



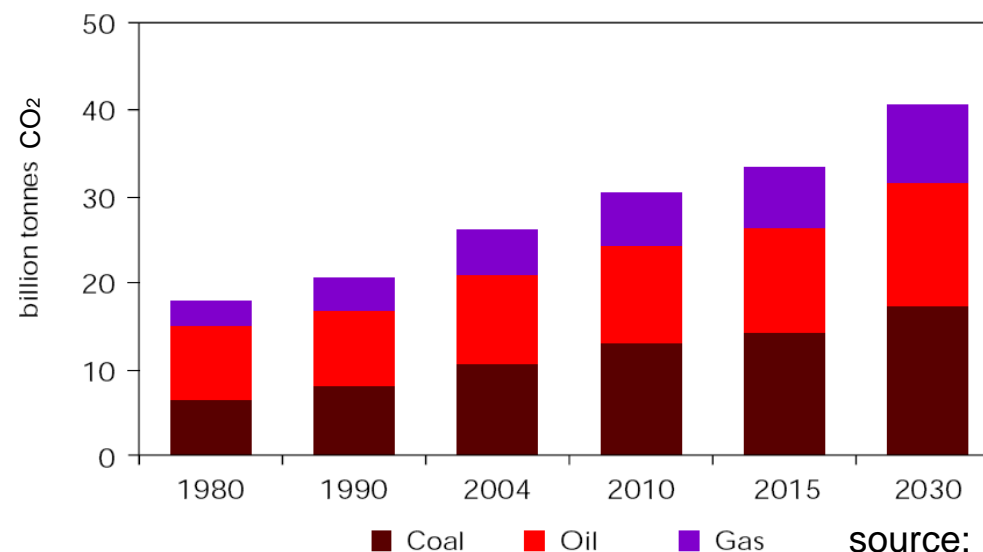
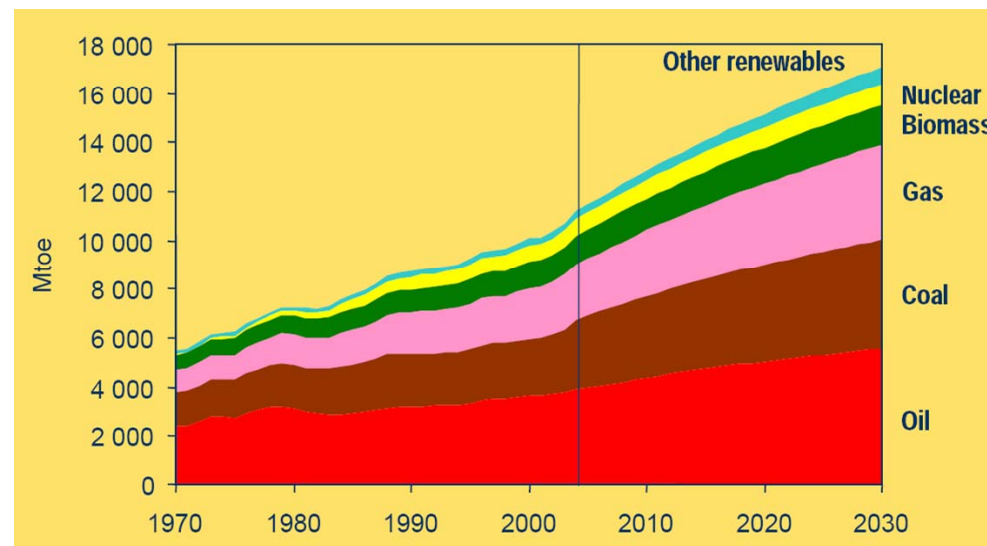
Legal barriers to CCS

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Norwegian Ministry of Petroleum and Energy
Bali, 19 March 2009

The world needs energy...

