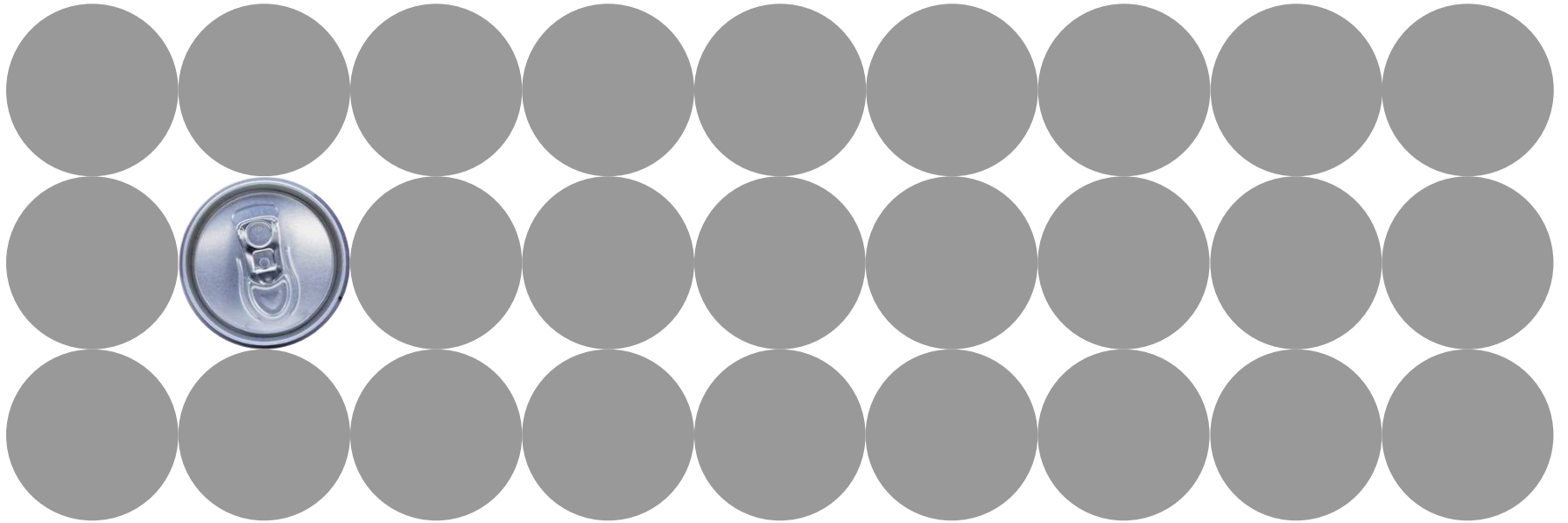


# Energy



Jørgen C. Arentz Rostrup, Executive Vice President and Head of Energy

September 25, 2008

# Key messages

- Solid coverage for Aluminium energy consumption
- Strong captive power position
- Industrial ambitions within Solar

