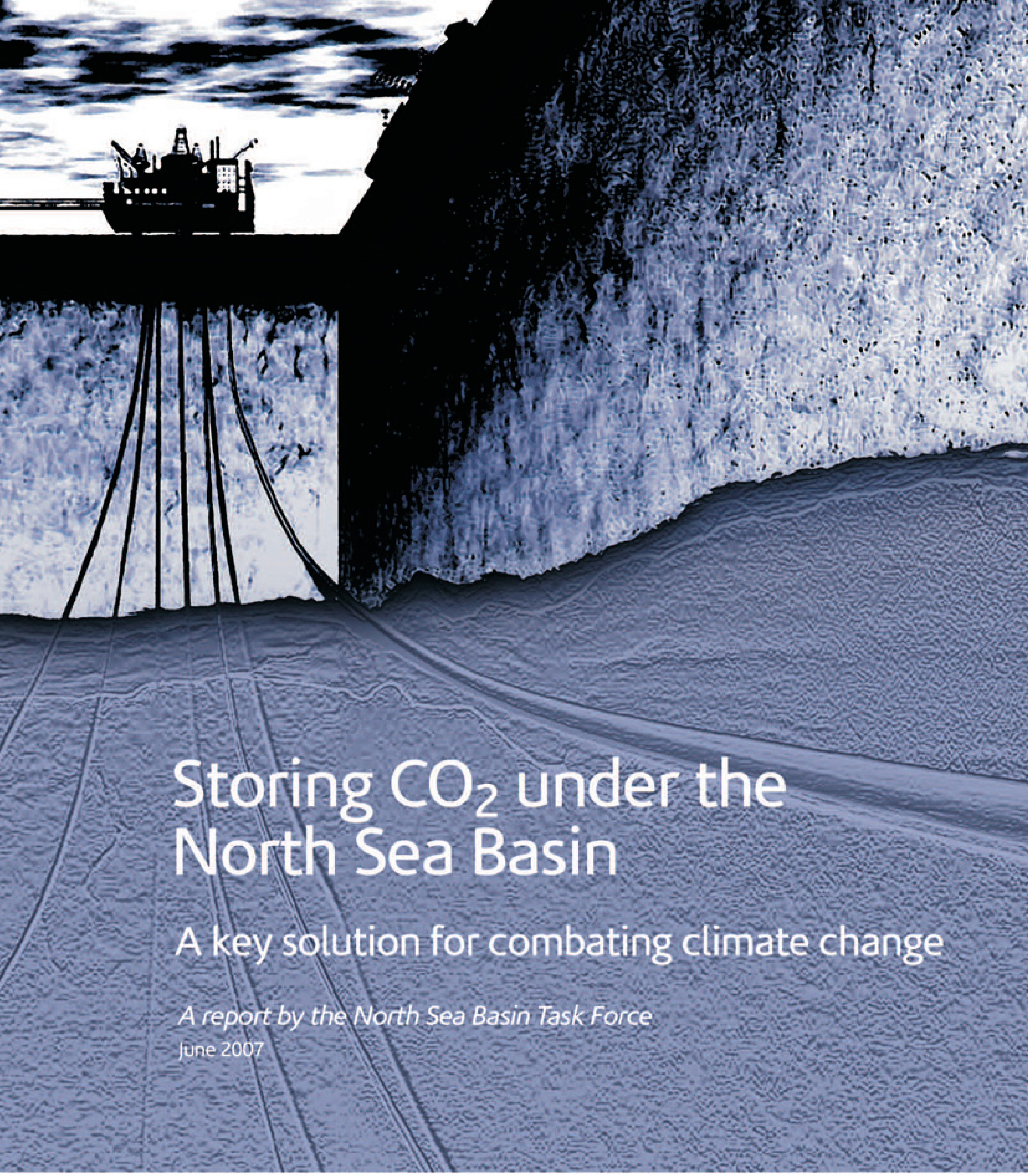


Storing CO_2 under the North Sea Basin

A key solution for combating climate change

A report by the North Sea Basin Task Force

June 2007

NORWEGIAN MINISTRY OF PETROLEUM AND ENERGY

dti
UK Department of Trade and Industry

Contents

Image courtesy of Statoil

Foreword

This report represents the first deliverable of the North Sea Basin Task Force, which Norway and the UK established in November 2005 to work together on issues surrounding the transport and storage of CO_2 beneath the North Sea. The North Sea represents the best geological opportunity for storing our CO_2 emissions away from the atmosphere for both the UK and Norway.

The Task Force is made up of representatives from both government and industry, and it has met a number of times over the last 18 months. Its work continues to demonstrate how well both our countries can work together on tackling issues of mutual interest, such as climate change.

This first report looks at developing a set of common principles for the regulation and management for storing CO_2 in geological formations beneath the seabed. Further work undertaken by the Task Force is looking at issues such as the possibility of developing a common infrastructure in the North Sea, providing for the transport of CO_2 and identifying a CO_2 value chain.