- Global energy demand will increase by 55% by 2030
- 84% of global energy demand will be covered by fossil fuels
- Limiting CO₂ emissions from energy generation will be a key to reducing emissions of greenhouse gases



source: IEA

www.mpe.dep.no

...and CCS is part of the solution

- Necessary to develop sustainable energy systems
 - CCS is a solution
 - In addition to other measures such as energy efficiency and increased use of renewable energy sources
- Mitigation through implementation of clean energy technologies



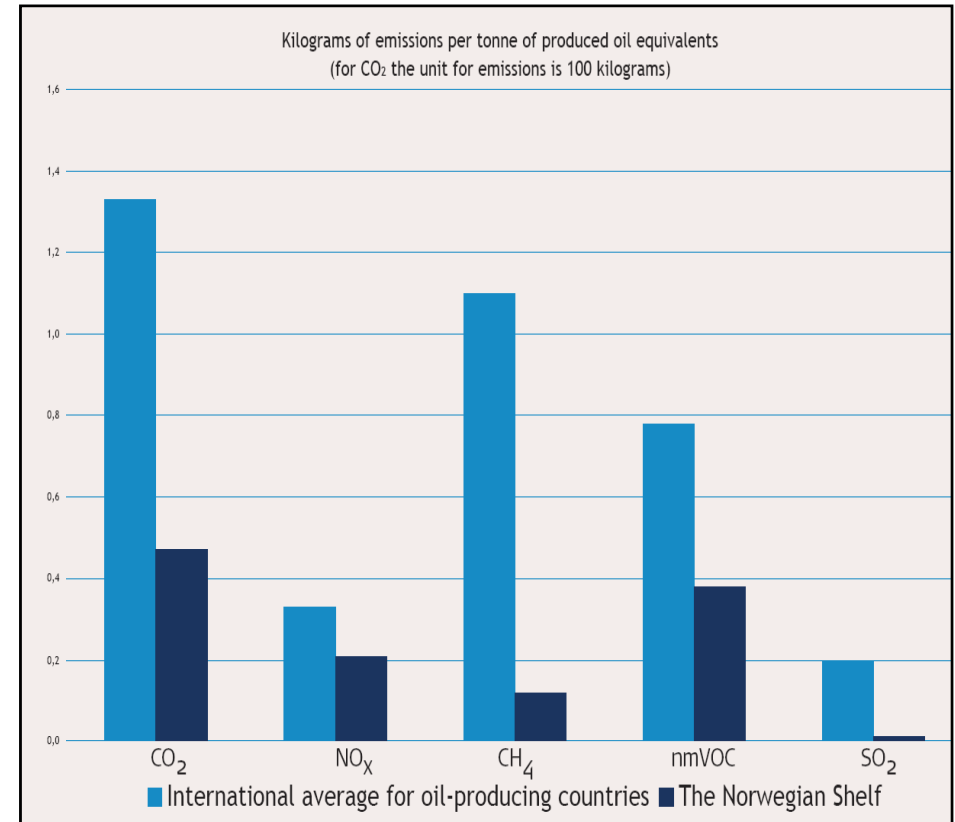
Implementing CCS: Major challenges

- **Costs**
 - Establish commercial incentives
 - Stimulate development, deployment and dissemination of CCS technologies
 - Public funding will be important in an early CCS demonstration phase
- **Legal and regulatory frameworks**
 - Issues of safe storage, liability, transport etc.
- **Public acceptance**



The Norwegian Context

- **Environmental concerns have always been a priority**
- **Measures such as:**
 - **CO₂-tax**
 - **Prohibition of flaring**
- **Successful results**



Source: OGP/OLF 2005

Ambitious, binding climate policy

Norway will:

- Reduce its emissions by an additional 10% on top of our initial Kyoto Protocol commitments
- Become carbon neutral by 2030
- Reduce 2/3 of emissions in 2020 by cuts in domestic emissions
- Involve all sectors and industry
- Concentrate on technology development



