



OLJE- OG ENERGIDEPARTEMENTET

Ministry of Petroleum and Energy

The Energy Sector in Norway and the future role of renewable resources

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Norway

- 4,5 mill people
- 325 000 sq. km – 14 persons/sq. km
- North-western part of Europe
- GDP is ca. 36 000 USD/capita (PPP)
- European Economic Area



Ministry of Petroleum and Energy

- The Ministry is responsible for *petroleum* offshore, and *energy supply* and *water resources management*
- High value creation through efficient, secure and environment-friendly management of Norway's energy resources



Norway is a major petroleum producer

- 3rd largest oil exporter in the World (3,0 mill. barrels/day)
- 3rd largest exporter of natural gas (71 Bn. Scm)
- 7th largest oil producer (2003: 3,3 mill.barrels/day)



....and hydropower producer

- 6th largest hydropower producer in the world
- Average production capacity is 119 TWh/year
- Installed capacity is 27 300 MW



Electricity production

- All electricity production in Norway is based on hydropower
- Electricity plays a dominating role in stationary energy consumption (48 per cent)



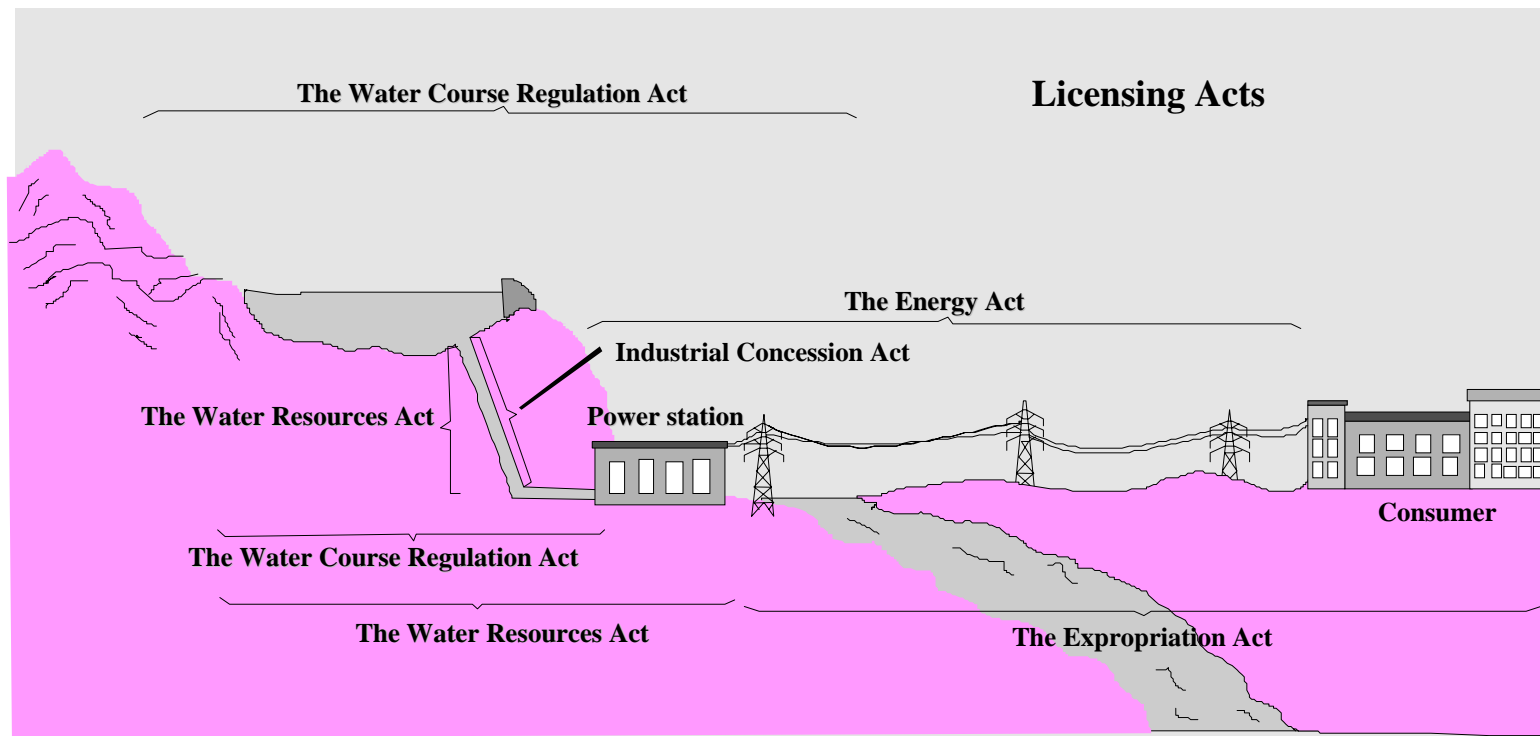
The Hydropower sector - some main historical events