Since the Task Force was established, carbon dioxide capture and storage (CCS) has increasingly been seen as a viable technology for allowing us to continue to use fossil fuels without damaging the environment. In fact, Norway has been demonstrating to the world for the last ten years that CO_2 can be stored in an aquifer safely and securely – the Sleipner project has been a beacon to other countries in this respect storing some 10 million tonnes of CO_2 in the Utsira Sands. Norway also has additional plans for even more projects similar to Sleipner, as well as having very active plans to build natural gas power plants with CCS, storing the CO_2 under the North Sea.

The UK Government's recent Energy White Paper and its Spring Budget Statement announced a competition to provide support for full-scale CCS demonstration projects. Already some six to seven CCS projects have been proposed by British industry. The UK Government plans to have selected one or more of these projects before the end of next year, with the aim to have these fully operational by 2014. In support of this, it is also considering how it should regulate CO_2 storage and has recently established a Regulatory Task Force.

So, this report is very timely in providing sound and consistent guidelines for both our countries on the transport and storage of CO_2 beneath the North Sea. It means that both of us can effectively avoid future CO_2 emissions, and make a real contribution to solving the worldwide problem of climate change.

HE Odd Roger Enoksen
Minister of Petroleum and Energy, Norway

15 June 2007

Lord Truscott MP
Parliamentary Under Secretary of State for Energy, UK

15 June 2007

1 Executive summary

On 30 November 2005, Minister Enoksen of Norway and Minister Wicks of the UK agreed to establish a North Sea Basin Task Force, composed of public and private bodies from countries on the rim of the North Sea. Its purpose: to develop common principles for managing and regulating the transport, injection and permanent storage of CO_2 in the North Sea sub-seabed.

Indeed, because they own much of the North Sea Basin – with world-class industrial capability to deploy this technology and the option to re-use existing infrastructure – the UK and Norway have a unique window of opportunity to lead the world in CO_2 capture and storage (CCS).

To this end, the Task Force has identified the following conclusions and recommendations.

CCS: a key solution for combating climate change

The direct benefits to the UK and Norway from the successful deployment of CCS in the North Sea Basin are enormous, including:

- **Significant volumes of CO_2 emissions avoided by geological storage.**
- Reliable supplies of **low-carbon electricity**.
- Potential additional domestic revenue and employment from **enhanced oil recovery** (EOR).

There are also indirect benefits, including leadership in international climate change, CCS technology and regulation, which will help promote engagement with developing economies.

Removing the barriers to deployment

However, from the gap analysis undertaken, it is clear that CCS still suffers from significant institutional uncertainties and associated risks. Critical issues to be resolved include:

1. Amending existing North Sea legal and regulatory frameworks to enable CCS
   - Define a viable approach to long-term liability and stewardship.
   - Define criteria for risk acceptance and site qualification (permitting and licensing).
   - Establish monitoring, verification, accounting and reporting requirements.
   - Remove barriers to CCS in international conventions affecting the North Sea (including EU directives and emissions trading).
2. Establishing financial and other incentives for CCS.
3. Ensuring CCS is implemented in a manner acceptable to stakeholders.

The Task Force also recommends a management approach to CCS projects using a risk-based qualification process for storage sites (reservoirs). This is aimed at stimulating a continuous drive towards the use of best available techniques (BAT) and solutions. In this, the Task Force recommends following the *2006 IPCC*[1] *Guidelines for National Greenhouse Gas Inventories*.

Establishing a clear regulatory framework

In addition to some overarching principles outlined in the report, the Task Force recommends that CCS should be regulated through a licensing and regulatory regime that:

- Focuses on the selection and management of appropriate geological storage sites.
- Allows an operator to manage storage site(s) in a way that reassures the public on the effective long-term storage of CO_2, and provides project participants with clarity and transparency of obligations – particularly regarding access, property rights and the assignment of long-term responsibilities.
- Uses a risk assessment and management approach in issuing licenses and other regulations of CCS activities in the North Sea area. This should follow the guidance of the London Convention Risk Assessment and Management Framework, London Convention CO_2-specific Waste Assessment Guidance and OSPAR Technical Guidance, as appropriate.
- Involves government bodies, the public, private companies, non-governmental organisations and foreign governments, as appropriate.
- Monitors and reports the CO_2 captured, transported, injected, stored and emitted at each stage, in line with the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. This should be for as long as is deemed necessary to ensure long-term security from CO_2 emissions to the atmosphere and to fulfil reporting requirements under the EU Emissions Trading Scheme (ETS) and other relevant Directives.
- Maximises the utilisation of storage capacity.

Conclusion

Given the significant benefits of CCS, the issues to be resolved and the ongoing development of regulations, projects and the bilateral study on infrastructure, **the Task Force now recommends that it should proceed to Phase II** to:

- Address the issues for solution identified by Phase I.
- Share knowledge between the governments and industries of both countries as regulation and projects develop, including experiences already gained from offshore petroleum projects.
- To follow up the results of the UK-Norway infrastructure study.

Consideration should also be given to widening membership to other North Sea region states with an interest in CO_2 storage.

