

**BELLONA**

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**Burying CO<sub>2</sub>**  
**The New EU Directive on Geological Storage of CO<sub>2</sub>**  
**from a Norwegian Perspective**

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Oslo, January 2009

## Acknowledgements

This paper was prepared as part of Bellona's work related to the EU Technology Platform on Zero Emission Fossil Fuel Power Plants (ZEP). Bellona would like to thank the Research Council of Norway and the Norwegian Ministry of Environment who have funded portions of Bellona's activity within ZEP.

The author would like to thank Aage Stangeland, Christine Karlsen and Michele Hege Grønbech from the Bellona Foundation for their valuable contribution to this paper.

Any errors or misrepresentations remain the author's responsibility.

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## LIST OF ABBREVIATIONS AND ACRONYMS

BERR	Department for Business, Enterprise and Regulatory Reform (UK)
CCS	Carbon Capture and Storage
CO <sub>2</sub>	Carbon dioxide
EEZ	Extended Economic Zone beyond territorial waters
EFTA	European Free Trade Association
ELD	Environmental Liability Directive 2004/35/EC
EOR/EHC	Enhanced Oil Recovery/Enhanced Hydrocarbon Recovery
EU	European Union
ETS	Emission Trading Scheme for sale and purchase of CO <sub>2</sub> credits
ESA	EFTA Surveillance Authority
IEA	International Energy Authority
IPCC	Intergovernmental Panel on Climate Change
IPPC	Integrated Pollution Prevention Control (Directive)
NCS	Norwegian Continental Shelf
OED	The Norwegian Oil and Energy Department
OSPAR	(Oslo-Paris) Convention for the Protection of the Marine Environment in the North East Atlantic
PDO	Plan for Development and Operation
PPP	Private&Public Partnership
SFT	The Norwegian Pollution Control Authority

## Section I Introduction

On January 23, 2008 the European Commission proposed a major package of measures to achieve the EU's ambitious targets for fighting climate change and promoting renewable energy up to 2020 and beyond<sup>1</sup>.

On December 17, 2008 – and after intensive debates and negotiation between the EU Parliament and the Council to reach an agreement - the Climate and Energy package was eventually adopted and will help to transform Europe into a low-carbon economy and increase its energy security<sup>2</sup>.

While energy efficiency and renewables are in the long term the most sustainable solutions both for security of energy supply and climate, global greenhouse gas emissions (GHG) cannot be reduced sufficiently if we do not also use other options such as CO<sub>2</sub> Carbon Capture and Storage (“CCS”). The process consists of capturing the CO<sub>2</sub> from its source, compressing it, transporting it either by pipeline or ship to an offshore or onshore location, and injecting it underground in geological formations for permanent storage. The primary application of CCS is to reduce CO<sub>2</sub> emissions from power generation plants (mainly coal or gas fired power stations) but it can also be used in other CO<sub>2</sub> intensive industries, such as cement, iron and steel, oil and gas processing and chemicals. If implemented without delay and deployed in all industry sectors, CCS could reduce CO<sub>2</sub> emissions in the EU by 54% by 2050<sup>3</sup>. The key is to kick-start wide-scale deployment of CCS to make it commercially viable by 2020. According to an in-depth investigation carried out by the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP<sup>4</sup>) in 2008, a total of 10-12 demonstration projects are required in order to demystify CCS for all players within the value chain and achieve commercialisation by 2020<sup>5</sup>.

As part of its Energy package, the EU has now adopted a Directive on the geological storage of CO<sub>2</sub>. The Directive provides a regulatory framework for CO<sub>2</sub> storage activities, which should allow potential developers and investors to adequately assess and manage their risks and liabilities with respect to CO<sub>2</sub> geological<sup>6</sup> storage and consequently facilitate the adoption

<sup>1</sup>Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - 20 20 by 2020 - Europe's climate change opportunity <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0030:FIN:EN:HTML>

<sup>2</sup> Texts adopted on Wednesday 17 December 2008: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+20081217+TOC+DOC+XML+V0//EN&language=EN#formats>. It sets the following ambitious targets for 2020 : a) cutting greenhouse gases by at least 20% of 1990 levels (30% if other developed countries commit to comparable cuts); b) increasing use of renewables (wind, solar, biomass, etc) to 20% of total energy production (currently ± 8.5%); c) cutting energy consumption by 20% of projected 2020 levels - by improving energy efficiency.

<sup>3</sup> A. Stangeland, Scenarios for global CO<sub>2</sub> emissions, Bellona Paper, Oslo, Norway, [http://www.bellona.org/filearchive/fil\\_Stangeland\\_-\\_Bellona\\_Paper-Model\\_for\\_CO2\\_capture\\_potential.pdf](http://www.bellona.org/filearchive/fil_Stangeland_-_Bellona_Paper-Model_for_CO2_capture_potential.pdf)

<sup>4</sup> Founded in 2005, the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP) is a broad coalition of stakeholders united in their support for CO<sub>2</sub> Capture and Storage (CCS) as a key technology for combating climate change.

