



NORWEGIAN MINISTRY
OF PETROLEUM AND ENERGY

The key role of renewable energy in a petroleum exporting country

AQPER's conference in Quebec City, 28 February 2013

Mr. Øivind Johansen, Assistant Director General

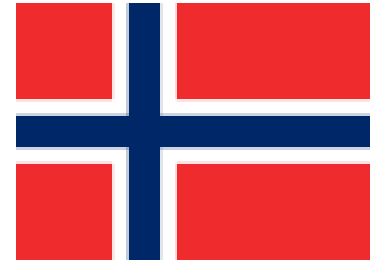
Outline

1. General overview
2. The petroleum sector
3. The power sector
4. Current policies and trends in RE development

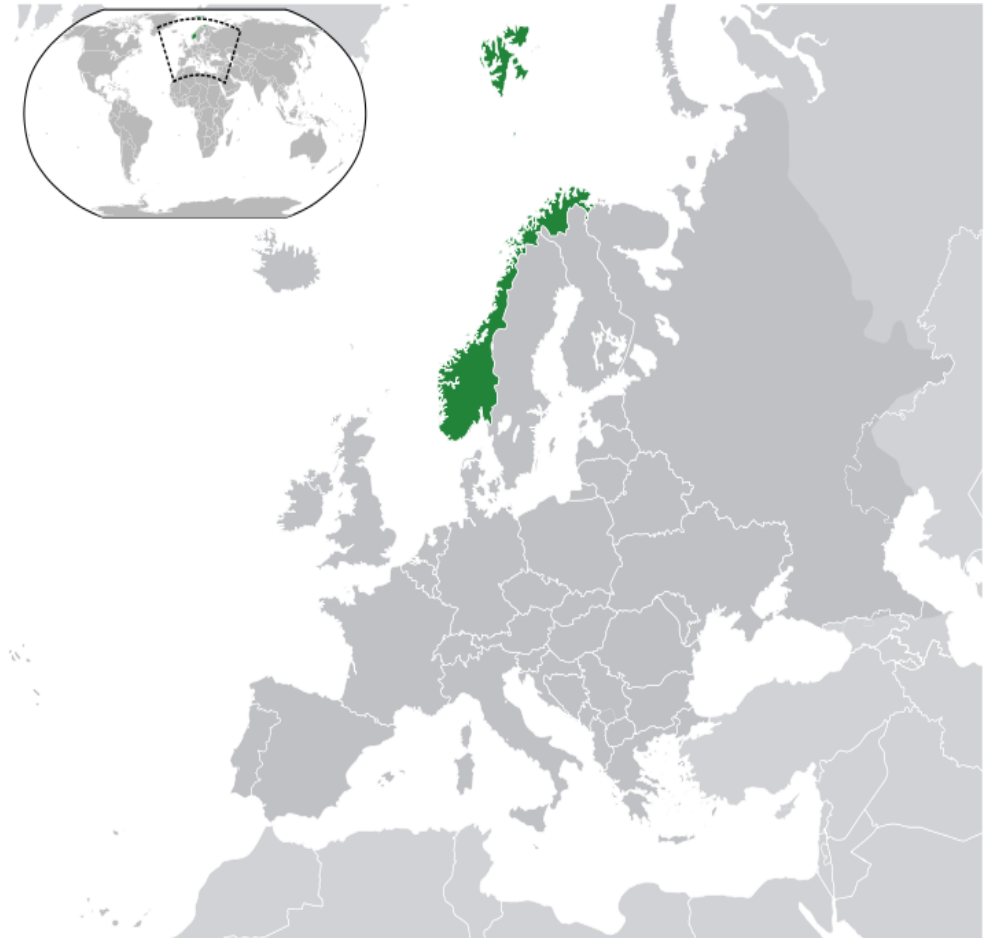
1 General overview



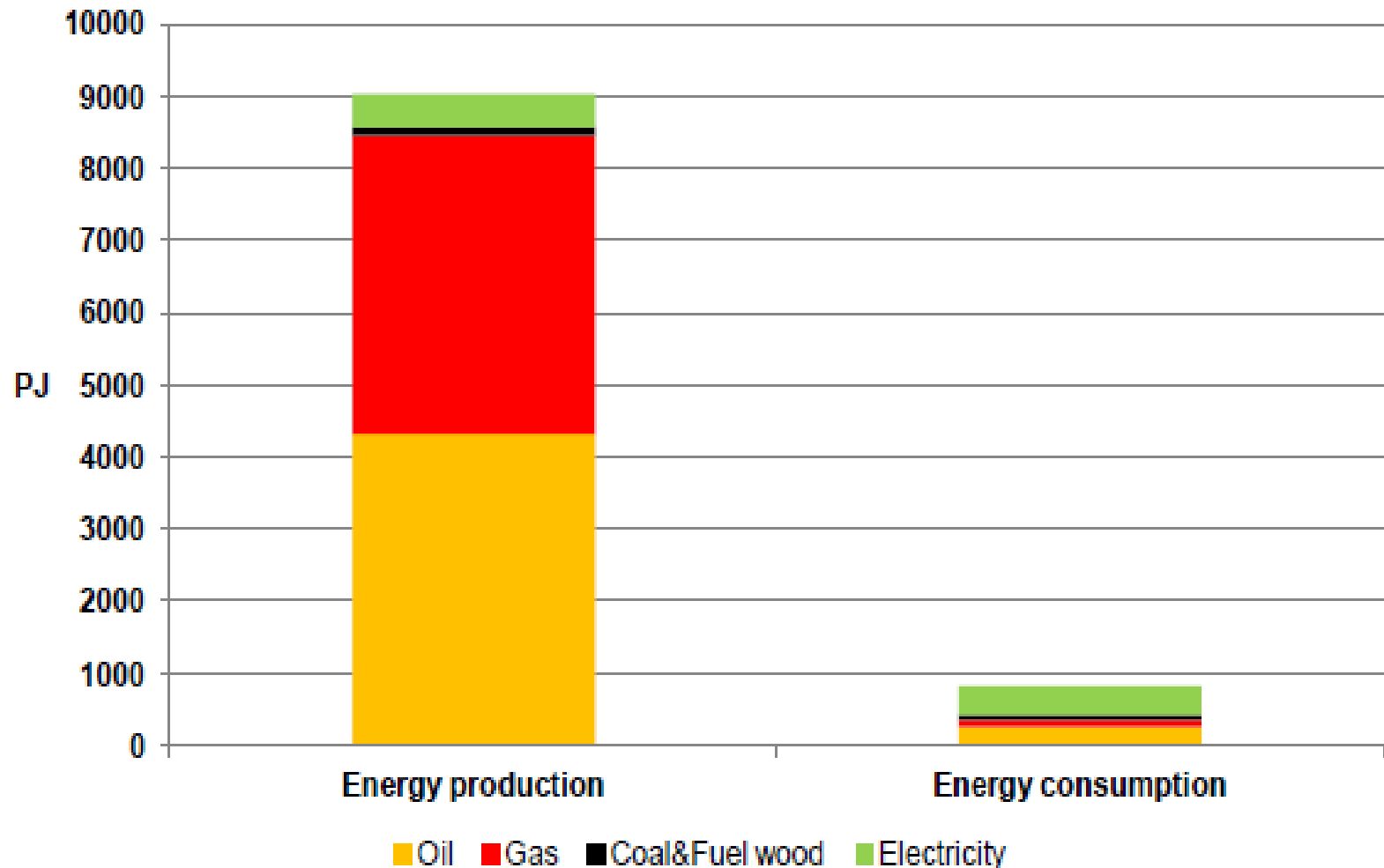
Norway at a glance

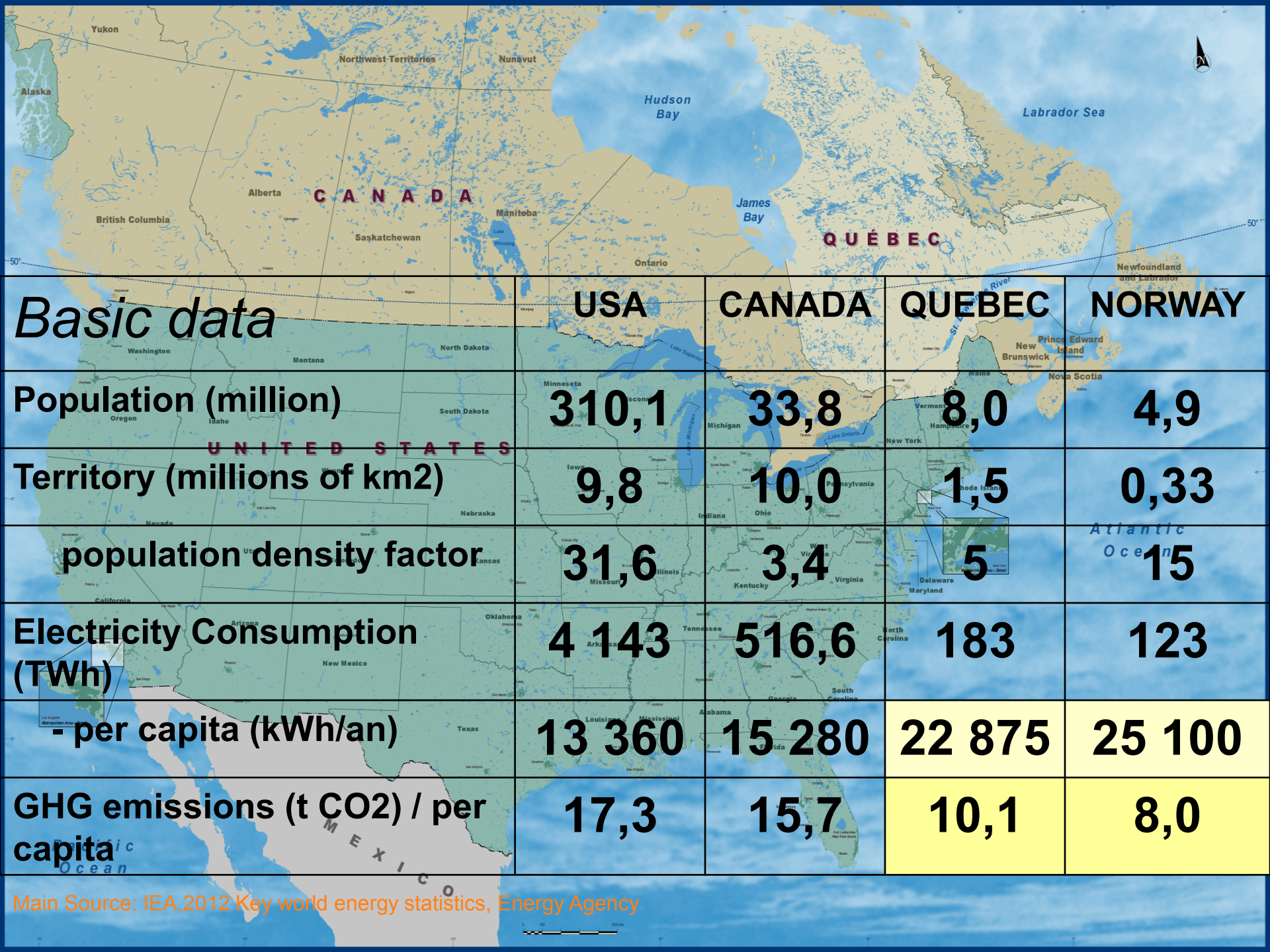


- Kingdom in Northern Europe
- 5,0 mill people
- 385 000 sq km
- GDP (nominal, 2011)
~ 98 000 USD/capita
- Member of the European
Economic Area (EEA)
- Rich in natural resources