[1] United Nations Intergovernmental Panel on Climate Change

2 A unique window of opportunity for CCS in Europe

There is a scientific consensus that atmospheric concentrations of CO_2 must be stabilised between 450 and 550 ppm[2] if the catastrophic consequences of climate change are to be avoided. This will require radical changes in the way we live and the large-scale deployment of a wide range of new energy technologies. It will also require a significant investment in new infrastructure, as energy production and end-use is transformed.

Energy efficiency and renewable energy will be key to this transformation, but neither is yet sufficiently developed to reduce CO_2 emissions on the massive scale required. Fossil fuels will, therefore, continue to play a major role in the world's primary energy mix over the next few decades – particularly in rapidly developing economies such as China and India.

This means that a technology 'bridge' is urgently needed – one that can not only meet global energy demand, but also substantially reduce greenhouse gas (GHG) emissions to the atmosphere[3]. With the potential to contribute upto 55%[4], of the mitigation effort required, CCS is a key technology for combating climate change in the near to mid-term.

CCS technology captures up to 90% of the CO_2 produced by power plants (and other industrial processes) and transports it for storage in deep geological formations, such as depleted oil and gas fields and deep saline formations. The technology is not new – it is available today, offering a clean and reliable form of electricity supply. However, full-scale demonstration projects are urgently needed to create a "market pull" for the technology, address issues of scale-up and integration, and help shape the necessary policy and regulatory frameworks.

Image courtesy of Statoil

2 Parts per million (volume)
3 The case for immediate action is made eloquently in the Lavutslippsutvalget's report to the Norwegian Ministry of Environment (published 4th October 2006) and the Stern Review (published 30th October 2006 by the UK Treasury)
4 IPCC Special Report on Carbon Dioxide Capture and Storage

Europe is uniquely well-placed to deploy CCS

With many large, fixed CO_2 point sources and numerous geological formations deep beneath the North Sea, Europe is uniquely well-placed to deploy CCS. It also has an extensive network of oil and gas infrastructure that could be re-used to transport and securely store CO_2. In the UK, much of this will reach the end of its economic life within the next 10-20 years and could be available for re-use. In Norway, it is expected to have a considerably longer economic lifetime (for hydrocarbon use) and it is more likely that purpose-built storage infrastructure will be required for near-term projects.

However, as with other new technologies, the early deployment of commercial-scale CCS projects will involve substantial costs and risks. They are long-term in nature, requiring high upfront investments, potentially long periods of operation (30-50 years) and subsequent stewardship. Therefore, there is an urgent need to establish a set of regulatory and fiscal conditions that will manage some of the risks and remove the uncertainty that is a barrier to investment.

Why the North Sea Basin?

The direct benefits for the UK and Norway from the successful deployment of CCS in the North Sea Basin are enormous:

1 **Massive reduction in CO_2 emissions through geological storage**
Today, Europe emits around 4,000 million tonnes of CO_2 every year. At this rate, the EU as a whole may have difficulty in meeting its emission reduction targets in the first Kyoto commitment period. Yet it is estimated that geological formations deep beneath the North Sea Basin are capable of securely storing a huge proportion of its CO_2 emissions – for thousands of years. For example, at over 26,000 km^2, the Utsira deep saline formation can store up to 600 billion tonnes of CO_2. This is equivalent to all the CO_2 emissions from all the power stations in Europe for the next 600 years!

Power generation accounts for the largest volume of CO_2 emissions that can be cost-effectively tackled by CCS, but other energy-intensive sectors (e.g. cement and steel industries) could also be included. Depending on a number of factors, and with practical experience, it is estimated that CO_2 from large point-sources could eventually be captured and stored at a cost of

Industrial-scale CO_2 capture and storage in operation at Salah, Algeria

Image courtesy of BP

€35-€65 per tonne. If a market is created for CCS, commercial competition and economies of scale will reduce that cost even further.

2 **Reliable supplies of low-carbon electricity**
CCS enables clean, low-carbon power generation which, despite being a relatively new technology, already has the potential to be cost-competitive. Indeed, a number of new technologies (such as membrane separation and process simplification) have already been identified, which could substantially reduce costs even further. If electricity can be reliably generated with minimal CO_2 emissions, other sectors (such as transport) could also be decarbonised (via electric trains and cars, i.e. plug-in hybrids).

3 **Increased energy security, domestic revenue and employment from EOR**
CO_2 storage combined with EOR has considerable potential, though it will be very challenging, both technically and economically. The technology already exists and experience points to the potential to improve oil field recovery rates. However, the capital costs of adapting offshore production facilities may be prohibitively expensive, while the incremental recovery rates will likely be limited by a number of site-specific physical and chemical reservoir characteristics. Simple storage of CO_2 (without EOR) should therefore be considered the base case, with EOR regarded as viable only when circumstances are favourable.

Time is of the essence

If climate change is to be tackled effectively, the wide-scale deployment of a range of low-carbon energy technologies must begin *as soon as possible*, with CCS playing a vital role.

The UK and Norway have a unique window of opportunity to lead the world in CCS because they not only own much of the North Sea Basin, but have world-class industrial capability to deploy CCS technology, with the option to re-use existing infrastructure. However, the window of opportunity is brief – especially in the UK North Sea – as it is now at a stage in its evolution when EOR may be appropriate for offshore fields. Without near-term intervention, the required infrastructure will be removed and the opportunity for re-use for CCS lost.