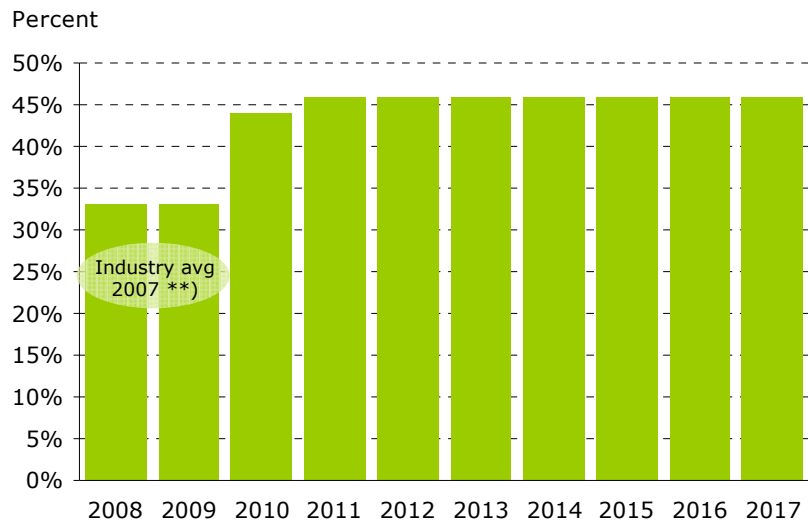
1

Power

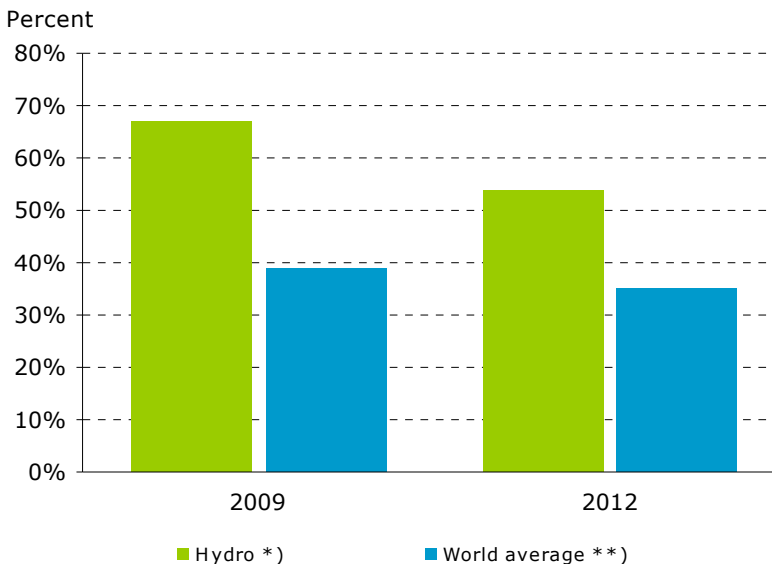
# Strong power position

## – self-generated and renewable energy sources

Share of self-generated power \*)