- 1890 The first hydropower station is built
- 1906 The first concession act is passed to secure national control of the waterfalls
- 1991 The Energy Act creates a market in power production and trade
- 1993 The Power Exchange is established

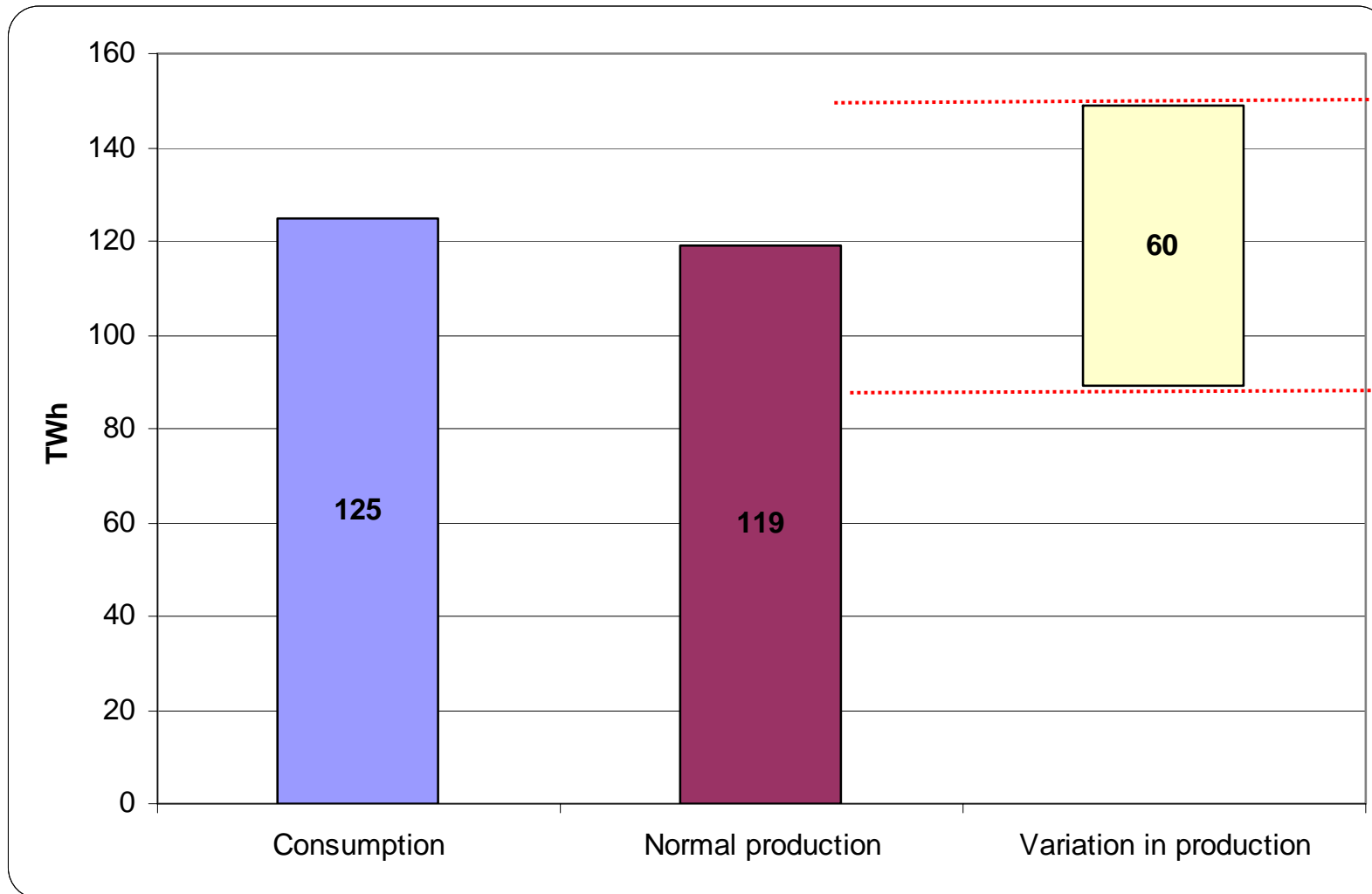


Planning tools for water fall resources

- 4 protection plans for water courses
- A Master Plan for Hydropower Resources