With the availability of CCS technology; an ambitious programme within the UK and Norwegian energy industry over the next decade; and the availability of partially depleted oil and gas fields (that are approaching the end of their economic life), now is the perfect opportunity to realise the significant opportunities offered by CCS.

3 What are the barriers to deployment?

In close collaboration with the North Sea Basin Task Force, Det Norske Veritas (DNV) carried out a gap analysis on issues related to legal and regulatory frameworks, public acceptance, as well as emission accounting, monitoring, verification and risk management.

Barriers to the wide-scale deployment of CCS are in the areas of:

- Definitions and policies
  - The classification of CO_2.
  - Balancing the various objectives of the international community.
  - Sustainability, polluter pays and the precautionary principles.
  - CCS as a climate change mitigation technology.
  - Storage site selection and ownership.
- Liability
  - Short-term; operational.
  - Permanent; environmental; in-situ.
  - Trans-national.
- Legal and regulatory frameworks
  - Barriers in international frameworks related to CCS.
  - Status of instruments in use in Europe, UK and Norway.
  - The CCS life cycle and maturity of regulatory frameworks.
- Risk management and acceptance criteria
  - Risk management principles.
  - Gaps in risk management of CCS.
- Monitoring and verification.
- Public acceptance.
- Accounting and certification of emission reduction credits.
- Economics and incentives.
- Technology maturity.

Image courtesy of Statoil

Reel barge used to lay CO_2 pipeline

Identifying the gaps

The table opposite lists the gaps highlighted in the DNV report: the traffic lights indicate whether (as a result of initiatives outside of the Task Force) they are expected to be short-term, long-term or are already solved.

- Red means "will not be solved in the time period" (i.e. a barrier).
- Amber means "will probably be solved" (i.e. follow-up).
- Green means "solved" (i.e. an enabler).

Barriers and enablers are classified as international, regional or national.

Red lights

- Long-term liability and responsibility is a critical area that will require better definition and acceptance by all parties.

Amber lights

- The Kyoto Protocol (CDM[5], JI[6]).
- Cross-border movement of CO_2 (not utility CO_2); however, the first national CCS projects may circumvent this.
- Risk acceptance and site approval criteria.
- Monitoring and verification – further work is needed.
- Public support seems to be growing with the increasing focus on climate change.
- The challenging economics of CCS projects need to be addressed.

Green lights

- The *2006 IPCC Guidelines for National Greenhouse Gas Inventories* and the London Protocol approved CCS in 2006; OSPAR is expected to follow.

Potential barriers or enablers	International (I), Regional (R), National (N)	Expected time until solved	
		< 2 years	2-5 years
UNFCC-IPCC National Inventories	N, I	Green	Green
Kyoto Protocol (CDM and JI)	I	Red	Amber
UNCLOS	I	Green	Green
London Convention and Protocol	I	Green	Green
OSPAR	R	Amber	Green
Trans-boundary movement and/or damage	I	Amber	Amber
The Aarhus Convention	I	Green	Green
EU ETS	R	Amber	Green
EU enabling legal framework	R	Red	Green
UK regulations and CCS	N	Amber	Green
Norway regulations and CCS	N	Amber	Green
Long-term liability	N, R, I	Red	Red
Risk assessment methods	I	Amber	Green
Risk acceptance, including site approval criteria	I	Red	Amber
Monitoring and verification	I	Red	Amber
Public support	I	Amber	Amber
Accounting and certification of credits	I	Amber	Green
Costs and economics	I	Red	Amber
Incentives	I/R/N	Red	Amber
Technology maturity	I	Green	Green