Share of renewable energy origin

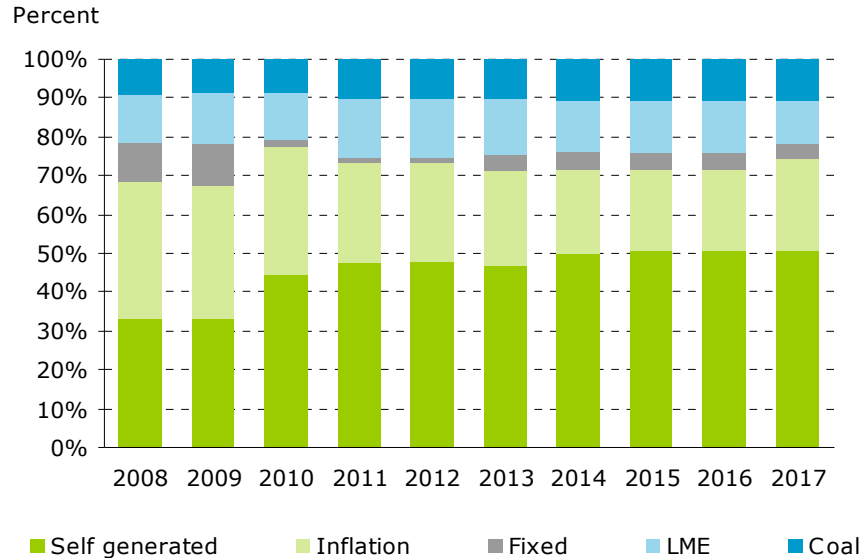


\*) Including normal production equity power less concession power sales

\*\*\*) Source: CRU

# Long-term power sourcing at competitive prices

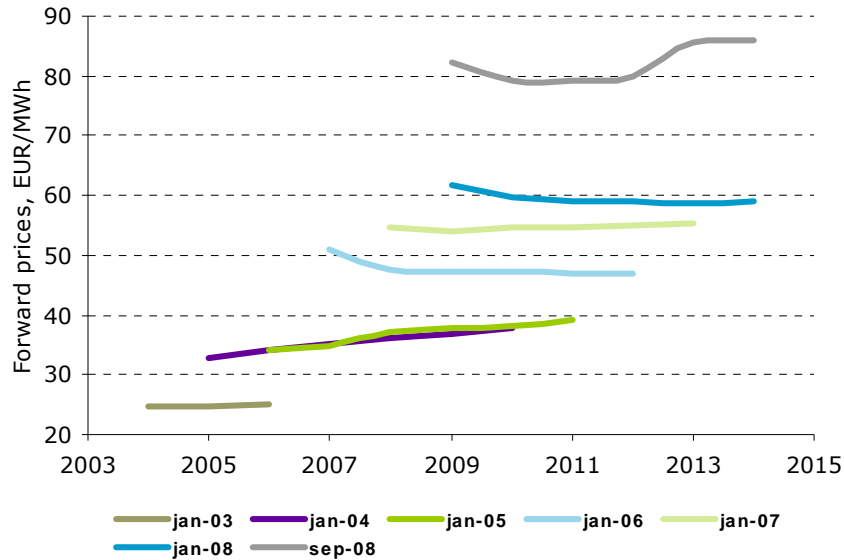
## Indexation of power supplies



- Power consumption ~26 TWh in Metal in 2008
- Self-generation and long-term contracts ensures predictability
- Limited commodity exposure
  - Indexation to LME and coal with time-lag
- NOK and USD the dominant currency exposure

# Increased power prices over time

German forward price development



- German and Nordic forward prices more than doubled since 2003
  - Increasing fuel cost – coal price up from 90 to 170 USD/ton last year
  - Cost of CO2 introduced
  - Tighter demand/supply balance
- Outlook for continued high global energy prices
  - Supporting high aluminum price levels

# New power secured

- Vattenfall contract signed September 10
  - 18 TWh power contract with Vattenfall AB
  - Deliveries 2013-2020
  - Secures coverage for power consumption in Norway to 2020, incl. Sørøst
- Germany
  - Neuss on cash-plus basis
  - 2009: 80% covered with market contracts
  - Exploring alternatives for medium-/long-term coverage

# Reversion



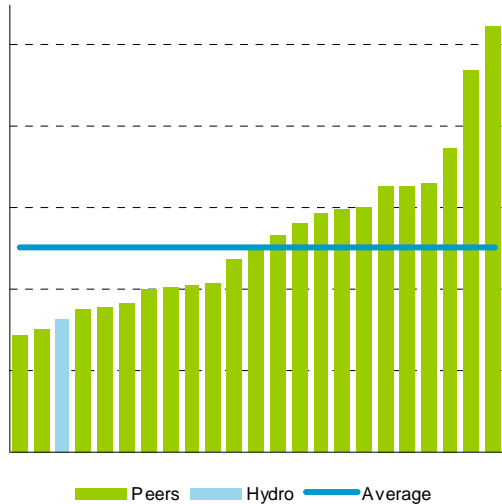
- Effects for private companies
  - No renewal or new concessions
  - Can own up to 1/3 of publicly owned plants
  - Everlasting concessions if sold to public companies
- Implications for Hydro
  - First large system to revert in 2022
  - Financial impact muted by:
    - Public everlasting concession possibility
    - Hydro can maintain 1/3 indefinitely
  - Goal is to ensure predictable long-term power supply at competitive prices

Note: public ownership implies ownership by the state or municipalities

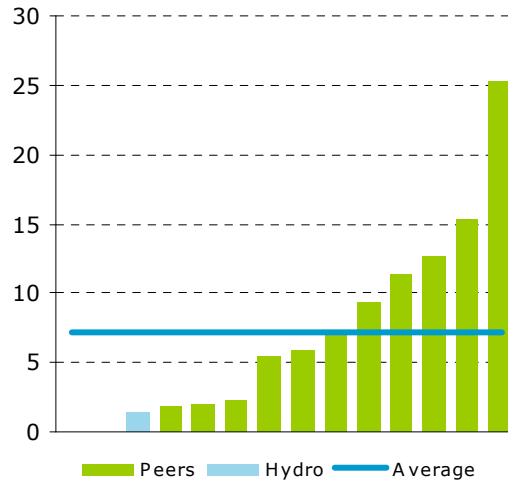
# Solid operational performance

Production cost 2005-2007 \*)