Production and consumption of energy in Norway (2009)





Main Source: IEA.2012 Key world energy statistics, Energy Agency

The Ministry of Petroleum and Energy

The Ministry's responsibilities:

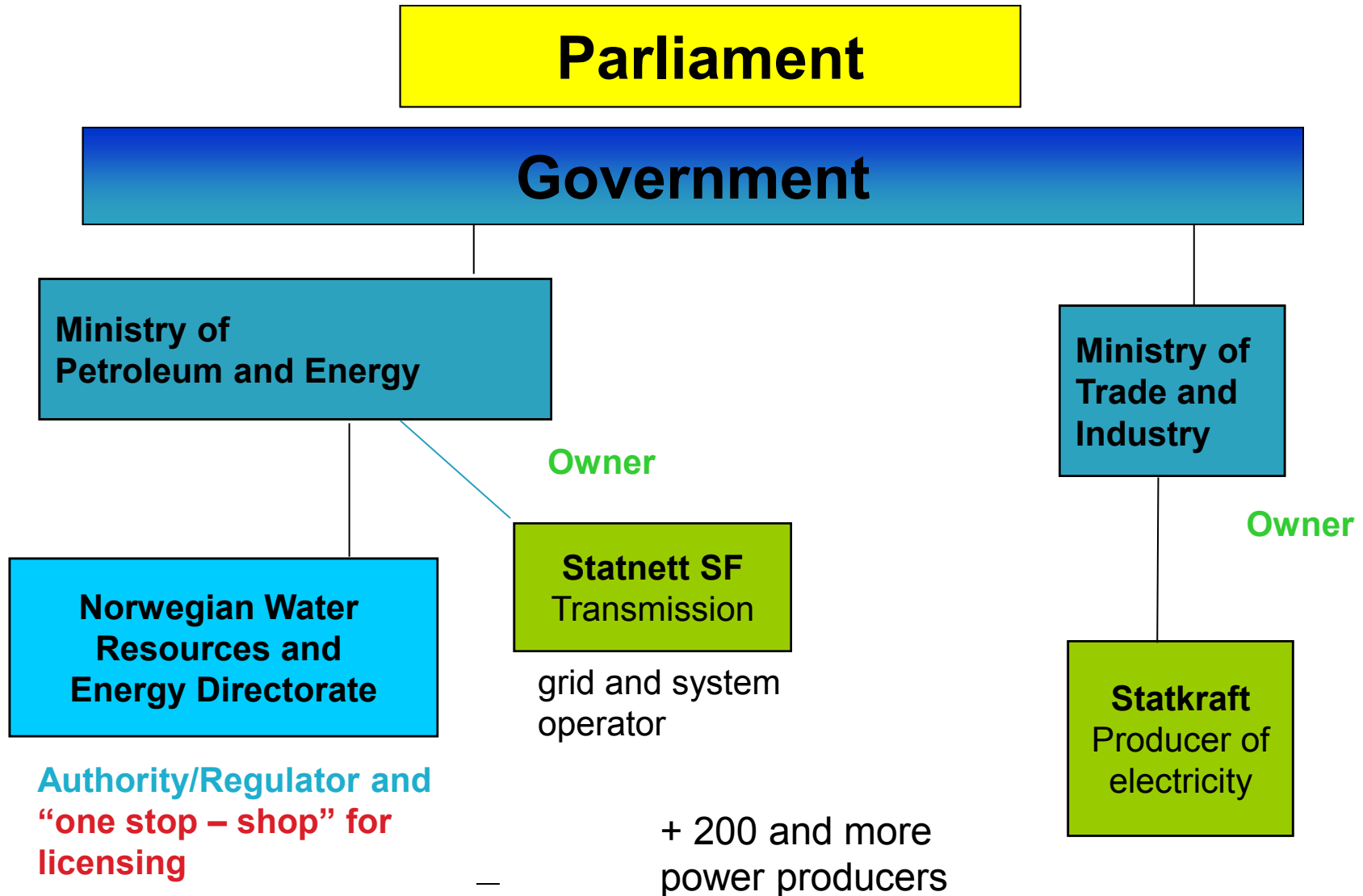
- ***petroleum*** (offshore),
- ***energy*** (mainland)
- ***water resources*** management

- **Overall objective:**

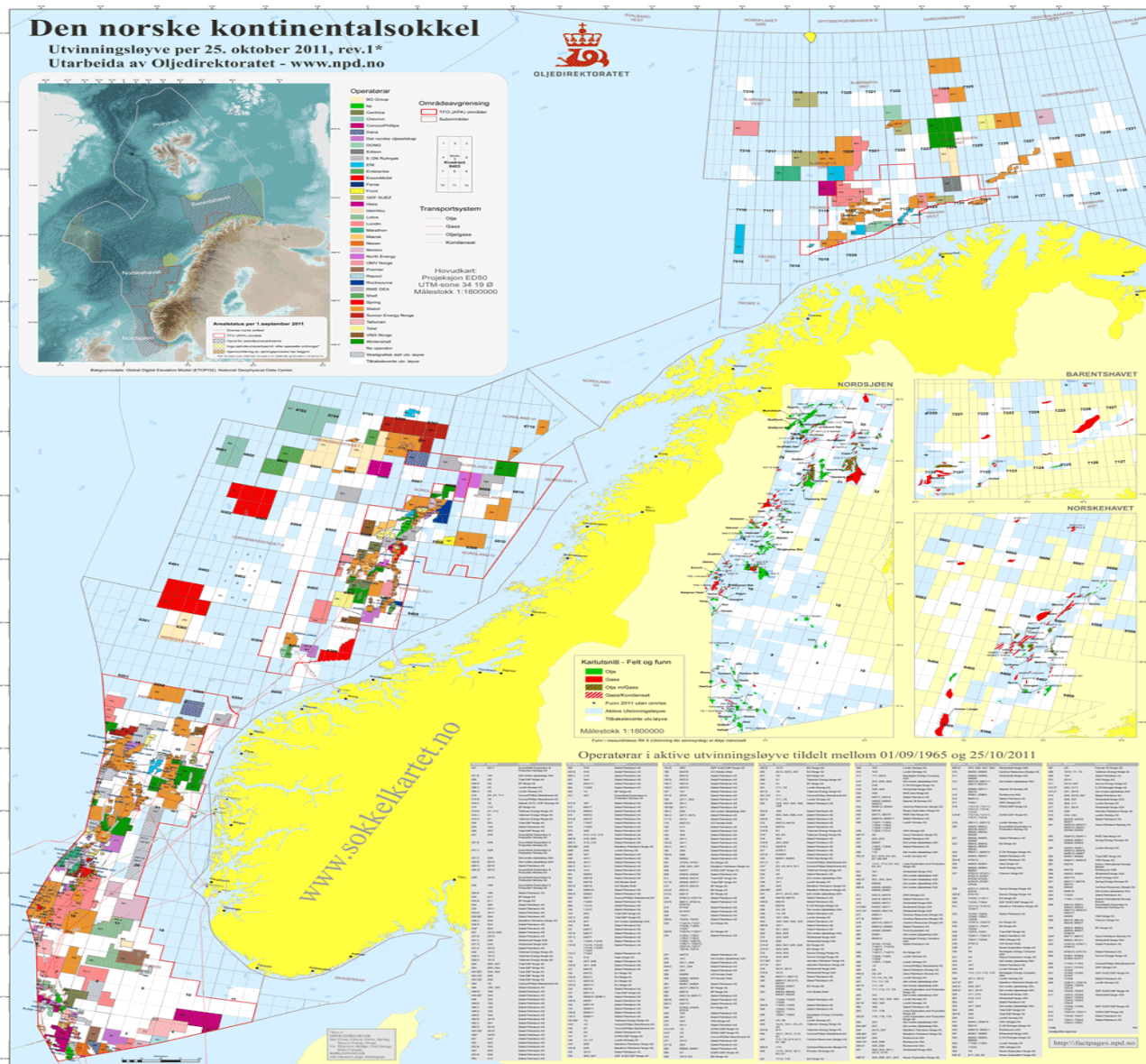
high value creation through efficient and environment friendly management of the energy resources



