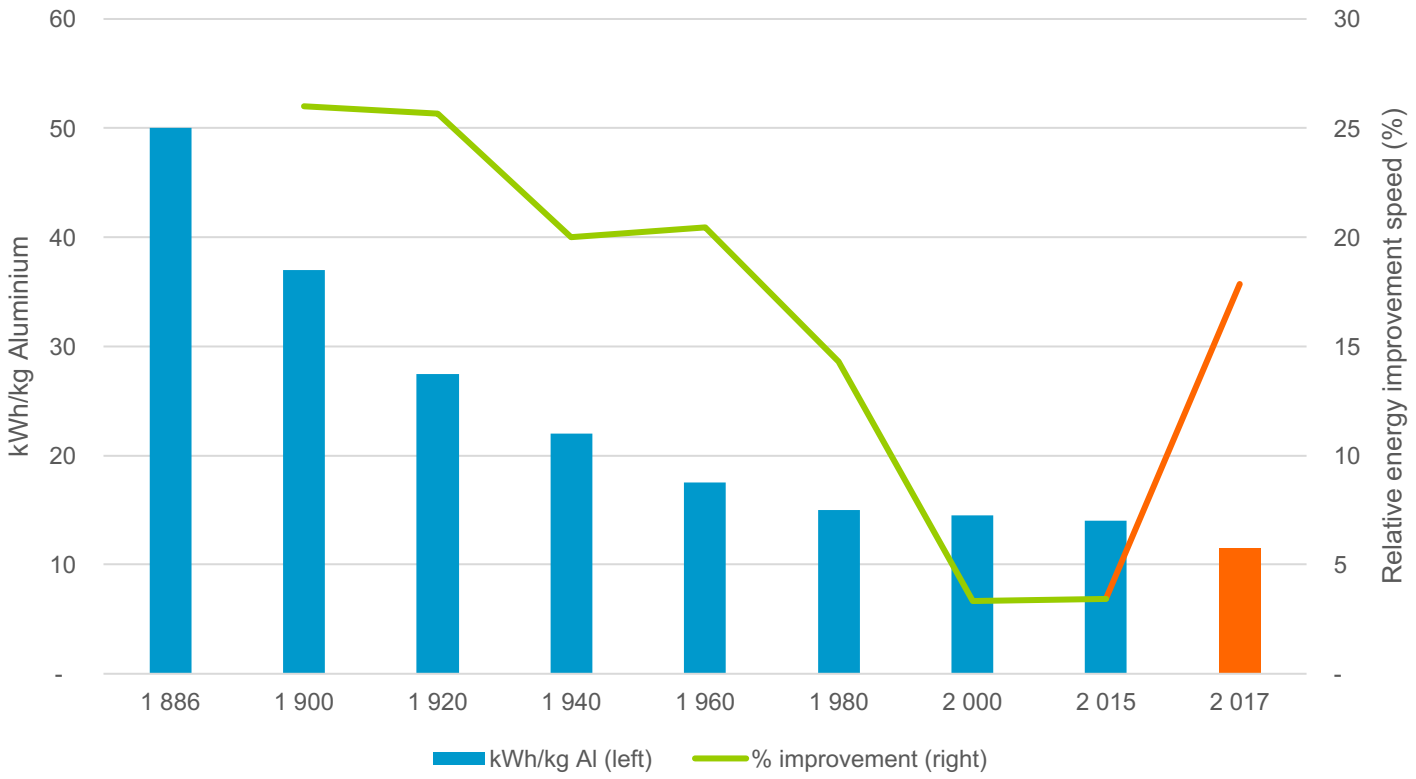
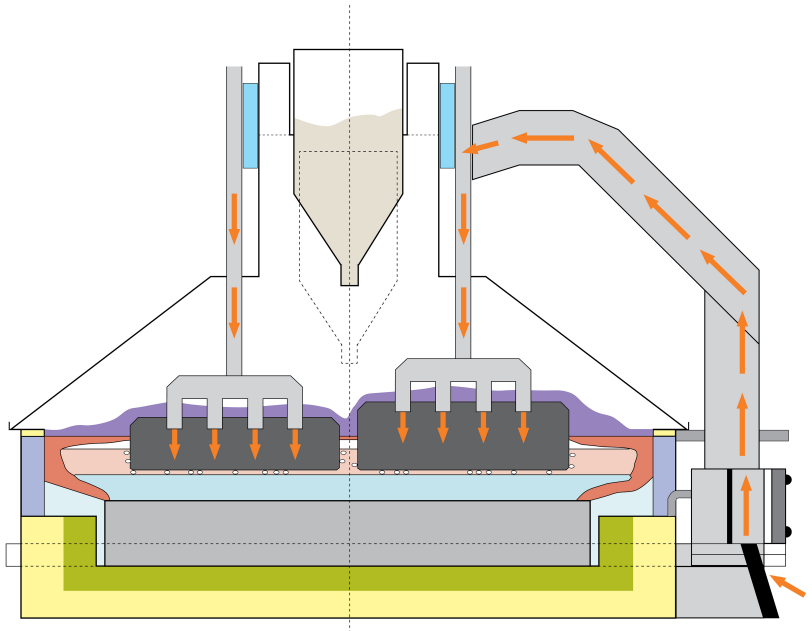
Step-change for a mature smelter technology