The Norwegian Government has ambitious goals

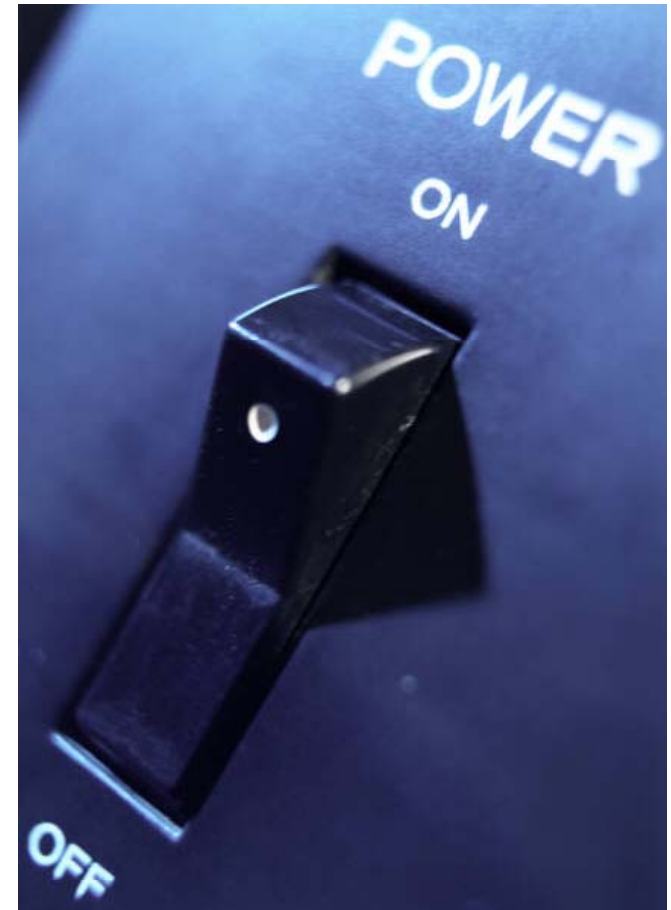
Aim = make widespread use of Carbon Capture and Storage (CCS) a reality

- The Norwegian Government intends to:
 - cooperate with the industry
 - identify potential CO₂ chains
 - provide public funding
- *“All new gas fired power plants shall be based on technology for CO₂ capture”*



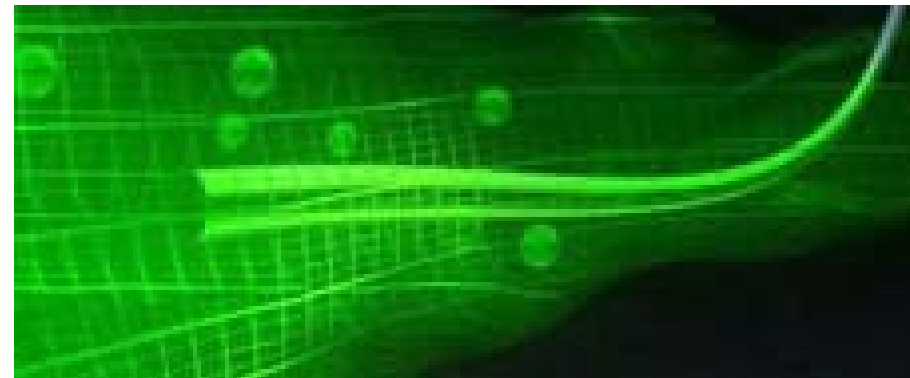
Carbon Capture and Storage in Norway

- **10 years of storage experience**
 - Sleipner
 - and from 2008: Snøhvit
- **Carbon Capture and Storage projects in progress**
 - Test Centre Mongstad
 - Large Scale Facility Mongstad
 - Large Scale Facility Kårstø