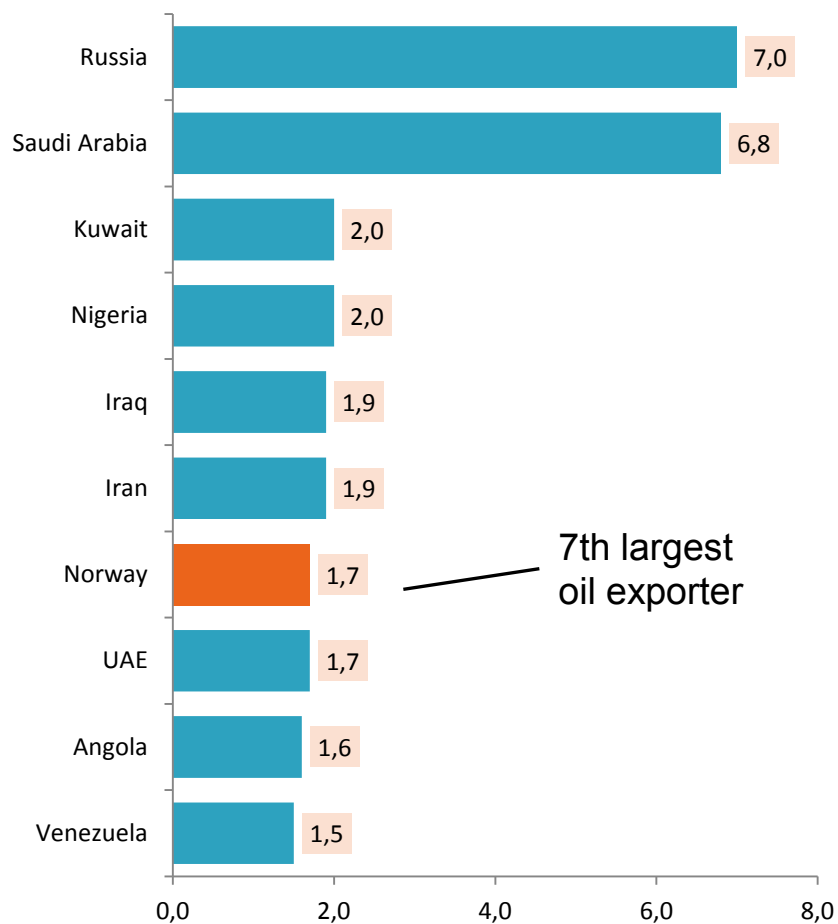
Administrative system – dual roles



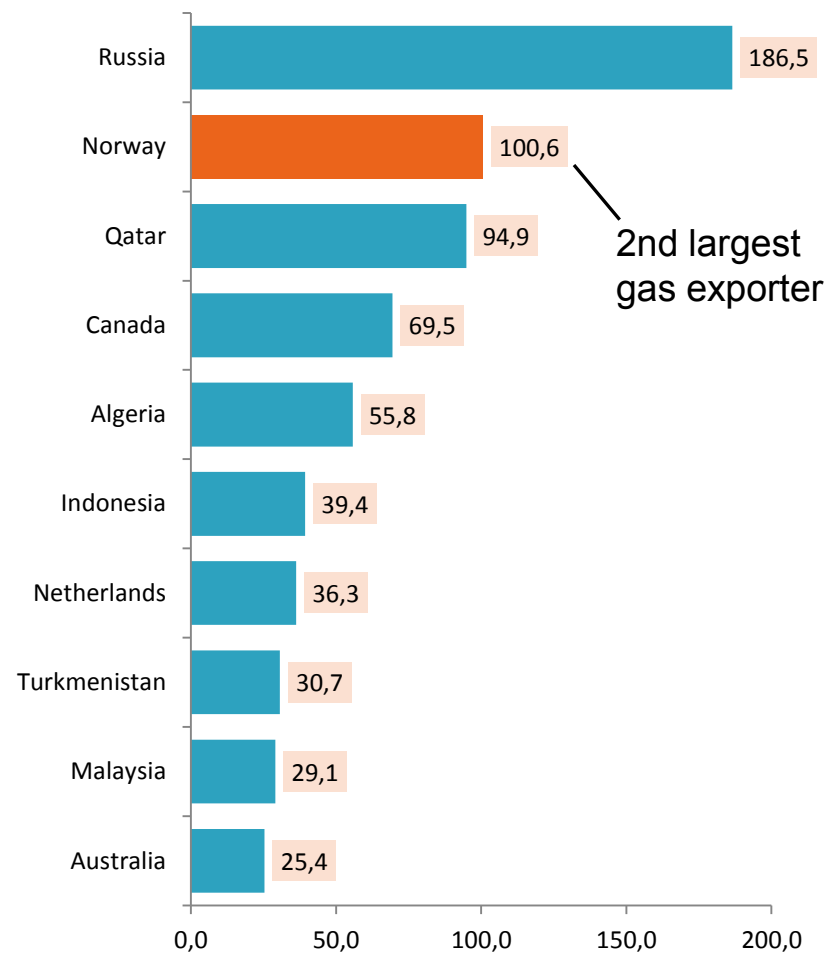
2 The Petroleum sector



Important petroleum exporter



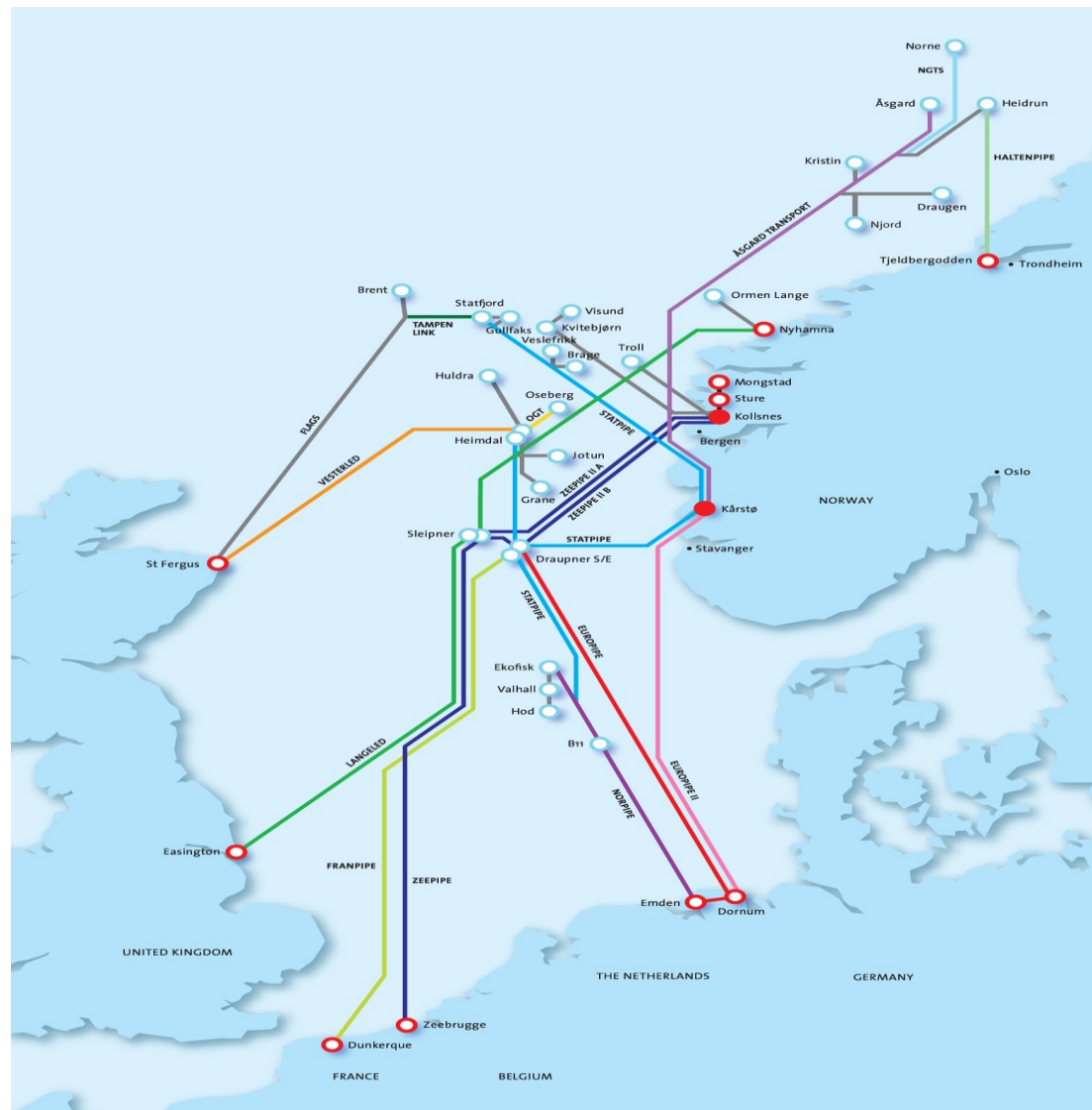
7th largest
oil exporter



2nd largest
gas exporter

Source: KBC, oil ranking 2011 and gas ranking 2010

Bringing Norwegian gas to Europe



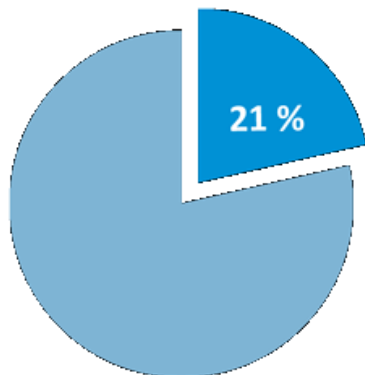
Important sector for Norway



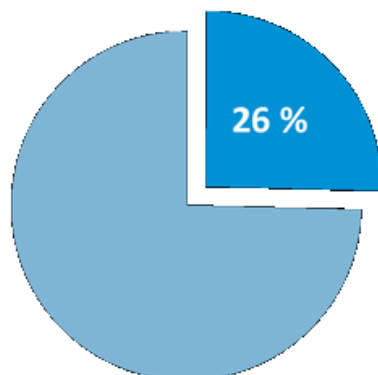
2,0
Million barrels of oil



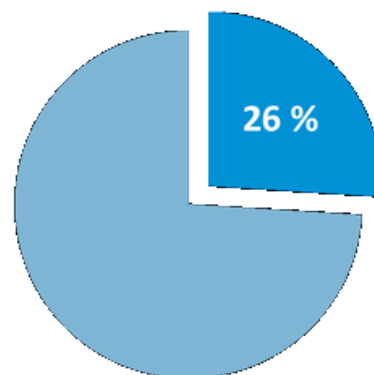
100
Bn Sqm gas



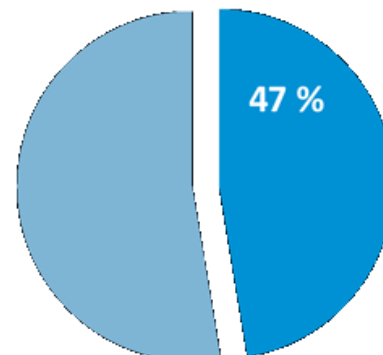
**The petroleum sector's
share of GDP**



**The petroleum sector's
share of state revenues**



**The petroleum sector's
share of total investment**