NOK/MWh

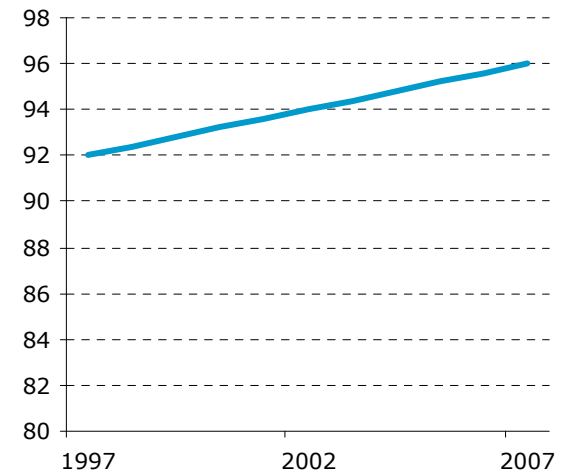


Average LTI 2005-2007 \*)



Availability

Percent

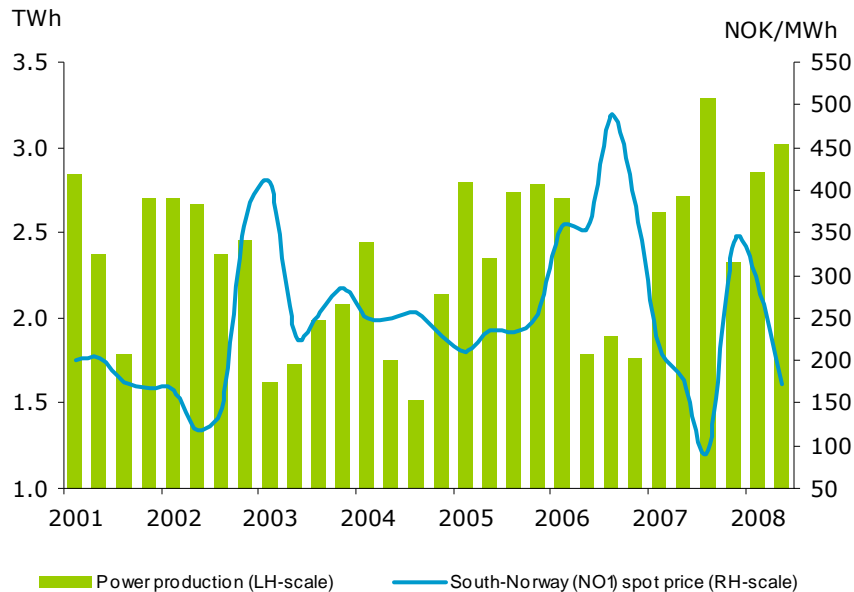


\*) Source: PA Consulting Group Benchmark Study 2007

# Power portfolio management

– significant volatility in price and volume

Quarterly production and spot price



- Norwegian power portfolio optimized versus market
- Production and market prices strongly impacted by hydrological conditions
  - "Dry" versus "wet" years
- Historical inverse relationship between volume and price
- Seasonal variations in demand/supply
- Occasional delinkage between area prices

# Developing Norwegian hydropower assets



- New normal production 9.4 TWh
- Development potential 0.5 – 1 TWh
  - Utilizing existing concession areas and infrastructure
  - Investments NOK 1.2 – 2.5 billion from 2011 onwards



# Growth ambitions

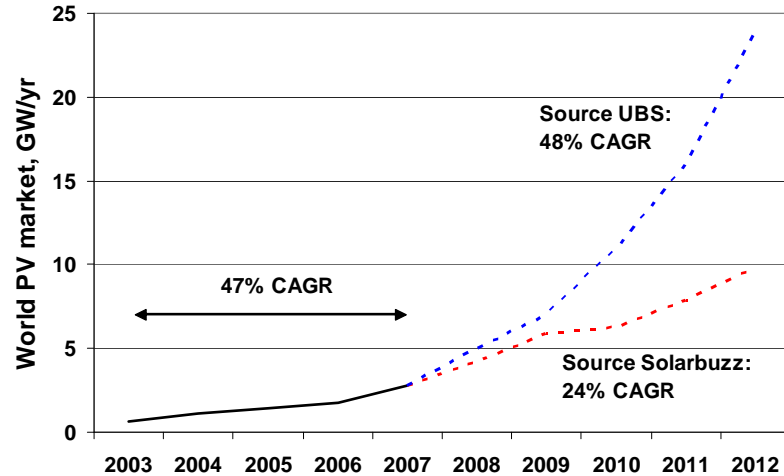
- Ambition to increase share of captive power
- Develop energy positions for smelter growth
- Capitalize on energy market and project management skills