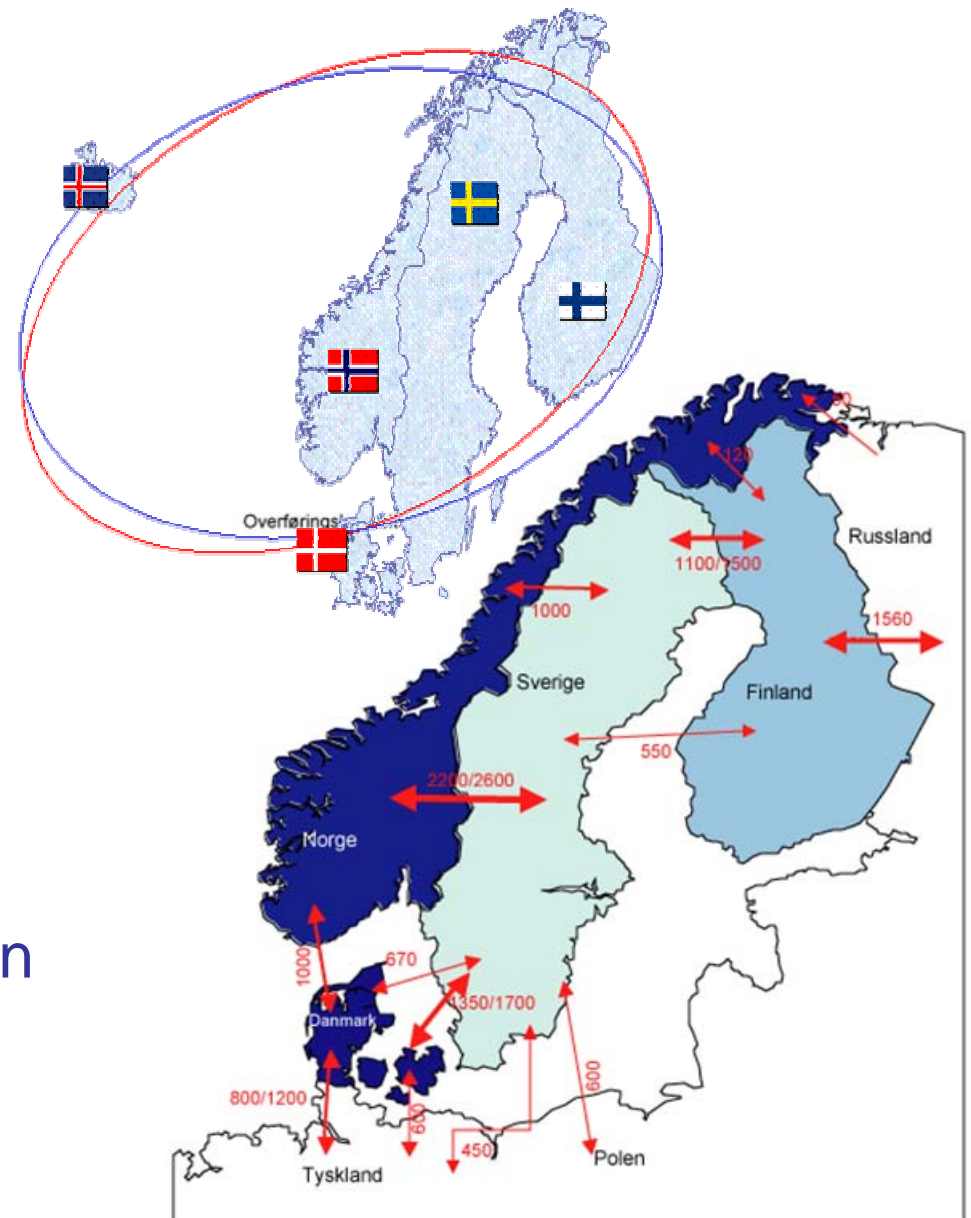
Characteristics of hydropower supply



The production varies +/- 30 TWh

A Nordic Powermarket

- Provides an effective coordination of generation from hydropower, nuclear and coal
- Gives adequate market signals to sustain a necessary level of investments
- Secures well functioning transmission capacity within Norway and between and the Nordic countries