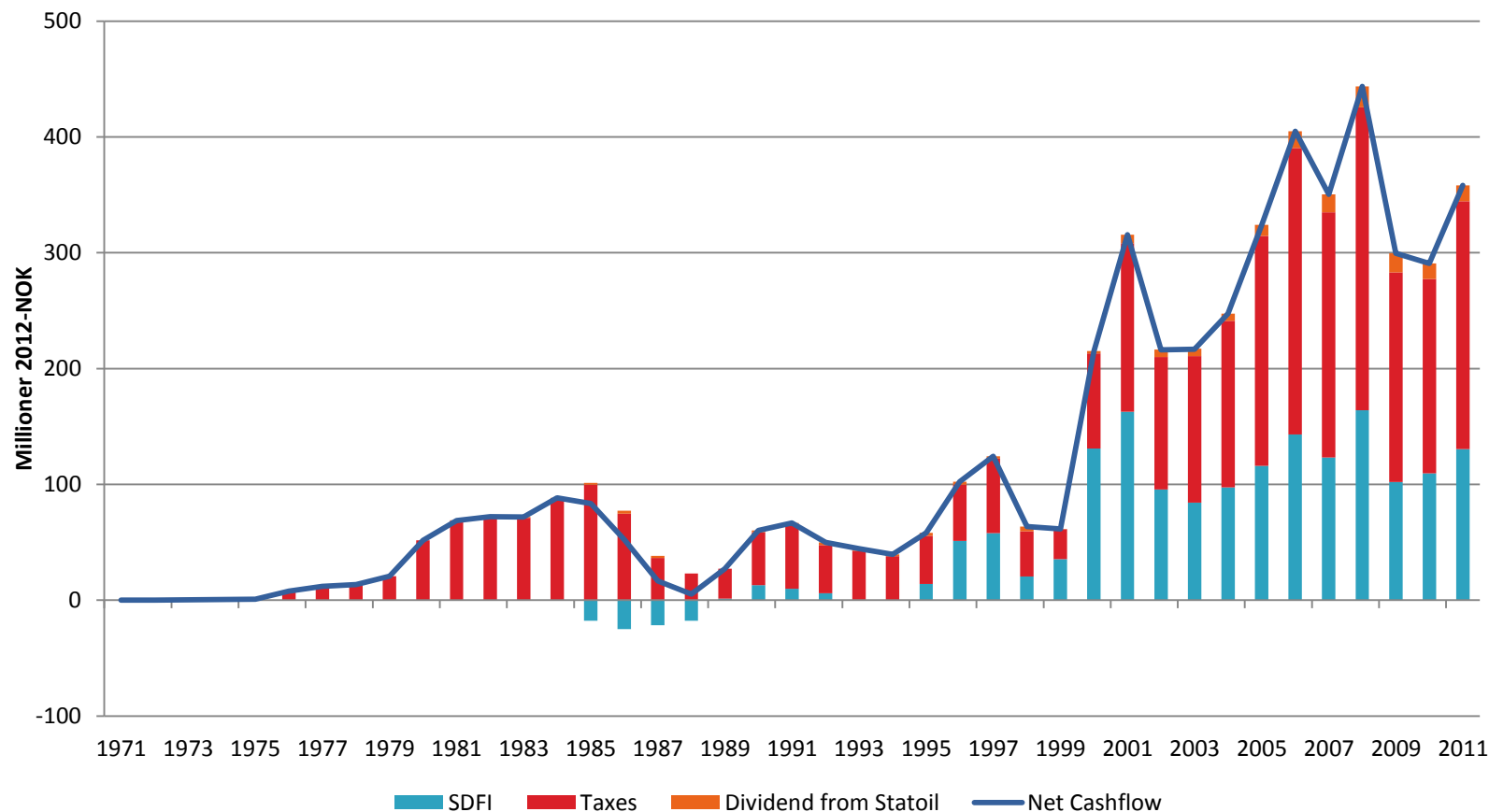


**The petroleum sector's
share of total exports**

Source: Statistics Norway, Ministry of Finance and NPD

Government Net Cashflow from Petroleum Activities

High oil price yields high income for the state.



Source: The National Budget

The Government Pension Fund ("the oil fund")

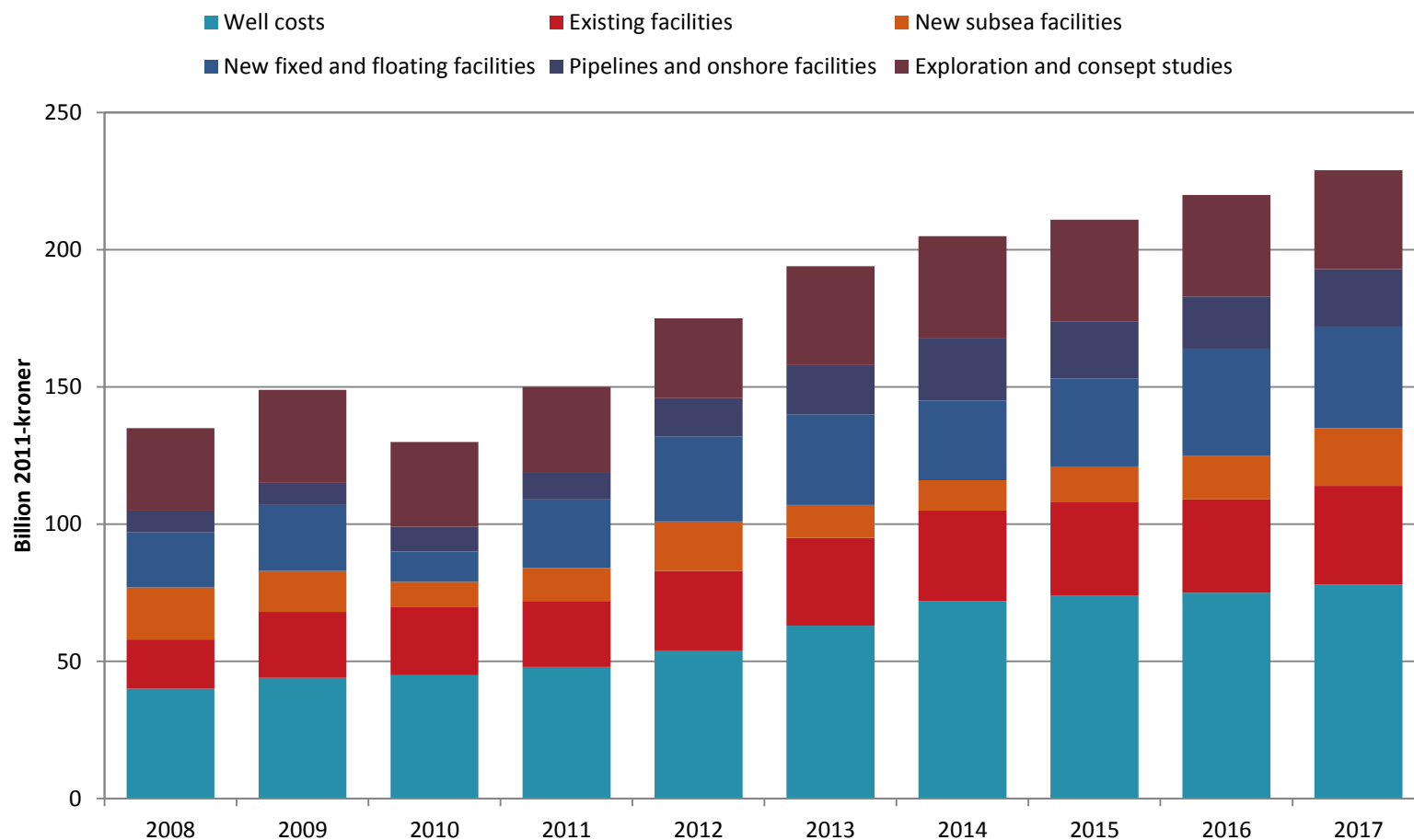
Market value end of Q3 2012 was 3 723 Billion
NOK (approx 678 Billion CAD)

The Budgetary Rule
regulates the use



Investments in the Petroleum Industry

High activity level on the Norwegian Continental Shelf



Source: NPD

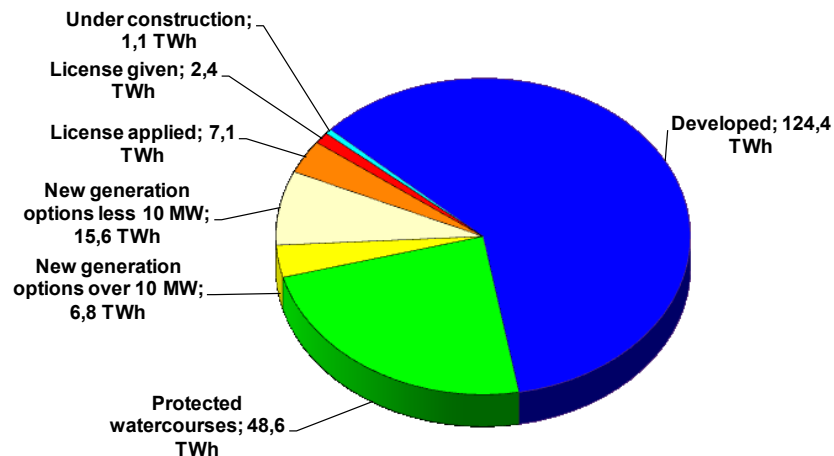
3 The Power sector



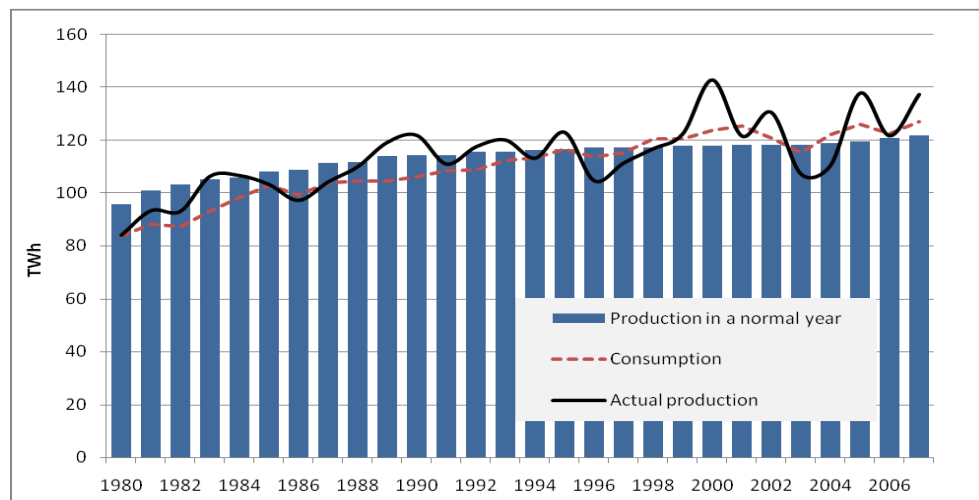
The Norwegian Museum of Hydro Power and Industry,
Tyssedal