Karmøy Technology Pilot – proprietory electrolysis technology





Source: International Aluminium Institute, Hydro analysis

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Smelter 4.0 – the smelter of the future

Autonomous cells

Connected operator & maintenance

Connected plants

Automated cranes

Automated transport

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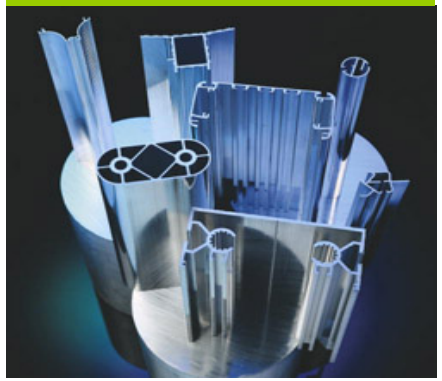
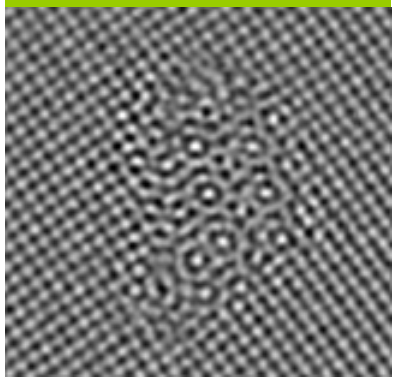
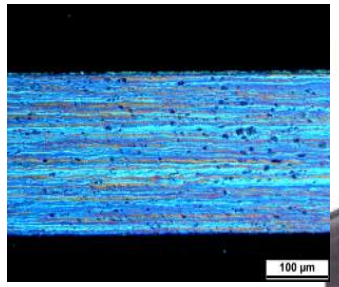
Metallurgical expertise develops new products and markets

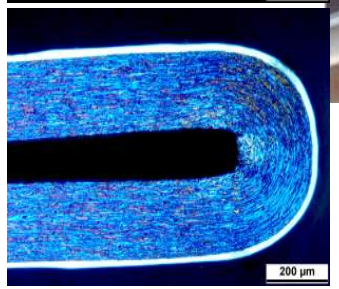
High Speed Alloys



Mg-Si prec.