5 Clean Development Mechanism
6 Joint Implementation

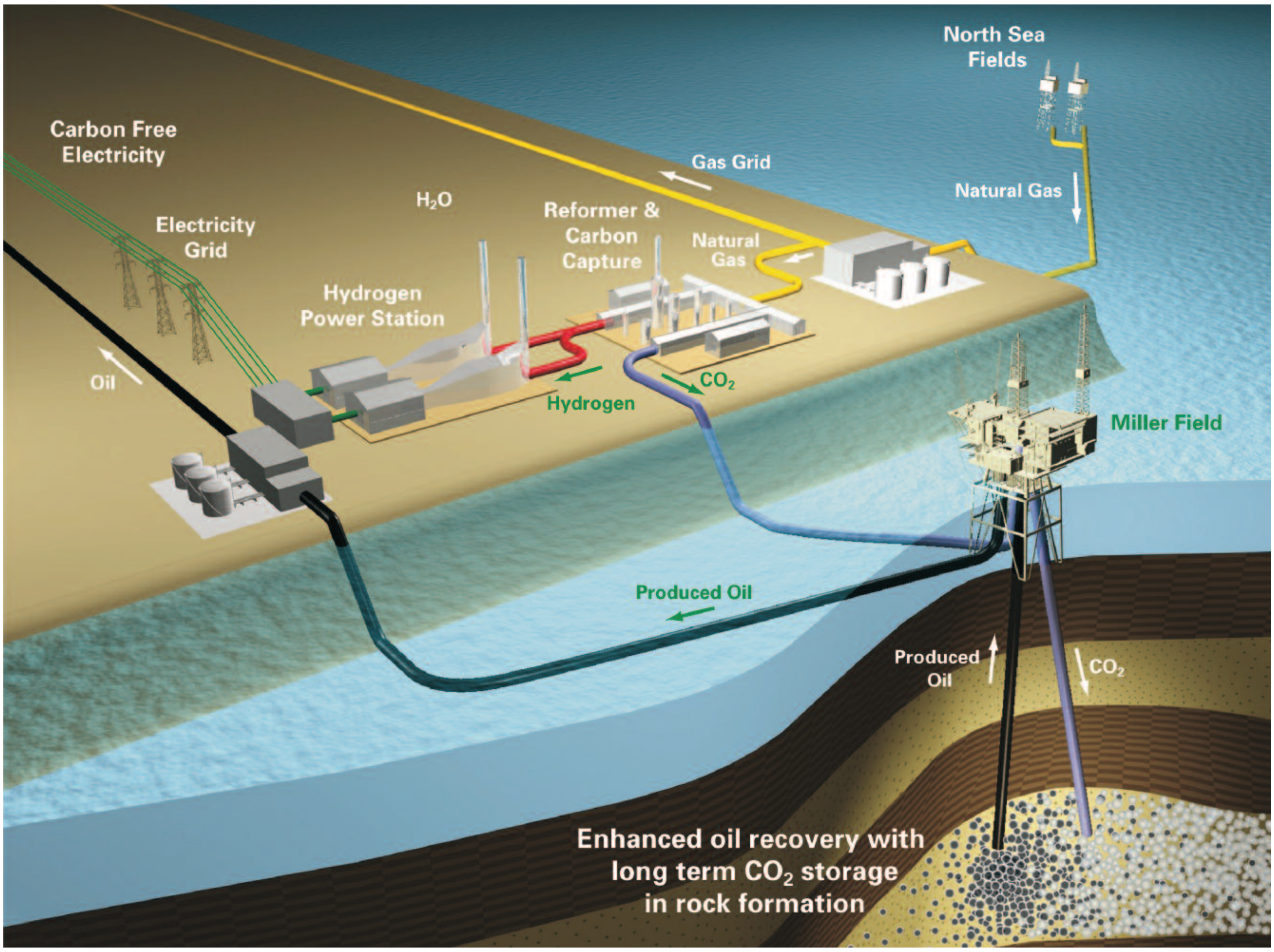


Image courtesy of BP

BP's Peterhead project in North East Scotland

- The EU Strategic Energy Review (published 10 January 2007) aims to demonstrate and enable CCS; proposes inclusion in the EU ETS.
- Ongoing initiatives in the UK and Norway aim at removing national barriers for CCS.
- R&D will improve risk assessment and environmental impact assessment methods over the next few years, but a lack of data and criteria will still present a challenge.
- Accounting and verification is required by the IPCC Guidelines and will mature over the next few years.
- Although technology is not a significant obstacle, technology development will reduce costs and risks.

Kick-starting the market for CCS

Initiatives from the UK and Norway aimed at finding viable solutions of deploying CCS in the North Sea will not only set an example to other nations, but help define best practice internationally.

Indeed, with progress already made in modifying international conventions to include CCS, Norway and the UK should take the lead in developing frameworks and principles. Certainly, CCS projects currently planned or underway in the North Sea will require regulatory frameworks to be clarified. This includes a fit-for-purpose regime for granting operating licenses for CO_2 storage sites offshore.