Electricity Production in Norway

Hydropower potential as of 01.01.2011



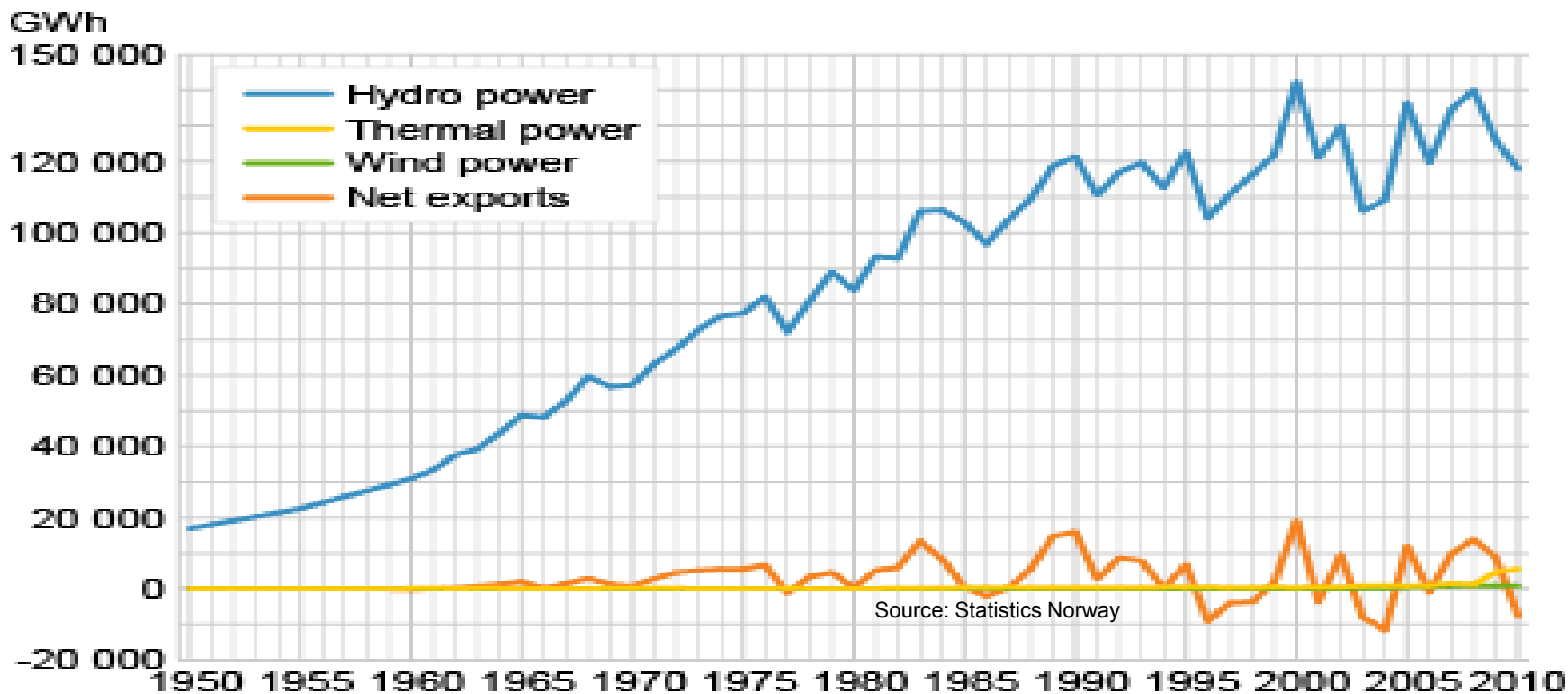
Mean annual generation capacity: 206,0 TWh



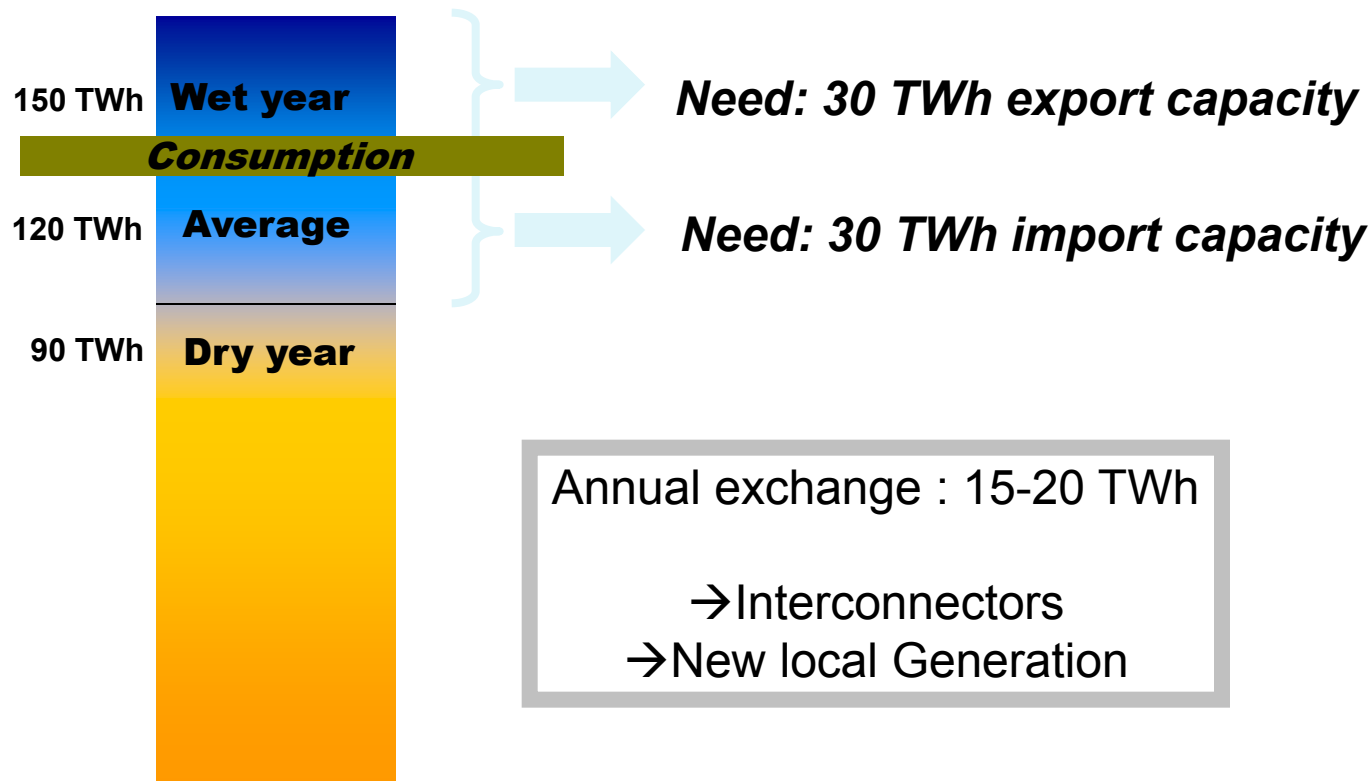
- Installed capacity 31 200 MW
- Production in 2012: 148 TWh
- Sixth largest hydropower producer in the World
- 96-97 % of electricity production from hydro power
- Roughly 50 % of the reservoir capacity in Europe (~84 TWh/y)
- Statkraft is Europe's largest producer of renewable energy