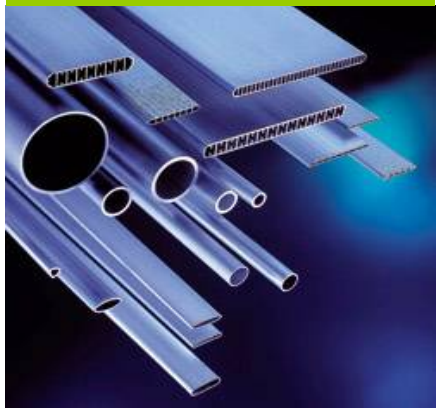




Microstructure

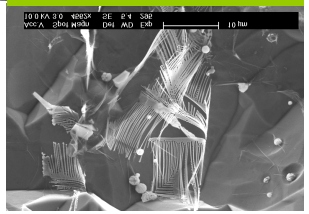
Bending behaviour

Long Life Alloys

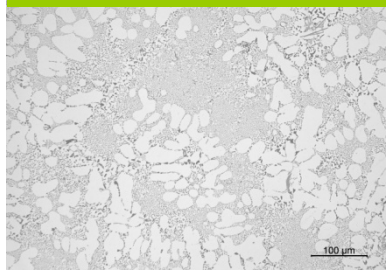


Dispersoids

Fe-rich particles



Eutectic morphology

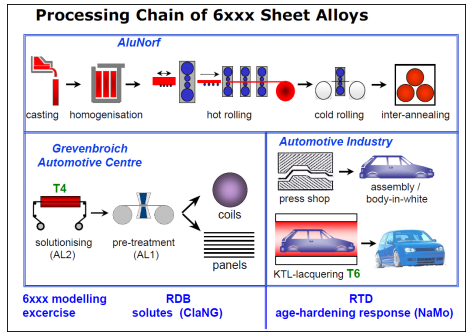


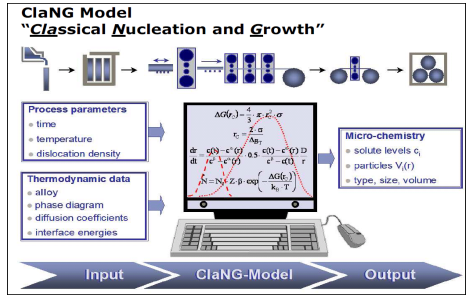
«Aluminium was the ideal choice, providing thinness, lightness and nice finishing options»

Dan Riccio,
Senior Vice President of Hardware Engineering, Apple

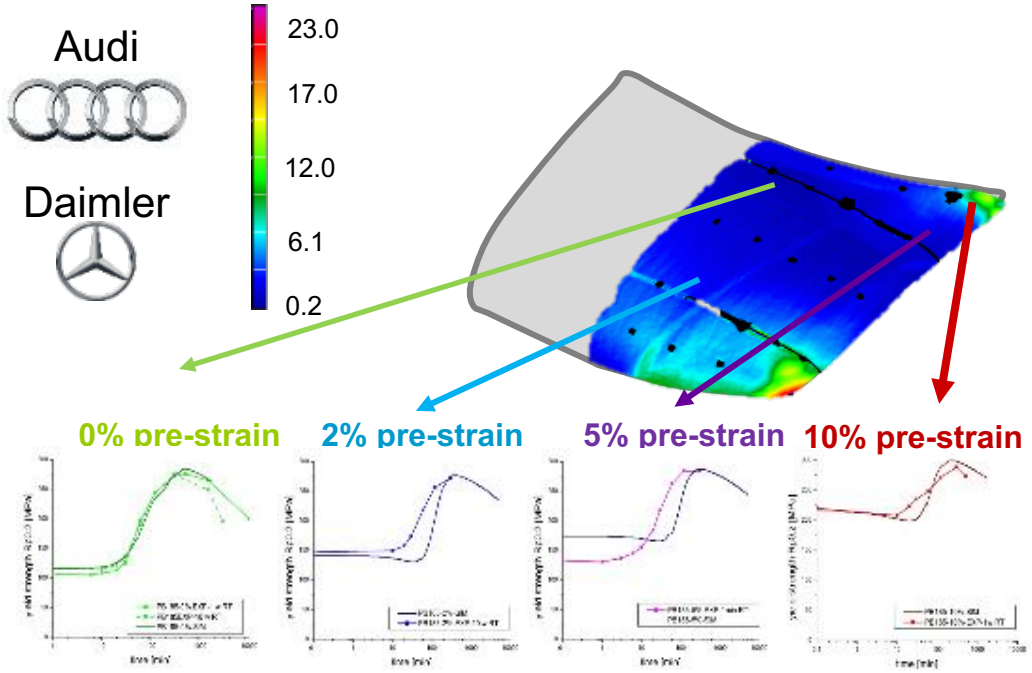
HYDRO

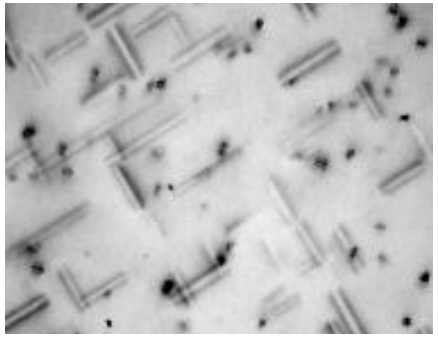
Aluminium substitutes steel in automotive due to weight, sustainability and good properties