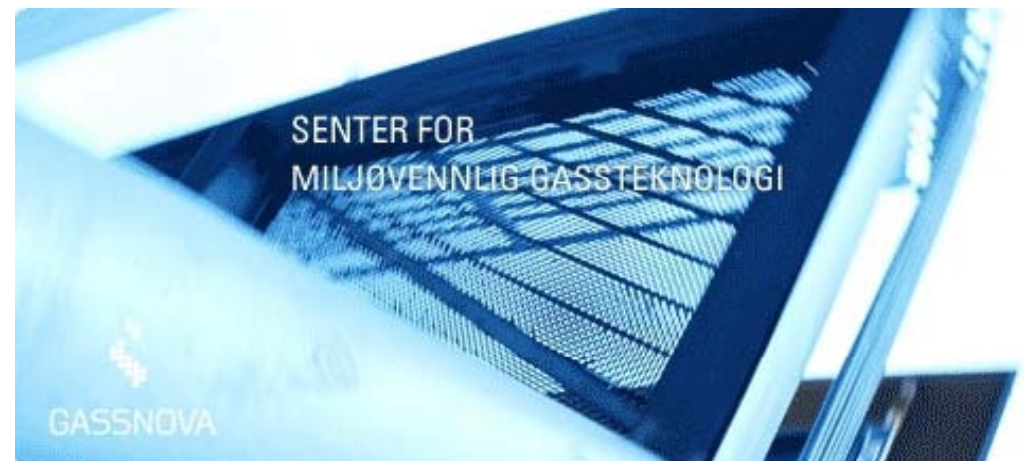
Transportation of CO₂

- **Several solutions for carbon transport and storage from Kårstø and Mongstad are being considered**
- **Transportation by pipeline for permanent storage in a subsea geological formation on the continental shelf is currently the only feasible solution**



A State owned CCS Company – Gassnova SF

- In order to administer the Government's participation in the Norwegian CCS-projects, a dedicated State-owned company – Gassnova SF – was given the task of managing the State investment in the projects from January 2008
- The company will constitute an efficient tool in planning and executing CCS projects in cooperation with industrial partners

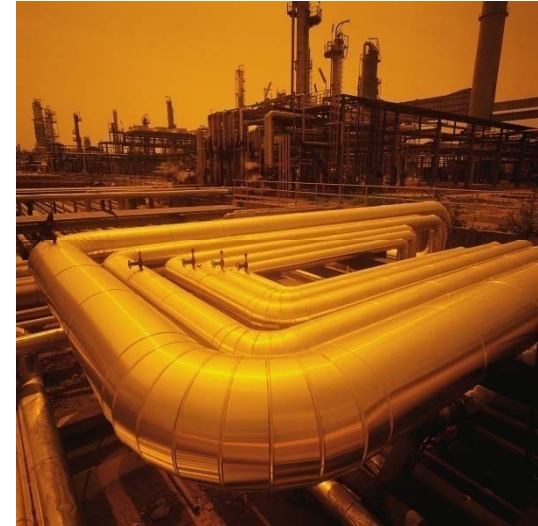


CCS

- Sources of CO₂:
 - an onshore energy facility/power plant (not part of petroleum activities), or
 - a facility for petroleum activities onshore or on the continental shelf
- Captured CO₂ may be used for:
 - enhanced oil recovery (EOR)
 - permanent storage (most practical in Norway due to small volumes of CO₂)
- Permanent storage: Non-produceable coal reservoirs, empty oil and gas reservoirs onshore/offshore, subsurface saline aquifers, in the water column, on the sea-bed

International framework for Carbon Capture and Storage Projects


- Protection of the seas
 - The London Protocol of 1996 (Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter)
 - The OSPAR-convention (Protection of the Marine Environment of the North-East Atlantic)
- EU Directive on the geological storage of CO₂
- Site selection criteria, monitoring guidelines





Norway: National regulation of CCS as part of petroleum activities: Applicable legislation exists

- CCS as part of petroleum activities (whether for the purpose of EOR or permanent storage on the continental shelf): Regulated under the ordinary petroleum legal regime:
 - The Petroleum Act and Regulations (production licence required, conditions for transportation and storage as part of approved Plan for development and operation)
 - The Pollution Control Act and Regulations (permit to inject CO₂, requirements for the composition of the CO₂-stream, monitoring)
 - The CO₂-levies Act