Power supply

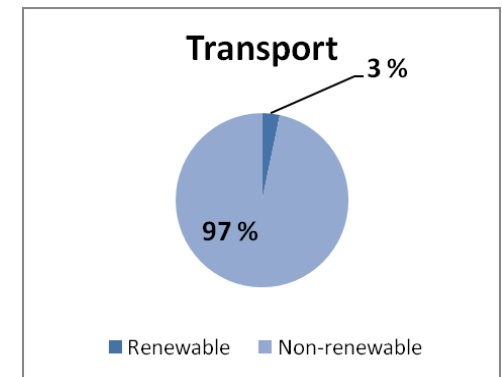
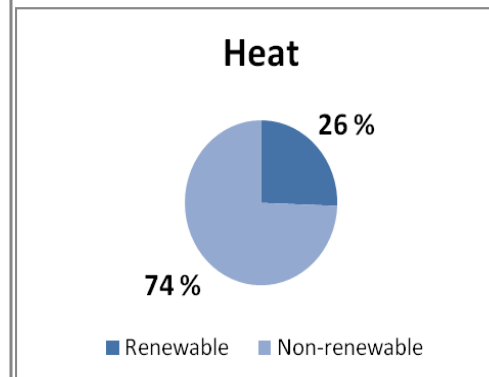
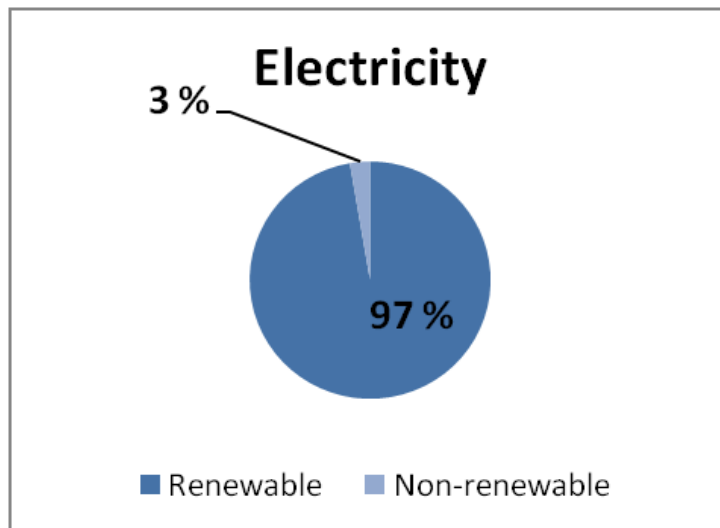
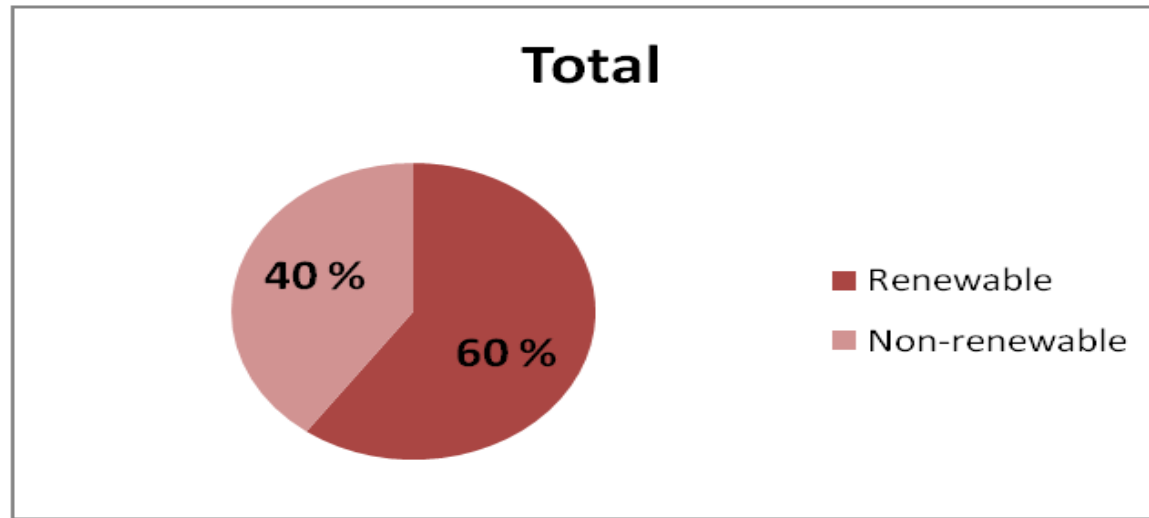
**Production of water-, thermal and windpower and net exports (export - imports) of electricity. 1950-2010. GWh
(Corrected 12 December 2011 at 12:20 p.m.)**



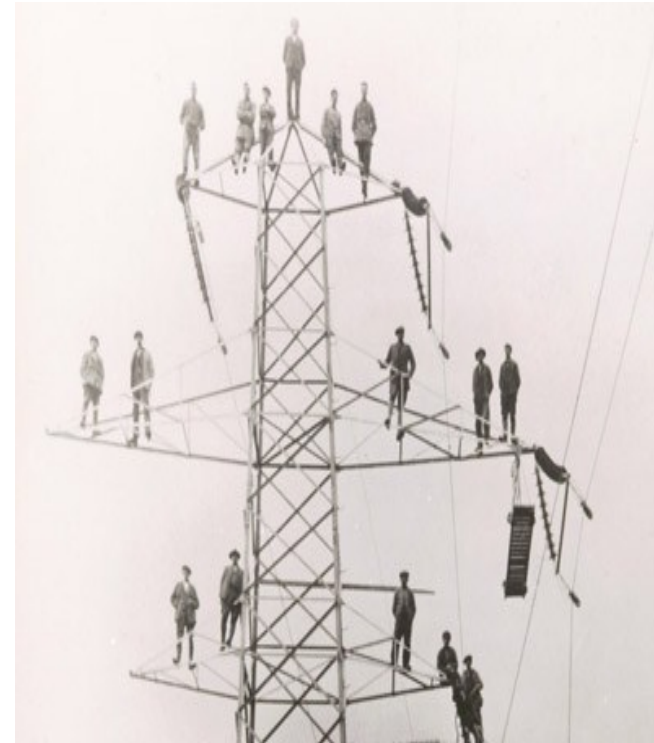
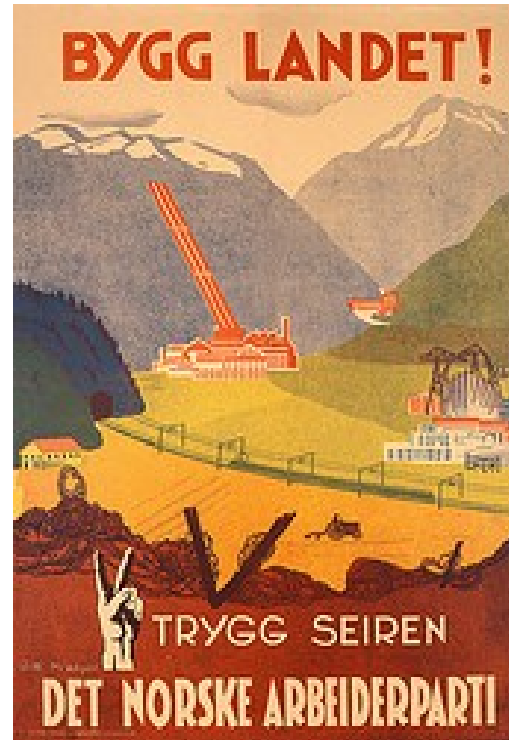
Annual variations in hydropower generation



Norway's share of renewable energy use



Historical development



Norway's first power production plant with interconnected customers opened in 1885

Development through hydropower

- Hydropower was key to industrialise and electrify Norway - the backbone of our prosperity
- Major benefits are given to local communities
- Domestic supply industry and consulting business was developed
- A large market at home is the basis for excellence abroad
- Several Norwegian companies invest in hydropower in emerging markets



Some main historical events

1885: The first hydropower station is built

1906: The first concession act is passed

1917: The main concession acts

1991: The Energy Act created a market

1992: Statkraft and Statnett separated

1993: The Nordic Power Exchange

2012: A common electricity certificate market with Sweden



Ownership of the hydropower capacity

- 89 % public ownership;
- The state, by Statkraft, 34 %
- Municipalities/counties 55 %
- Private companies 11%



Sustainability issues

**A secure and reliable
electricity supply**

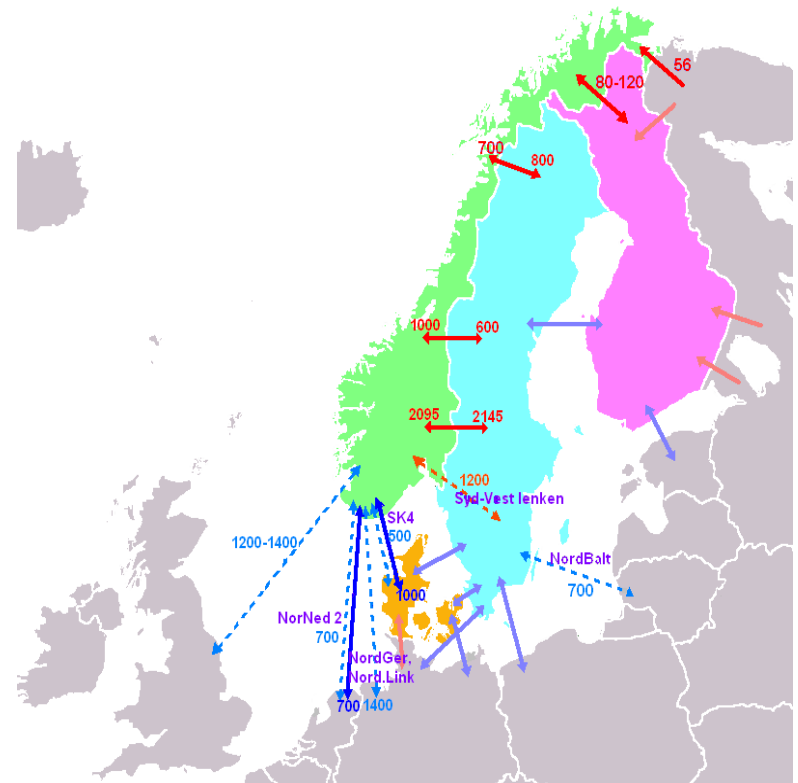


Value creation

**Environmental
considerations**

Power trade

- During the 1990s, the Nordic countries created a framework for a common power market based on open competition.
- Nord Pool was the first international commodity exchange for trading power.
- Integrated part of a Northern European power market



The electricity market

- Consumers are free to buy electricity from any supplier
- All participants have free access to the grid
- Power production is separated from grid operation
 - Production is a deregulated market
 - Grid is a natural monopoly
- 74 % of the power production in the Nordic countries is traded on the Nordic power exchange, Nord Pool Spot



4 Current Policies and Trends



Main issues in current energy policy

- Develop more renewable power production
- Further development of national grid
 - interconnectors
- Energy restructuring and
 - efficiency



EU's RES Directive (2009/28/EF)

- A target of increasing the share of RE from 8,5 to 20 per cent of EU's total energy consumption in 2020.
- Norway has agreed to a **target of 67,5 % in 2020**. (Up from ca **60 %** today)
- Norway's target is the highest in Europe.