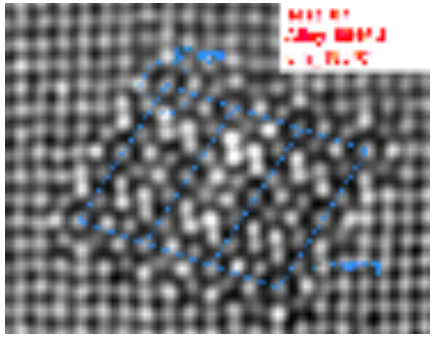




Combining advanced electron microscopy and modelling capabilities gives competitive edge







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The process industry participates in the world championship every day - and we need to win the technology race

Our industry challenge

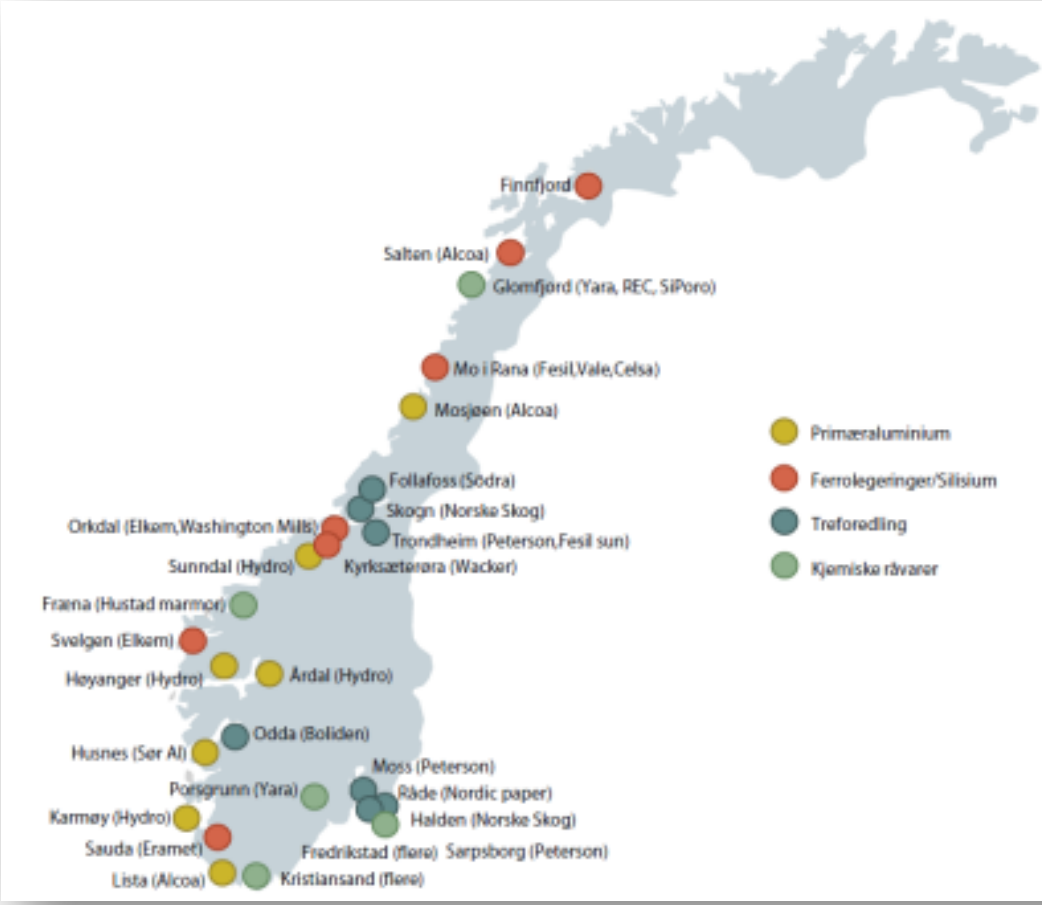
Global competition and over-capacity

Energy efficiency and emissions

Prerequisite for profitability and sustainability

Innovation drives margins and demand

Product development based on competence and innovation power



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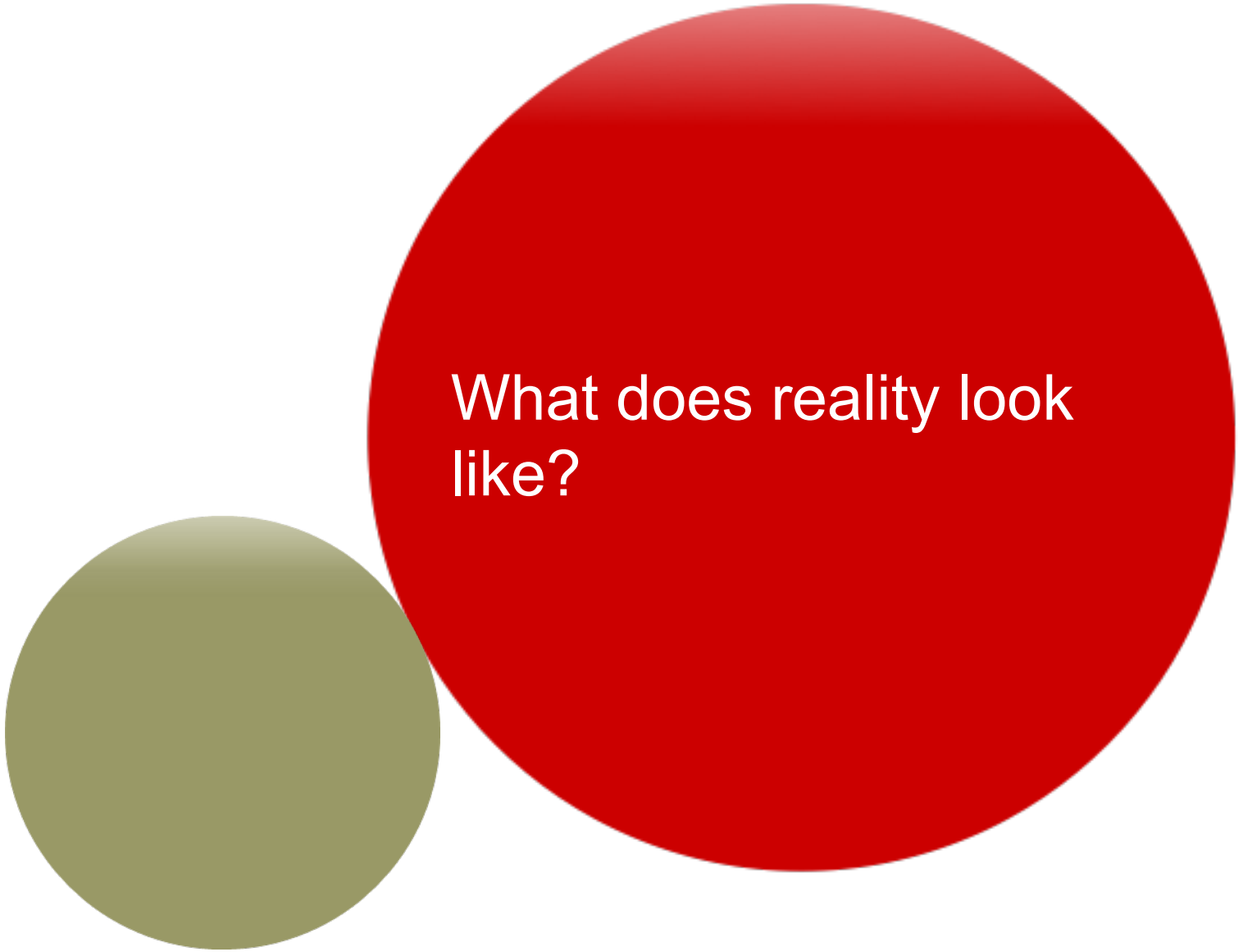