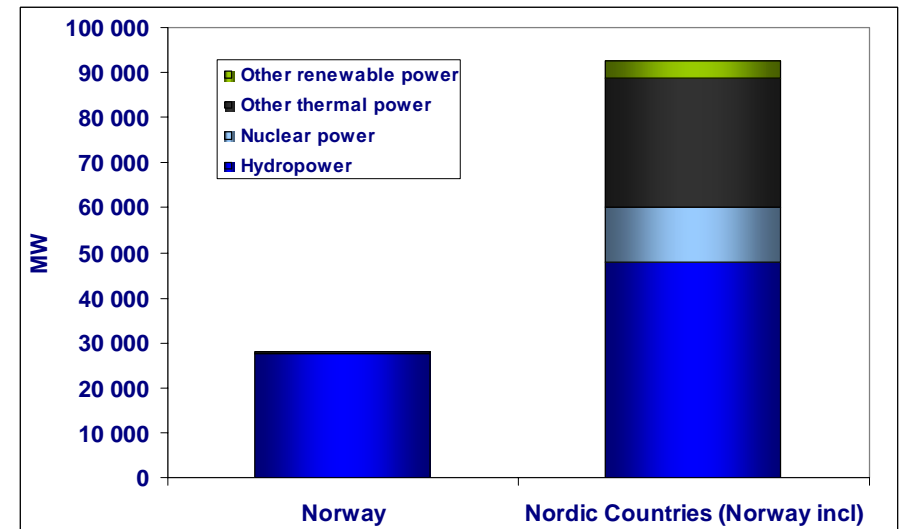


Security of energy supply

Alteration needed:

- Diversification of the energy sector
- Creation of a market for energy solutions
- New energy solutions on the supply, transport and demand side

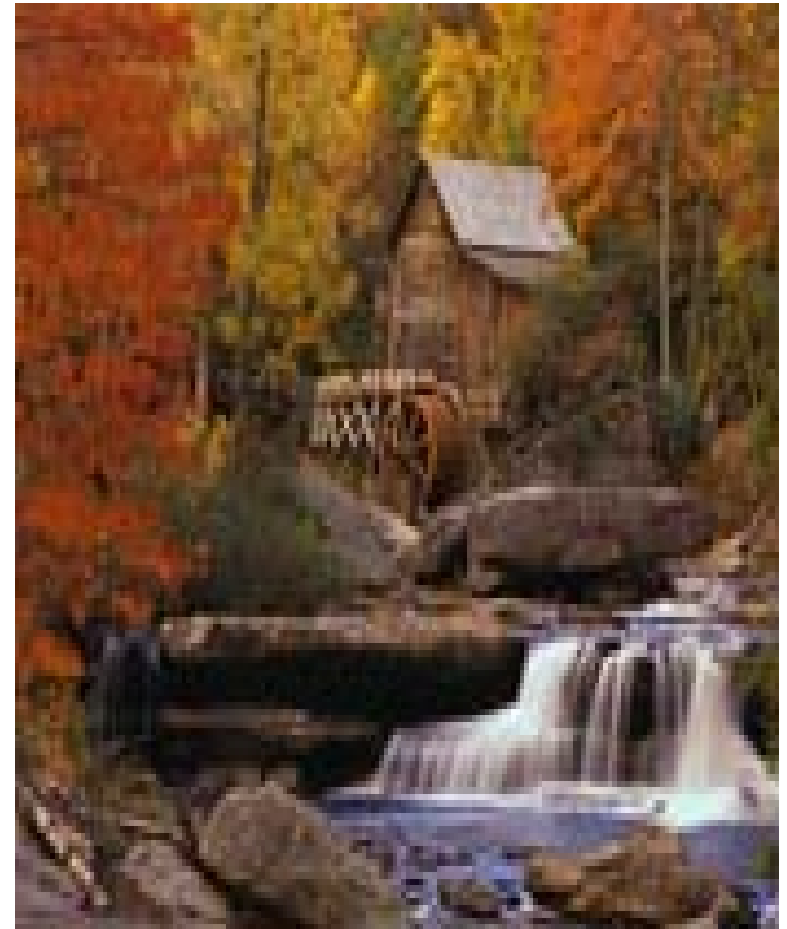
The results must be both energy- and cost efficient and secure competition