2

Solar

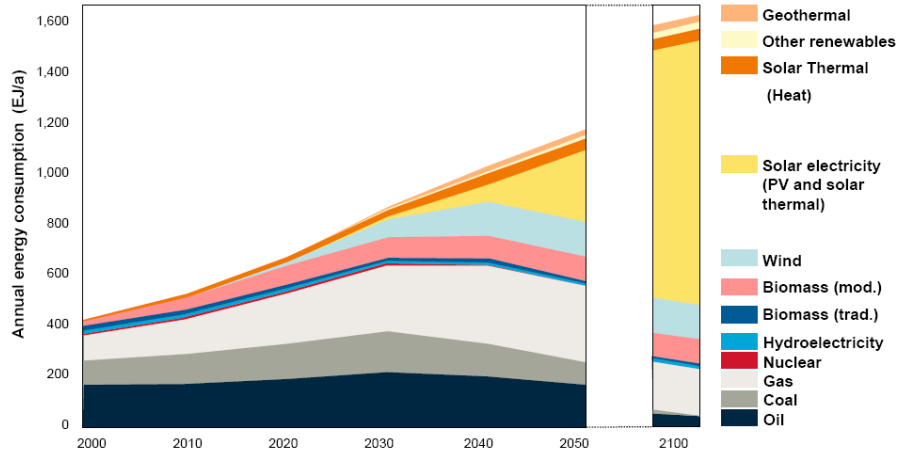
# Opportunities for growth in the solar market