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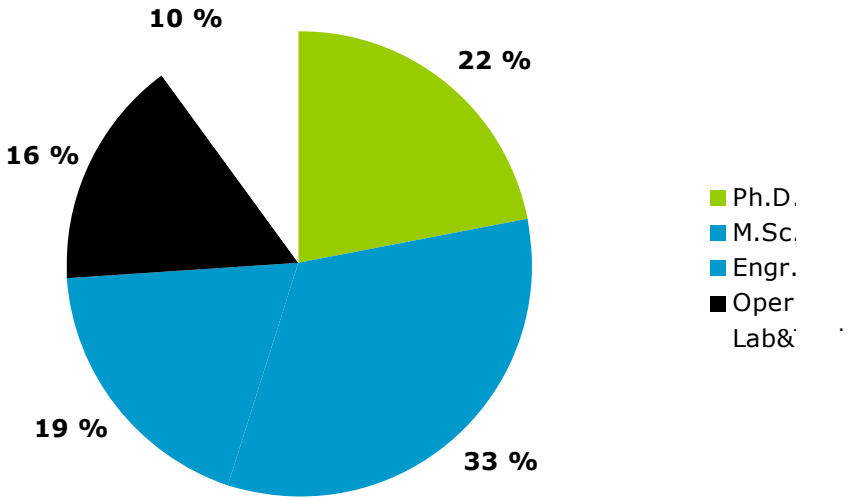
Primary Metal Technology (smelter technology organisation)

Wide span in competence background and many PhD candidates

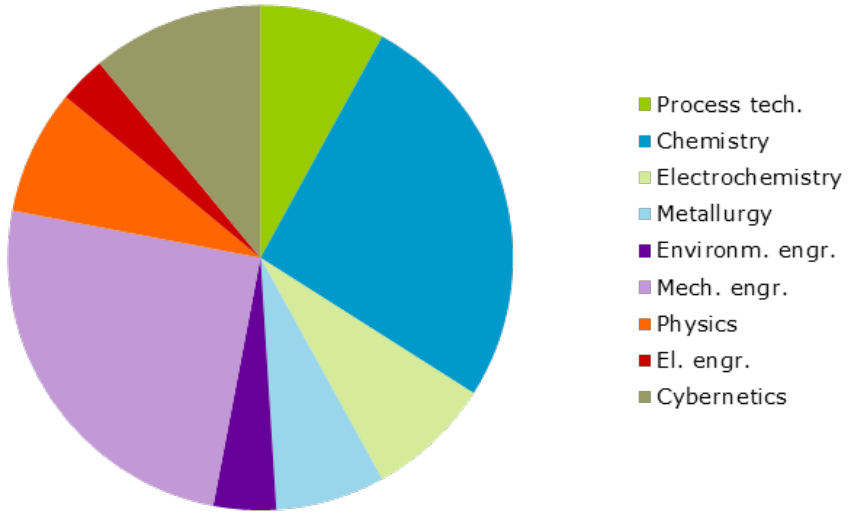
76% university graduates

(Ph.D., M.Sc. and Engineers)



Wide technical background

(Ph.D., M.Sc. and Engineers)



140 employees - 13 nationalities

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Did you know …

Hydro's CEO is Dr. Ing. from NTNU

Technologists in industry

- Background: PhD inorganic chemistry, post doc
- Career:
  - R&D, operations/management, CEO
  - Chairman BoD NTNU, BoD positions

Hydro in general

- 13.000 employees, close to 100 PhDs
- My PhD colleagues from metallurgy @ NTNU 90-ies:
  - Hydro: R&D og Prof. II @ NTNU
  - Hydro: process engineers, management
  - other material industry
  - SINTEF/NTNU

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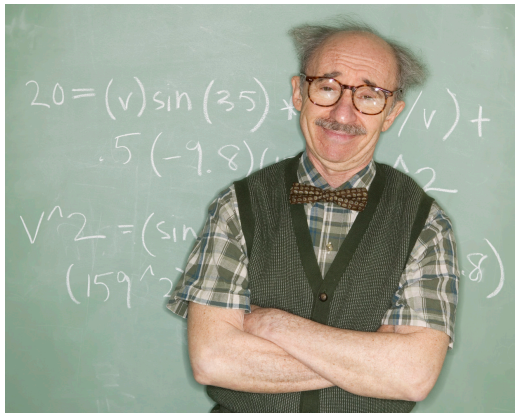
Competence needs in industry

- High internal technological competence required
  - Optimise production processes (productivity/emissions)
  - Product development
- We need to win the technology race to survive the global competition
  - Productivity growth primarily due to improved technology
  - We will need even more specialists and experts in an increasingly complex and technology-driven world
- PhD positive independent of career path
  - Proof of quality and determination/drive
  - Competence – we need specialists
  - Systematics, structure, ability to think in abstract terms and analyse and understand complex challenges



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