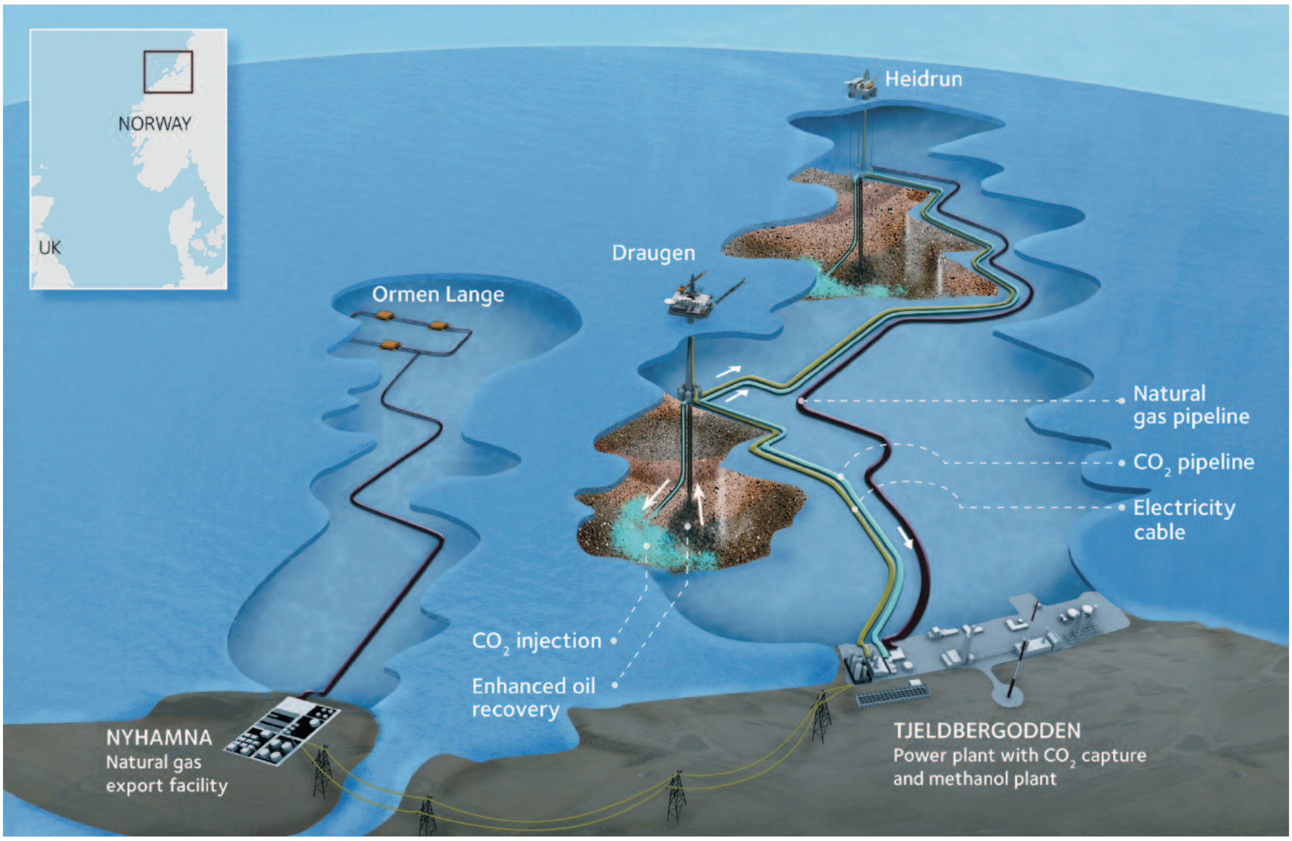


Image courtesy of Statoil and Shell

CO_2 capture and storage – Halten CO_2 project, Norway

Kick-starting the industry with urgent short- and long-term commercial incentives is also vital, including full accreditation of CCS under the EU ETS and CDM/JI of the Kyoto Protocol.

Developing a clear risk-management strategy

It is essential that the concerns of the public and NGOs are satisfied through consultation and environmental impact assessment (EIA), as well as through monitoring and verification of CO_2 emissions avoided.

A precautionary approach should, therefore, be taken to assure the proper management of long-term risks and liabilities. Many ecosystems in the North Sea are sensitive and CO_2 storage operations should not compromise their long-term viability.

A risk-management approach is therefore proposed, based on a qualification process for storage sites (reservoirs). This will stimulate a continuous drive towards the use of BAT and solutions within reasonable cost frames. Risks and uncertainties should be reduced as knowledge about storage sites and their performance increases. This will also help in identifying the most suitable sites and ways to spread risks over several sites.

A framework for risk management will address four specific time periods: site selection, operation, closure and post-closure. Critical gaps in current knowledge include risks of long-term effects, acceptance criteria and data.

Independent verification may be required to:

- Demonstrate compliance.
- Manage and minimise risks (and uncertainties).
- Avoid future loss or liabilities.
- Provide assurance to stakeholders (complete and accurate).
- Secure a transparent, consistent and cost-effective process.

Image courtesy of Statoil

4 Common principles for regulating CO_2 geological storage

A well-functioning legislative, regulatory and administrative framework is important to secure stable and predictable terms for the transport, injection and permanent storage of CO_2, safe operations and protection of the environment. Common principles in this respect should contribute to providing long-term predictability for governments, investors, operators, non-governmental organisations and the public. Such principles should enable cost-effective and environmentally responsible operations.

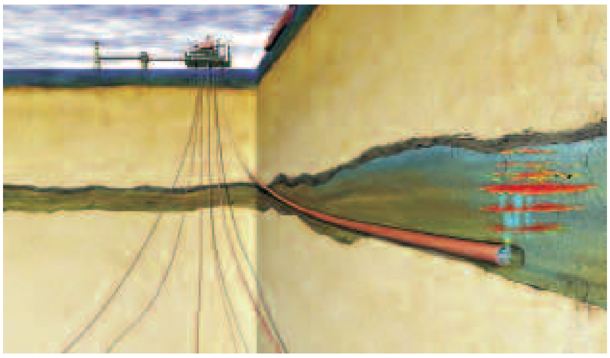
A consistent regulatory framework across the North Sea Basin (especially the UK and Norway) would maximise the amount of CO_2 emissions to the air avoided by geological storage. Regulatory frameworks should also be consistent with international law, including state sovereignty and sovereign rights, and those under the United Nations Convention on the Law of the Sea (UNCLOS) and, specifically, with the applicable international treaties for dumping and pollution at sea – the Protocol to the London Convention (1996) and the OSPAR Convention. They should also be consistent with international guidance (specifically, the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*).