Short term: Uncertainty on future growth rate



\*) CAGR = Compounded Annual Growth Rate

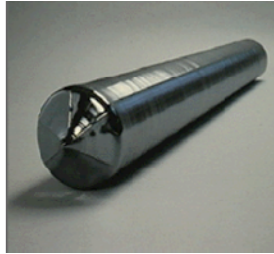
Long term: High growth potential



# Hydro has secured opportunities across the value chain – investments around 800 MNOK



Polysilicon



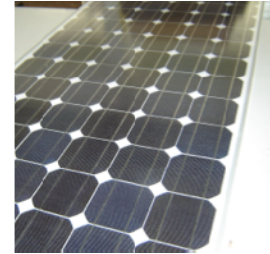
Ingot



Wafer



Cell



Module

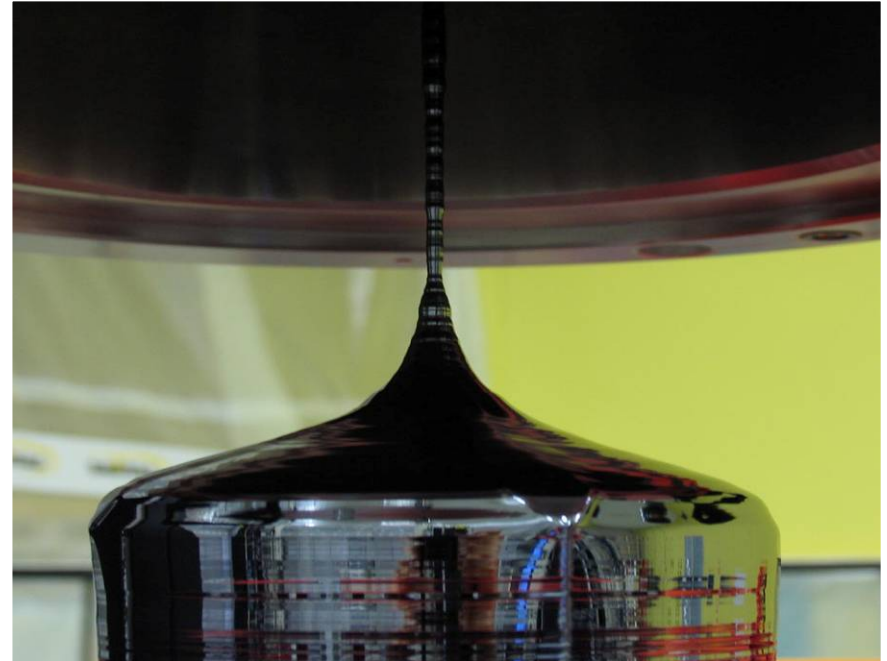


System/  
Installation



# NorSun: Årdal plant in operation

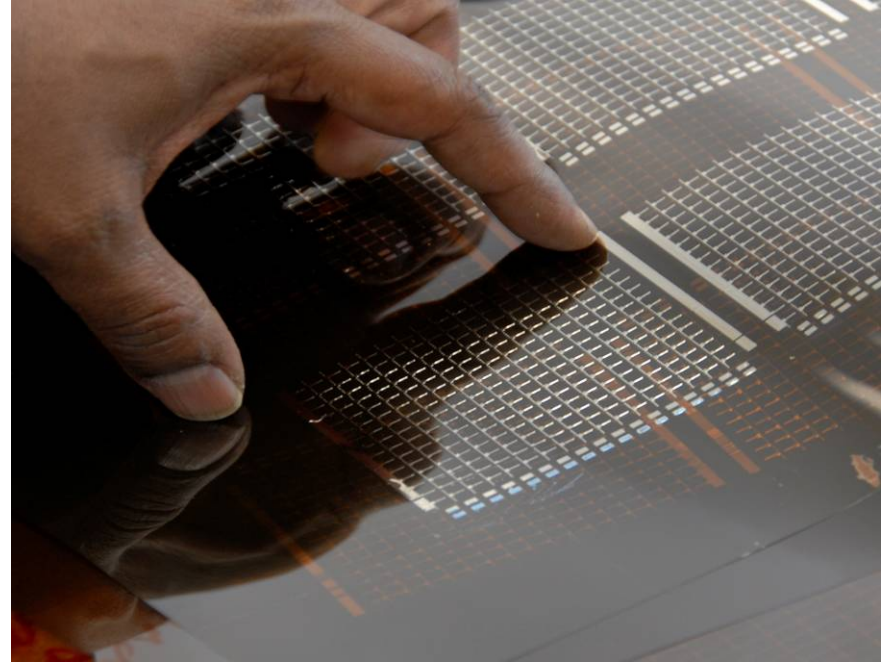
- Hydro largest industrial owner with 18% ownership
- Production of monocrystalline silicon ingots and wafers
- 155 MW production in Årdal, Norway. Started 2008
- Planning production of silicon wafers in Singapore (350 MW)
- Investment in polysilicon production
- 29% ownership in SunFilm AG



# Ascent: Promising pilot performance

- Hydro largest owner with 26.5%
- Produces thin-film solar cells for integration into buildings
- Pilot plant in operation since Q2 2008
- Commercial scale plant operational 2010
- Aggressive ramp-up feasible

NASDAQ: ASTI



# Ascent + Hydro Building Systems

= a promising partnership

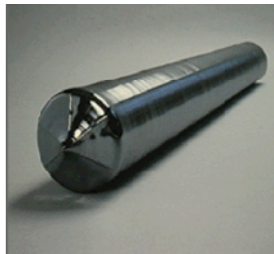
- Joint development team
- Prototype window shades with solar cells
- Energy-efficient facades that capture solar energy and produce electricity



# Hydro positioned across the solar value chain



Polysilicon



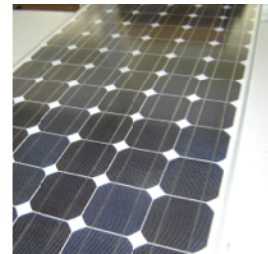
Ingot



Wafer



Cell



Module



System/  
Installation

Metallurgy

Industrialization

Internal synergies / building systems

# Key messages

- Solid coverage for Aluminium energy consumption
- Strong captive power position
- Industrial ambitions within Solar



[www.hydro.com](http://www.hydro.com)