<sup>5</sup> ZEP's proposal - EU Demonstration Programme for CO<sub>2</sub> Capture and Storage (CCS), 10 November 2008: <http://www.zero-emissionplatform.eu/website/library/index.html- etpzeppublications>

<sup>6</sup> There exist storage options other than geological storage such as storage in the water column and mineral storage. However storage in the water column is considered to present a high environmental risk and mineral storage is currently the subject of research

and deployment of CCS. The Directive, as adopted in its final version December 17, 2008, does not contain major changes<sup>7</sup> compared to the Commission's initial proposal and the Parliament's version<sup>8</sup>. The key elements remain in place, but the text has been clarified and strengthened in the course of the negotiations.

Member States will now have to incorporate this Directive into national legislation within two years after its publication and transmit the relevant provisions to the European Commission<sup>9</sup>. As the legal act is a Directive, it only establishes objectives and general requirements for CO<sub>2</sub> storage while leaving the details of the implementation to the Member States. Consequently there will be some variation in transposition and implementation across Europe.

Although Norway is not part of the European Union, the Directive on CO<sub>2</sub> storage is expected to be implemented in Norway as a consequence of its participation in the European Economic Area (EEA)<sup>10</sup>. It is therefore essential to understand the legal framework and to anticipate the consequences it will imply for Norway and particularly for Norwegian stakeholders. For simplicity, any reference to the term "Member State" in the following includes Norway.

The purpose of this study is to analyse the legal framework established by the Directive on geological storage of CO<sub>2</sub> in order to anticipate some of the legal issues and challenges that Norway might meet when implementing the Directive in its national legislation.

Section 2 summarises and comments on the aspects of the Directive that we consider to have particular interest, either in regard to the legal issues they can raise or in regard to their implication for stakeholders. This review is therefore limited in its scope and is not intended to give a comprehensive description of all aspects of the Directive.

Section 3 gives a description of the current legal regime for CCS in Norway which is mainly based on the Petroleum Act and the Pollution Control Act.

Section 4 gives recommendations on which considerations should be taken into account when implementing the Directive in Norway.

Section 5 briefly describes the remaining legal barriers for CCS at the international level and discusses transboundary issues.

Section 6 provides a summary of our main conclusions.

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<sup>7</sup> Except regarding monitoring after transfer of responsibility and the financial contribution attached to it.

<sup>8</sup> Chris Davies Report: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A6-2008-0414+0+DOC+XML+V0//EN&language=EN - title1>

<sup>9</sup> In the meantime, the Commission will prepare and adopt guidelines on a number of crucial issues including the composition of the CO<sub>2</sub> stream, transfer of responsibility and the calculation of the financial contribution for the post-transfer period, to help Member States implement the requirements of the directive. It will also establish an information exchange between the competent authorities of the Member States. Moreover, the scientific panel intended to help the Commission review the draft storage permits and draft decisions approving the transfer of responsibility will be established. Finally, the Monitoring and Reporting guidelines under the Emissions Trading Directive are in the process of being amended in view of the inclusion of CCS in the ETS. See "Questions and Answers on the directive on the geological storage of carbon dioxide" point 17 :

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/798&format=HTML&aged=0&language=EN&guiLanguage=en>

<sup>10</sup> The Directive shall however first be discussed for adoption at the EEA level.

## Section 2      **Brief overview and Comments to the EU Directive**

We will briefly review the scope of application and activities covered by the Directive on CO<sub>2</sub> storage before describing the permitting system established by the Directive.

### 2.1      **Scope of the Directive – Activities covered**

#### Storage

- The main scope of the Directive is to establish a new regulatory framework for CO<sub>2</sub> storage.
- Capture and transport of CO<sub>2</sub> are not addressed in the Directive as a number of legislative instruments are already in place to manage some of the environmental risks of CCS. Indeed CO<sub>2</sub> capture is regulated under Directive 96/61/EC of September 24, 1996 concerning integrated pollution prevention and control for certain industrial activities (IPPC Directive) and both CO<sub>2</sub> capture and pipeline transport are regulated under Directive 85/337/EEC of June 27, 1985 on the assessment of the effects of certain public and private projects on the environment.
- The Directive does not cover the activity of Enhanced Hydrocarbon Recovery (EHR) unless the activity is combined with geological storage of CO<sub>2</sub><sup>11</sup>.