Installed production Capacity

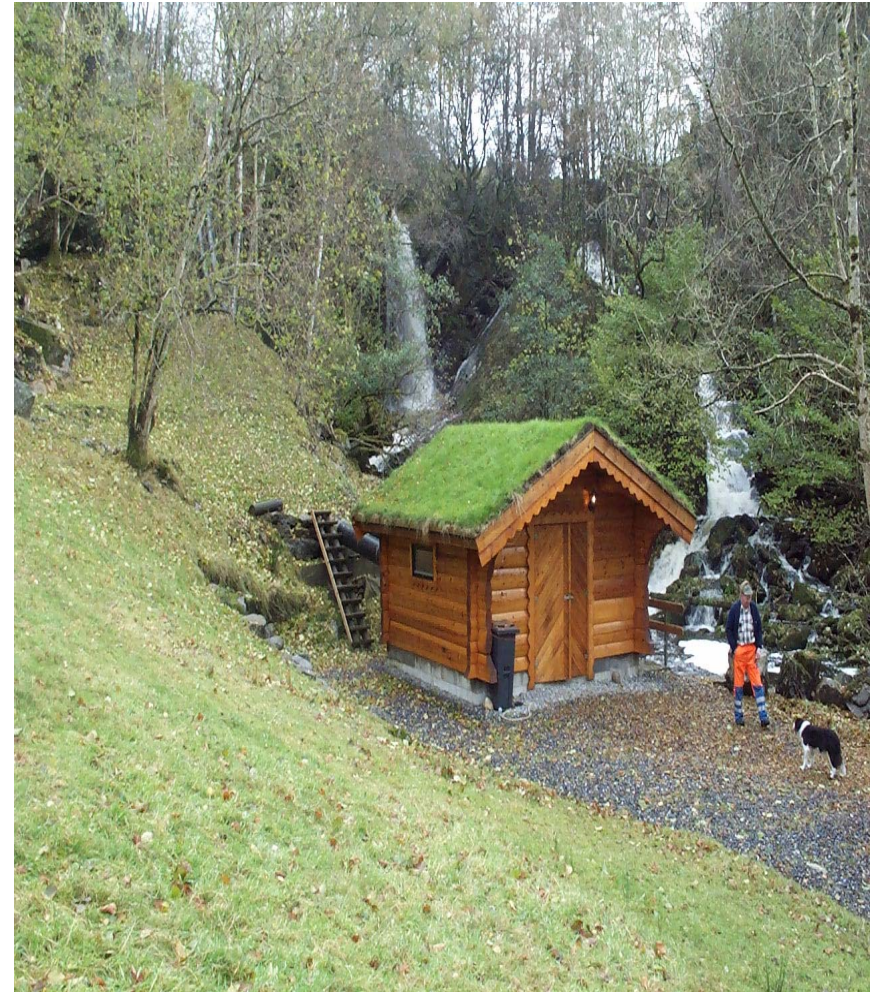
Upgrading and extension of existing plants

- Several plants are old and need upgrading
- Extensions can add more power
- New technology provides more efficiency



Small hydropower

- A large potential for future development
- A new strategy for more small hydropower projects (< 10 MW)



Wind power in Norway

Advantages

- High wind velocity (9 m/s)
- Large areas
- Regulation capacity exists in the hydropower system

Obstacles

- Need for subsidies
- Need for grid reinforcements

Political goal: 3 TWh within 2010



Hydrogen

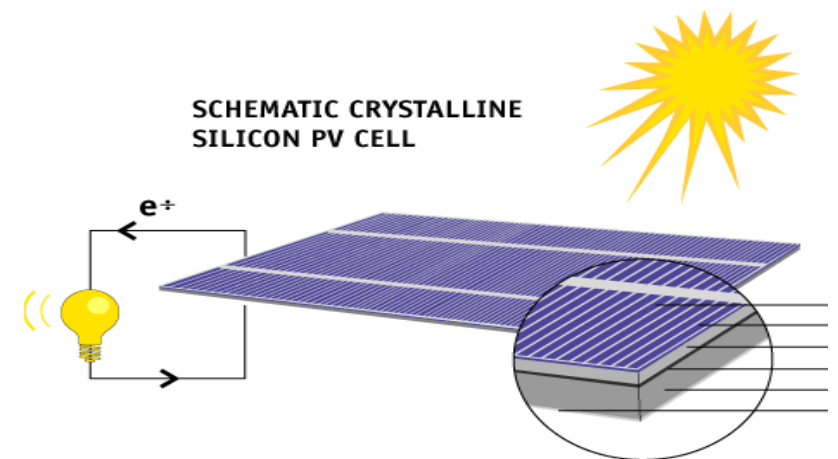
Hydrogen can play an important role in the future energy system:

- A flexible energy carrier
- Reduction of emissions
- Production of hydrogen from Norwegian natural gas
- Security of supply



Other possible areas for new generation capacity

- Biomass
- Solar
- Salt gradients
- Wave power



Norway – Resources and competence towards renewable energy

- more than one hundred years of experience in the field
- + a highly skilled research- and innovation minded sector
- + a committed political leadership within the sector
- = an interesting partner for China in this field