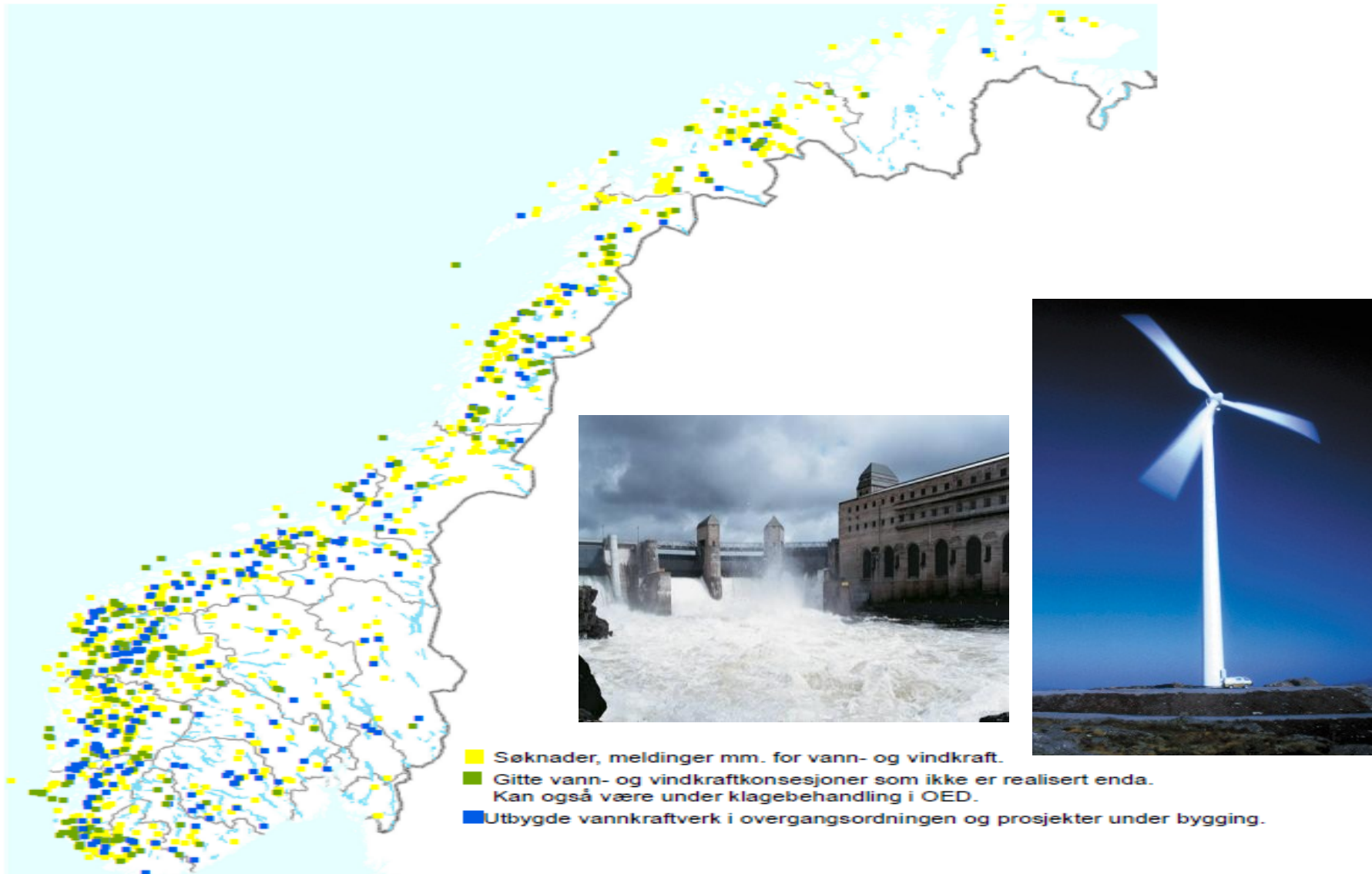


Swedish-Norwegian Green Certificate Market

- Together with Sweden, Norway has a goal of increasing the renewable energy production by 26,4 TWh/y by 2020.
- 26,4 TWh represent 13 per cent of the total renewable energy production in the two countries today, and 10 percent of total energy production.
- The common certificate market is to take effect from 1st of January 2012 and last until 31st of December 2035.
- Technology neutral system

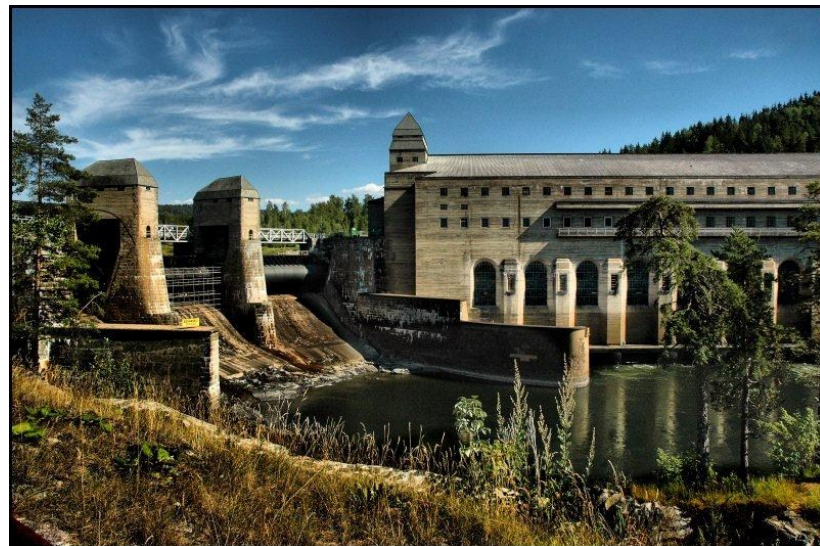


Possible projects in the certificate system

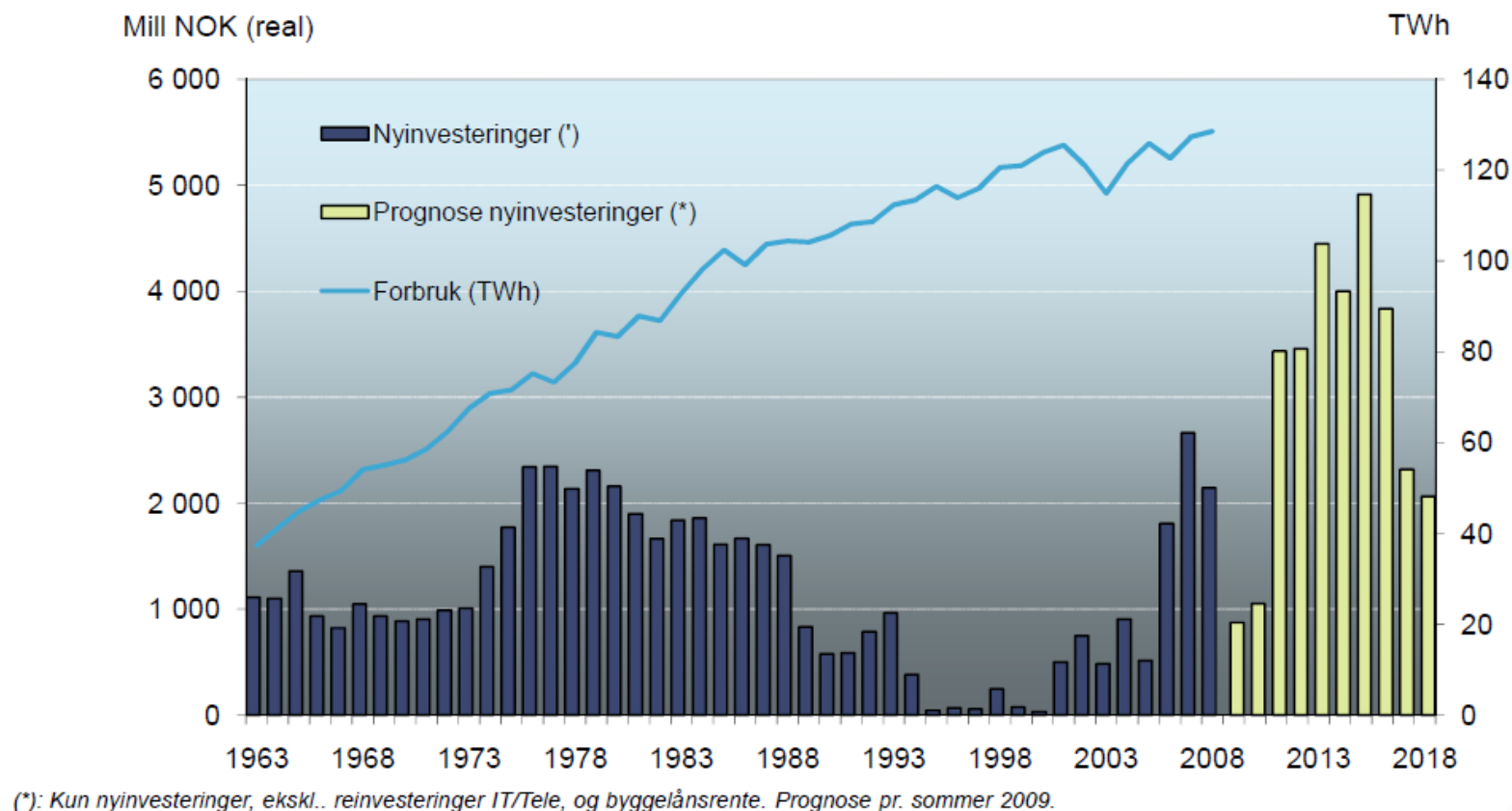


New challenges and opportunities

- Need for large investments due to:
 - Consumption growth
 - Aging infrastructure
 - New renewable power production
 - Security of supply considerations
 - Imbalances and price differences between regions
- New opportunities for using electricity i.e.;
 - increased power exports
 - new industries
 - supply of electricity to offshore installations
 - transport sector