Norway: National regulation of CCS for permanent storage on the continental shelf of CO₂ from energy facility/capture plant which is not part of petroleum activities

- CCS for permanent storage on the continental shelf:
 - Onshore capture plant: Energy Act/Planning Act (Ministry of Environment)
 - Building and operation of pipeline, exploration for, development and use of offshore reservoir for permanent storage: **No applicable legislation at present** (Ministry of Petroleum and Energy)
 - Permit to inject CO₂ on the continental shelf: Pollution Control Act (must be amended) (Ministry of Environment)

Norway: National regulation of CCS for permanent storage on the continental shelf

- Acceptance criteria based on the new EU storage directive and amended London Protocol:
 - CO₂ stream shall consist overwhelmingly of carbon dioxide
 - No wastes or other matter to be added for the purpose of disposal
 - CO₂ streams may contain incidental associated substances from the source or capture process, but concentrations of all incidental and added substances shall be below levels that would:
 - **Adversely affect the integrity of the storage site or the relevant transport infrastructure**
 - **Pose a significant risk to the environment or human health, or**
 - **Otherwise breach the requirements of applicable EC legislation**
 - Injection of CO₂ streams will be accepted subject to an analysis of the streams, including corrosive substances, and a risk assessment having been carried out, showing that the contamination levels are in line with accepted criteria

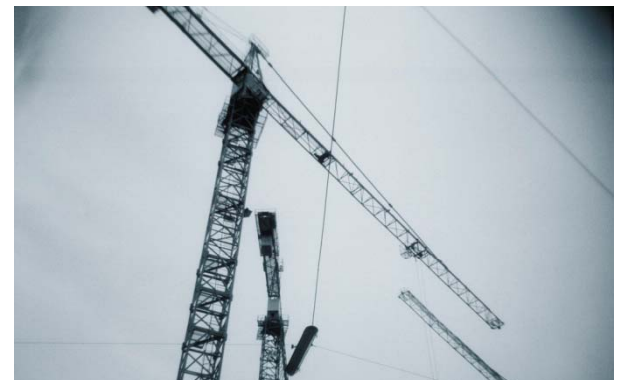


Norway: National regulation of CCS for permanent storage on the continental shelf

- Issues to be regulated by the Ministry of Petroleum and Energy (based on existing petroleum legislation):
 - Licence to:
 - **Explore for and use subsea geological structures for permanent storage of CO₂**
 - **Building and operation of pipeline for transportation of CO₂ from capture plant to offshore storage site**
 - Plan for use of an offshore geological formation for permanent storage of CO₂ – subject to approval
 - Obligation to carry out environmental impact assessments
 - Safety issues – risk analyses
 - Third party access to CO₂ pipelines and storage reservoirs – responsibility for injected CO₂
 - Responsibility for long term monitoring of storage reservoir
 - Transfer of responsibility to the State
 - Dispute resolution

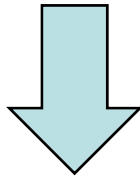
Barriers to global implementation

- **Costs and technological risk**
- **Risk of leakage/seepage and liability issues**
- **Public acceptance**
- **Bilateral and multilateral cooperation are necessary**



International cooperation on CCS is imperative

- Cooperation on CCS research and demonstration plants
- Sharing information and experiences
- Creating commercial incentives and legal - and regulatory frameworks



In order to...

- Enhance the commercial viability of the technology
- Gain public understanding and acceptance of CCS
- Make widespread use of CCS a global reality



To Sum Up...

- **Governments have a major role to play in supporting innovative R&D on Carbon Capture and Storage**
- **Carbon Capture and Storage has the potential to be one of the major measures to combat climate change**
- **Co-ordinated international effort is needed with stakeholders from governments, industry and research institutions**



Thank you for your attention