A common North Sea Basin regulatory framework for the geological storage of CO_2 should therefore:

1. Enable the sub-sea geological storage of substantial quantities of CO_2 derived from anthropogenic activities
2. Be soundly based, publicly stated, instil public confidence and provide predictability for stakeholders
3. Be consistent within national borders and across national borders, respecting the sovereignty and sovereign rights of the states concerned
4. Recognise states' existing rights and obligations under international law
5. Regulate the CO_2 cycle from transport (on and offshore by pipeline or by ship), injection and permanent storage (post-injection), to site closure, decommissioning, long-term monitoring and liabilities, building on existing legislation for transport, storage and disposal of commodities or waste, as appropriate
6. Adopt a science-based approach to site evaluation that takes into account environmental, health, safety and other public concerns
7. Address other potential environmental impacts of CCS activities throughout the lifetime of the project, such as site selection, characterisation, development, operation and decommissioning (e.g. use of seismic techniques)
8. Manage CO_2 injection and storage through a licensing and regulatory regime that:
   - Focuses on the appropriate selection and management of geological storage sites.

- Allows an operator to manage storage site(s) in a manner reassuring to the public on the effective long-term storage of CO_2 and provides project participants with the appropriate clarity and transparency of obligations, particularly with respect to access, property rights and the assignment of long-term responsibilities.
- Uses a risk-assessment and management approach in issuing licenses and in other regulations of CCS activities in the North Sea area. This should follow the guidance of the London Convention Risk Assessment and Management Framework, the London Convention CO_2-specific Waste Assessment Guidance and OSPAR Technical Guidance, when completed, as appropriate.
- Involves government bodies, the public, private companies, non-governmental organisations and foreign governments, as appropriate. It would be appropriate to build on existing legislation (e.g. EC Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment), as incorporated into national legislation. The EIA and public consultation process should form an integral part of the approval process. The EIA and the responses received in the consultation process should be duly considered in the state's approval process.
- Monitors and reports in line with the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* the CO_2 captured, transported, injected, stored and emitted at each stage. This to be for as long as deemed necessary to ensure long-term security from CO_2 emissions to the atmosphere and to fulfil reporting requirements under the EU ETS and other relevant Directives.
- Aim to maximise the utilisation of storage capacity.

Image courtesy of Statoil



The Sleipner project was the world's first demonstration of CO_2 capture and underground storage

Overview of issues to be addressed by a regulatory framework

Existing national legislation for offshore petroleum activities provides a regulatory framework for the exploitation of oil and gas resources, transport of oil and gas produced, and operation and decommissioning of oil and gas fields in the North Sea Basin. Many of the issues that need to be considered for CCS activities are already likely to be regulated, particularly for those involving enhanced hydrocarbon recovery.

However, the development of new legislation is likely to be required to address certain novel aspects of CCS (e.g. the long-term nature of the activities and for storage of CO_2 in sub-sea geological saline formations when not integrated with petroleum activities). Hence, the existing legislative principles contained in current petroleum or environmental protection legislation could provide a useful starting point for regulating the transportation, injection and permanent storage of CO_2 in sub-seabed geological structures.

Using these principles will enable governments and industry to build on the positive experience of a longstanding and efficient regulatory framework. The process for authority assessment of CO_2 licence applications, and the technological and environmental scrutiny that a licence application will undergo, will be specific to this activity.

The IPCC Special Report *Carbon Dioxide Capture and Storage* states that “the proportion of CO_2 retained in appropriately selected and managed sites is…likely to exceed 99% over 1000 years”. Therefore, the focus of a regulatory regime should be on the appropriate selection and management of geological storage sites. Subsequent monitoring will depend on the assessed risk of leakage from individual sites and should be developed on a site-specific basis. Well-characterised sites (e.g. oil and gas fields, that have proven traps) are likely to require less monitoring than less well-characterised sites (e.g. deep saline formations). Specific issues to be considered in the regulatory framework are set out below in chronological order, in the life of a CO_2 storage site (with indicative time-periods):

- **Site Selection (years 0-5)**
  The right to store CO_2 will have to be granted by the state in the form of a licence or permit, as appropriate. Before a storage project is approved by the state, the state and the commercial entity will, therefore, have to agree on the initial site conditions (baseline) and operational limits, so that the site can be returned to the state at a defined end of the project. Initial site selection will require a site-specific risk assessment, including seal capacity and reservoir fluids (pressure, chemistry, etc) and other considerations. A data acquisition and analysis programme will likely be required to bring all potential storage sites up to an appropriate level of risk of leakage.

- **Operation (years 6-39)**
  Depending on the quality of the site and the assessed risk of leakage, operational limits will include injection pressures and rates, together with a monitoring regime, focusing on the higher-risk leakage mechanisms and reporting to the State. As in hydrocarbon operations, the State may require intervention if the performance measurements are significantly different to the modelling predictions.