#### Area covered

- The Directive only regulates the storage of CO<sub>2</sub> inside the European Union and the European Economic Area (when incorporated into the EEA Agreement, as it is expected), and the storage of CO<sub>2</sub> beyond this area is not permitted (articles 2-1 and 2-3). However, storing CO<sub>2</sub> emissions outside the European Union (and EEA) is not banned, but any emissions so stored will receive no credit under the EU Emission Trading System (ETS), thus providing little incentive to store carbon dioxide abroad<sup>12</sup>.

#### Geological storage

- The Directive only regulates and allows geological storage, either onshore or offshore. Storage in the water columns is specifically prohibited (as it is considered to present great environmental risks) and mineral storage is currently the subject of research<sup>13</sup>. The two main kinds of geological formations that can be used for CO<sub>2</sub> storage are the depleted oil and gas fields, and the saline aquifers (groundwater bodies whose salt content makes them unsuitable for drinking water or agriculture).

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<sup>11</sup> The original Draft directive was silent about EHR activities. The European Committee on Environment was in favour of excluding such activities.

<sup>12</sup> See Questions and Answers on the directive on the geological storage of carbon dioxide

<sup>13</sup> See Questions and Answers on the directive on the geological storage of carbon dioxide

### CCS Projects covered

- The Directive will not apply to projects undertaken for research, development or testing of new products and processes with a total intended storage under 100 kilo tonnes<sup>14</sup>. It also means that the expected demonstration projects will be covered by the Directive, as long as they have a total intended storage capacity of more than 100 kilo tonnes.

### Not mandatory

- The Directive does not make CCS mandatory. It enables carbon capture and storage by providing a framework to manage environmental risks and remove barriers in existing legislation. Whether CCS is taken up in practice will be determined by the carbon emission price and the cost of the technology<sup>15</sup>. It will be up to each operator to decide whether it makes commercial sense to deploy CCS. However this situation may evolve, in particular as a way to help the EU meet the expected up-scaling of its emission reductions from 20 to 30 percent by 2020 (from 1990 levels).

## 2.2 Permitting system established by the Directive on geological storage of CO<sub>2</sub>

Below, we review the aspects of the Directive that we consider having a particular interest, either in regards to the legal issues they can raise, or in regards to their implication for stakeholders. This review is therefore limited in its scope and is not intended to give a comprehensive description of the Directive.

### 2.2.1 Storage

#### a) Selection of storage sites (article 4)

Member States have the right to determine the areas within their territory from which storage sites may be selected. This includes the right for Member States not to allow any storage in parts or on the whole of their territory, or to give priority to an other use of the underground such as exploration, production and storage of hydrocarbons or geothermal use of aquifer<sup>16</sup>.

In practise, it can be expected that States will decide in advance which areas (“block”) of their territory will be open for CO<sub>2</sub> storage (after a pre-exploration phase conducted in the same manner as is the norm for petroleum activities in Norway) and that they will invite tenders to apply for exploration or storage permits.

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<sup>14</sup> There was discussion during fall 2008 on whether demonstration projects should or should not be included. While the European Committee on environment suggested full application of the Directive to demonstration projects without threshold, the Committee on Industry suggested a threshold of 150 kt in order to exclude the presently initiated R& D pilot projects initiated in several EU countries

<sup>15</sup> See Questions and Answers on the directive on the geological storage of carbon dioxide

<sup>16</sup> Recital 19 and Article 4

The selection of the appropriate storage site is crucial to ensure that the stored CO<sub>2</sub> will be completely contained for the indefinite<sup>17</sup> future. A site should therefore only be selected as an appropriate storage site, if there is no significant risk of leakage, and if no significant environmental or health risks exist.

For site selection, a detailed analysis of the potential site must be carried out according to specific criteria specified in Annex I of the Directive<sup>18</sup>, including modelling of the expected behaviour of CO<sub>2</sub> following injection. This analysis is carried out by the potential operator according to best practices at the time of the assessment and is then submitted to the Member State's competent authority. The competent authority reviews the information and if it is satisfied that the site presents neither significant risk of leakage nor health or environmental risks, it issues a draft permit decision, transferred thereafter to the European Commission for review.

In order to ensure consistency for site selection within EU Member States, the Commission will establish an exchange of information and best practices between the competent authorities of the Member States (recital 22). For the early storage projects the Directive includes an additional safeguard as the Commission may review the draft permits with the assistance of a Scientific Panel of technical experts.

#### b) Exploration permit (article 5)

Member States may wish to allow a period of exploration in order to determine the suitable sites for storage of CO<sub>2</sub>. However, the exploration phase is not a necessary stage and the Member state might decide that the existing data regarding a specific storage site are sufficient to consider the granting of a storage permit.

As regard to the procedure and conditions for the granting of an exploration permit, the Directive does not provide the same level of details as it does for the granting of a storage permit.