Investments in the electricity sector

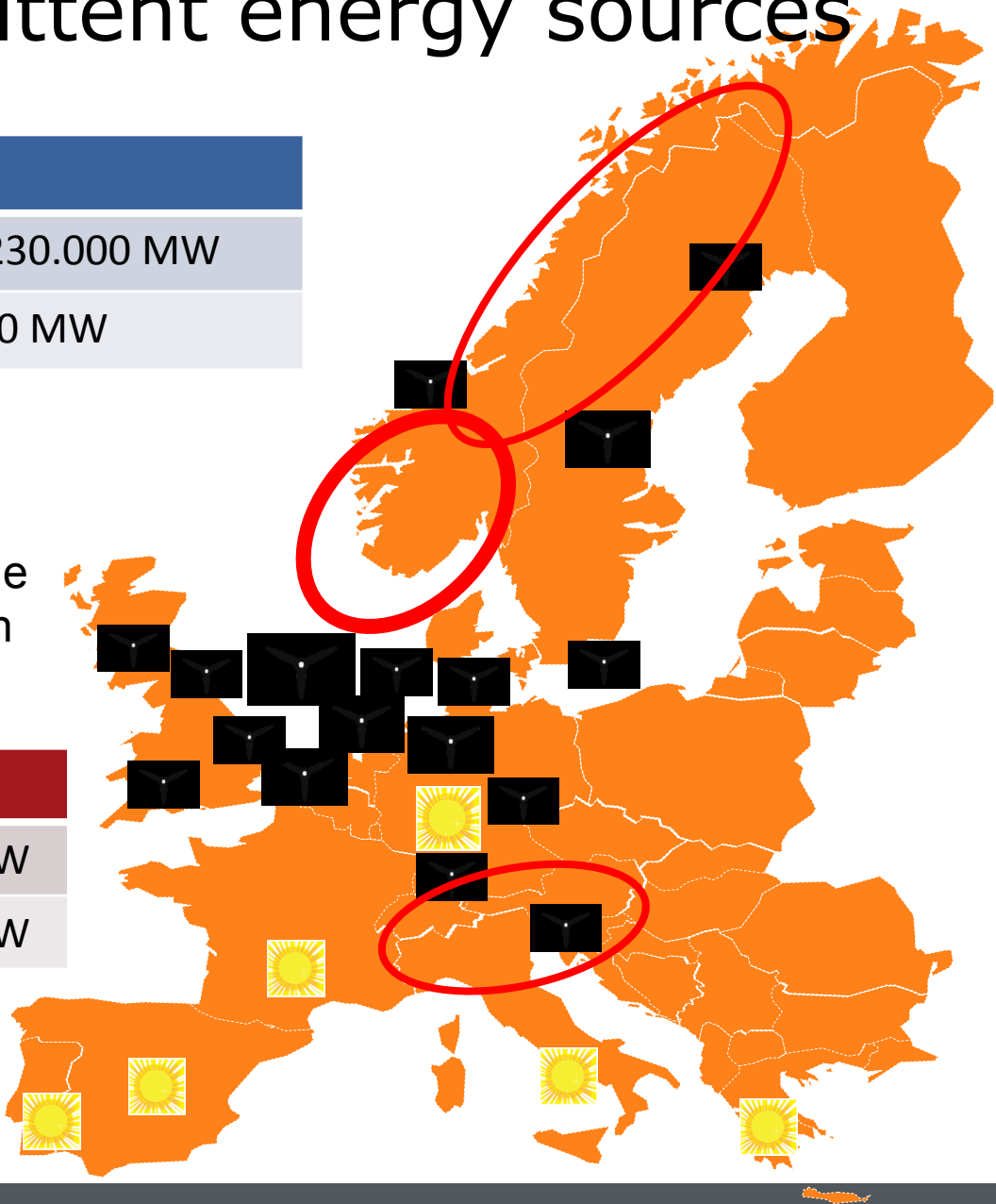


Growth in intermittent energy sources

EU	2009	2020
Wind	76.000 MW	180 – 230.000 MW
PV	16.000 MW	150.000 MW

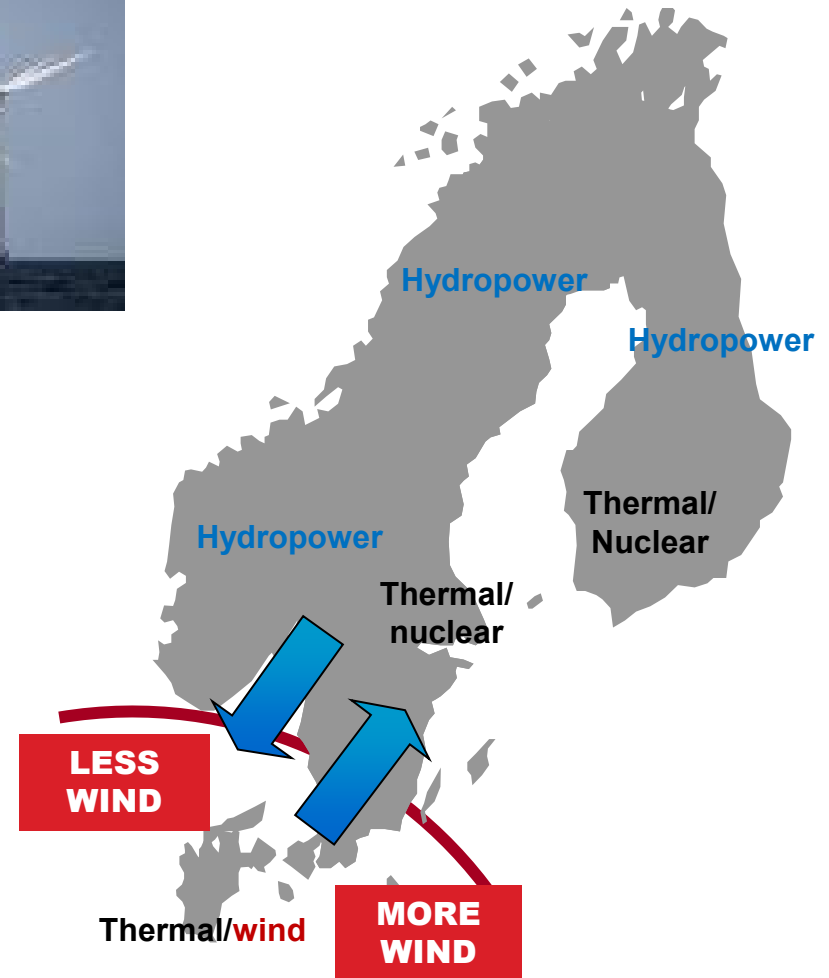
 Location of important flexible renewable hydro generation

Germany	2009	2020
Wind	26.000 MW	46.000 MW
PV	10.000 MW	52.000 MW

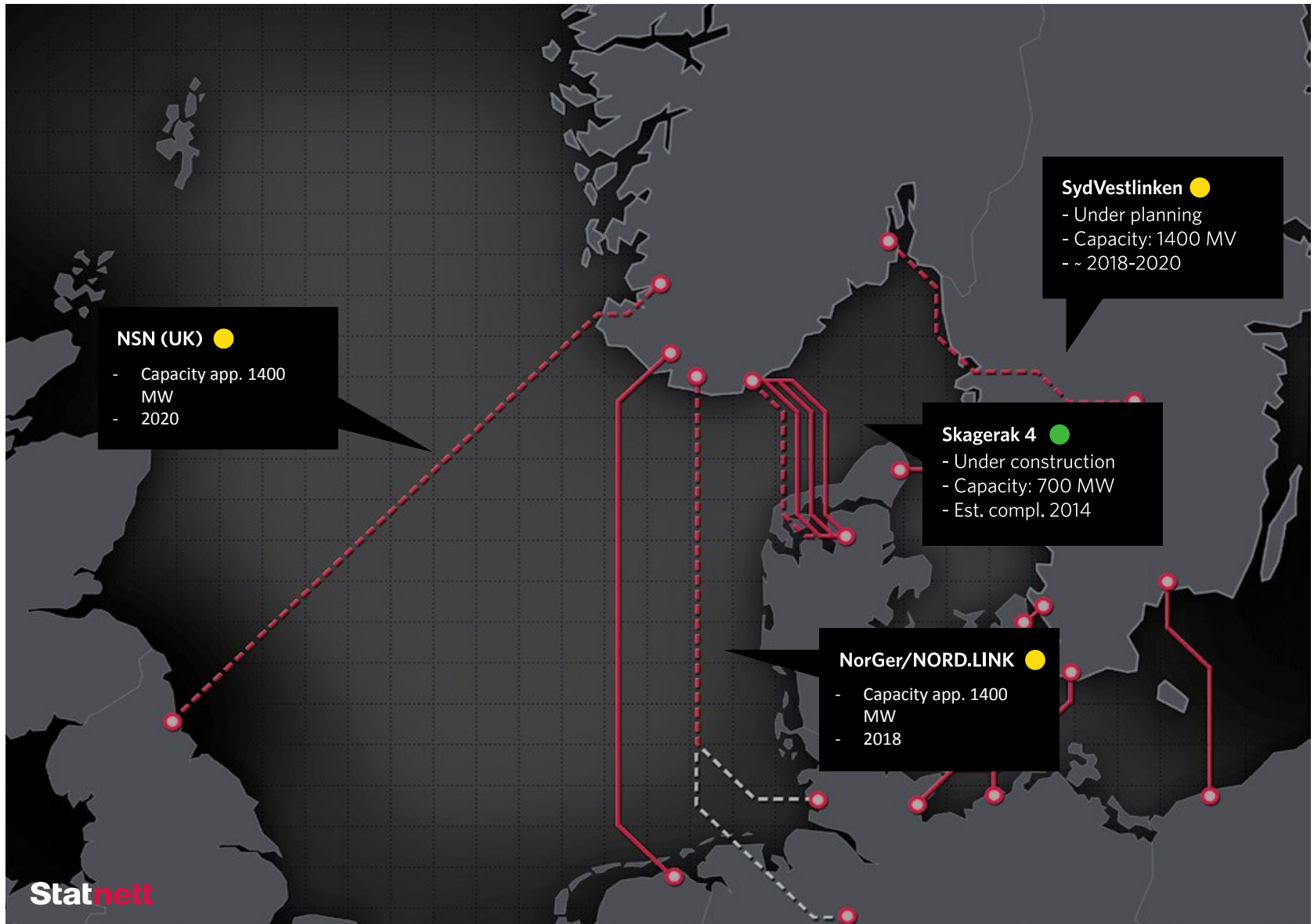


Sources: EurObservEr,;European Commission
EREC; EWEA, EPIA

Power trade as enabler for RE development



(New) interconnectors



Issues for further RE development

- Prices decided by the market – grid parity
- Licensing processes take time
- Possible bottlenecks (among supply industry, constructors and consultants, and a price driver?)
- Grid development and public perception (NIMBY)
- A booming petroleum sector = competition for human and industrial resources
- Great opportunities for industrial and economic development!



Merci de votre attention !

**Pour de plus amples renseignements
veuillez me contacter via:
jj@oed.dep.no**