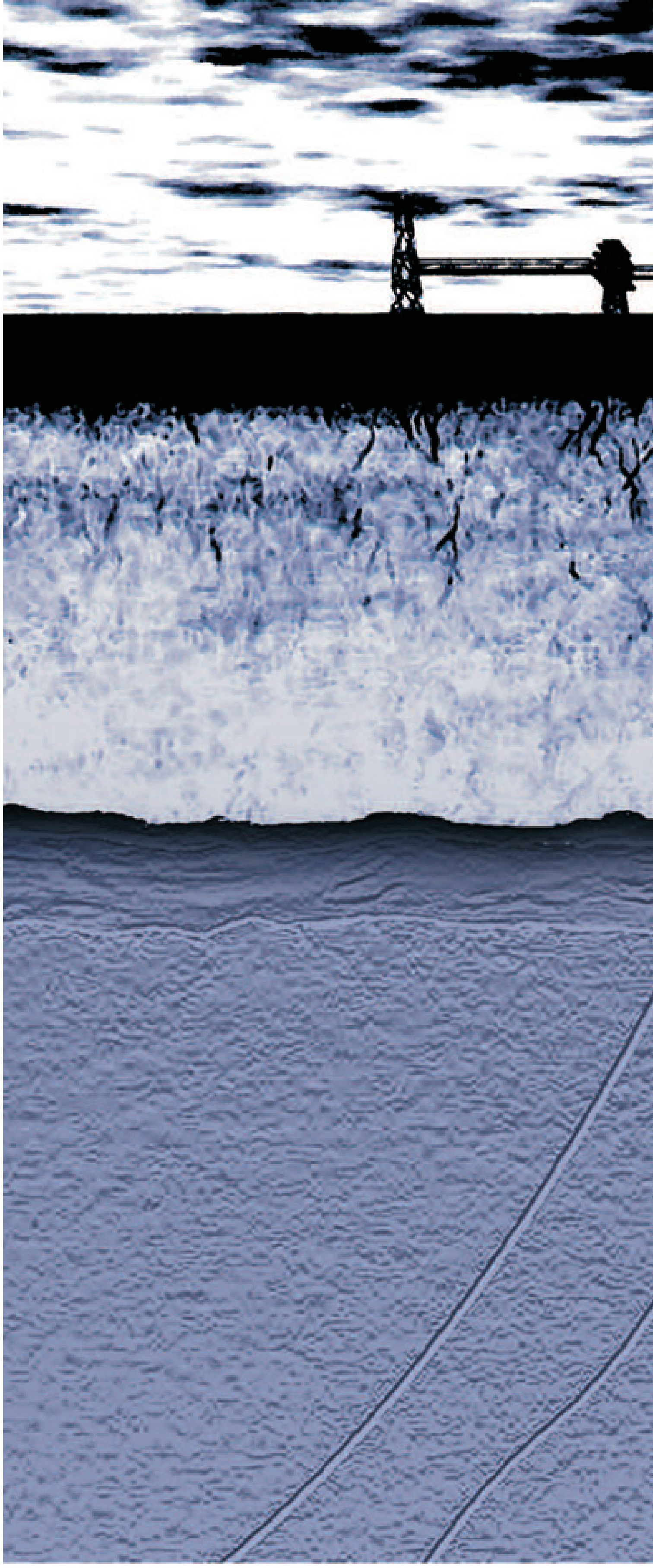
- **Closure (years ~40)**
  Once CO_2 injection has ceased, the operator can apply for a closure certificate/licence/permit based on the initial site certification/licence/permit obligations and the monitored performance of the site during operation. Once this certificate/licence/permit has been agreed, the operator will be able to remove the infrastructure (and associated intervention capability).

- **Post-Closure (years ~40-1,000)**
  A well-characterised site that has achieved its performance goals should require reduced or no long-term monitoring. A poorly characterised site, whose performance does not match modelling expectations, will require more long-term monitoring and possibly remediation/mitigation obligations for the operator.

5 Members of the North Sea Basin Task Force

Tone Skogen (Joint Chair)	Norwegian Ministry of Petroleum & Energy
Brian Morris (Joint Chair)	UK Department of Trade and Industry
Mette Agerup	Norwegian Ministry of Petroleum & Energy
Stig Øyvind Svenningsen	Norwegian Ministry of Petroleum & Energy
Knut Fredrik Kroepelien	Norwegian Ministry of the Environment
Marit Solheim	Norwegian Ministry of the Environment
Bronwen Northmore	UK Department of Trade and Industry
Tim Dixon	UK Department of Trade and Industry
Kevin O'Carroll	UK Department of Trade and Industry, Oil & Gas
Andy Greaves	UK Department for Environment, Food and Rural Affairs
Jason Golder	The UK Crown Estate
Ståle Selmer-Olsen	Det Norske Veritas
Ann Sjøtveit	Norsk Hydro
Olav Kårstad	Statoil
Nick Riley	British Geological Survey
Iain Wright	BP Alternative Energy
Chris Mansfield	Shell
Keith Burnard (Secretariat)	AEA Energy & Environment


Image courtesy of Statoil



R311

Cover image courtesy of Statoil
Printed on paper containing a minimum of
75% post-consumer waste.

DTI/Pub URN 07/1023