The most interesting aspects regarding exploration permits are as follows:

- It is unclear which authority shall grant exploration permits and ensure that the exploration permit has been complied with. More precisely it is unclear whether it will be the same authority as the authority having competence to deliver storage permits, and called in the directive "the Competent authority". It is also unclear whether the holder of the exploration right has any reporting obligations (and in such case to which authority) regarding the results of its work.
- Member States do not need to set admission criteria for procedures for granting exploration permits, but where they do, they shall at least ensure that the procedures for the granting of exploration permits are open to all entities possessing the necessary capacities. The permits shall be granted or refused on the basis of objective, published and non-discriminatory criteria.

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<sup>17</sup> Scientists say that the probability of leakage is about 1% in 1000 years.

<sup>18</sup> Annex I is based on the OSPAR guidelines for Risk Assessment and Management of Storage of CO<sub>2</sub>, Streams in Geological formations, as updated from time to time.

[http://www.co2captureandstorage.info/document\\_specific.php?document\\_id=15](http://www.co2captureandstorage.info/document_specific.php?document_id=15)

- The exploration permit is granted for a limited volume area and for a limited time, although no specific duration is mentioned<sup>19</sup>. It only states that the duration of the permit will be decided on a case by case basis, although it should not exceed the period necessary to carry out the exploration for which it is granted. However Member States can prolong the permit if it appears that it is insufficient to complete the exploration work.
- The exploration permit gives to its holder the sole right to explore the potential CO<sub>2</sub> storage complex.
- The holder of the exploration right is given a preferential right over competitors in the granting of the storage permit in order to compensate for the substantial investment made during the exploration phase. However, this priority right is subject to conditions: that the exploration of the site is completed, that the exploration permit has been complied with, and that the application for a storage permit is made during the period of validity of the exploration permit. By giving to exploration right holders a preferential right in the granting of a storage permit, it gives a greater incentive to undertake and invest in exploration work. It may however prejudice other operators applying for a storage permit but not involved in the site exploration phase. Moreover, this could be in contradiction with article 6-2 of the Directive stating that the procedures for the granting of storage permits are open to all entities. The challenge is how to combine these two interests.
- The Directive does not permit conflicting uses of the complex during the exploration time. This means that when a petroleum title already exists, no exploration permit for CO<sub>2</sub> storage can be granted, and vice versa. Such restriction may limit the number of areas that could be selected as a potential storage site.

c) Storage permits (article 6 to 12)

***Application process***

When applying for a storage permit, an operator must supply the information set out in article 7, including

- proof of competence,
- a detailed characterisation and assessment of the potential site,
- information regarding the CO<sub>2</sub> to be injected (the total quantity of CO<sub>2</sub> to be injected and stored, the prospective sources and transport methods, the composition of CO<sub>2</sub> stream, the injection rate and location of injection facilities),
- a description of measures to prevent significant irregularities,
- a monitoring plan and a corrective measure plan,
- an environmental impact assessment
- and a post closure plan backed up by proof of financial security to cover closure and potential leakage liabilities.

***Changes to permits – authority to review, update and withdraw permits***

Storage permits are not delivered once and for all but are subject to regular review by the competent authority (5 years after issuing the permit and thereafter every ten years), and can also be updated, or withdrawn under certain conditions.

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<sup>19</sup> The draft Directive (Commission proposal) suggested a period of validity of 2 years, renewable for another 2 years. It was silent on preferential rights

“Any changes” in the operation of a storage site shall be notified to the competent authority and the latest is allowed to update the permit conditions accordingly. “Any change” includes also changes concerning the operator<sup>20</sup>.

In case of “substantial” changes, the competent authority is required to update the storage permit or to issue a new permit. It also requires an environmental impact assessment to determine if the change would cause adverse environmental effects. However it is unclear what is meant by “substantial changes”.

The competent authority shall “review, update or as the last resort withdraw” the storage permit under certain conditions, including in case of significant irregularities or any leakages, non compliance with the permit conditions, or – and this is a novelty in the final Directive - “if it appears necessary on the basis of the latest scientific findings and technological progress” (article 11-3d).

If the storage permit is withdrawn (this shall be the last resort), the competent authority shall either issue a new storage permit (to another operator after a new application process) or close the storage site. Until a new storage permit has been issued, the competent authority shall temporarily take over all legal obligations and shall recover any cost incurred from the former operator (article 11-4) particularly by drawing on the financial security. In case of closure of the storage site, articles 17-4 and 17-5 shall apply and here also the competent authority will be responsible for all legal obligations and will recover the costs incurred from the former operator until the site is transferred to the State pursuant to article 18-8.

If the storage permit is withdrawn due to “significant leakages or irregularities”, it is most likely that the competent authority will have to close the storage site as no potential operator will be willing to take over a sick storage site and apply for a permit.

### ***Financial security***

Article 19 of the Directive requires a financial security from the operator of a storage site to ensure that all obligations under the permit can be met until the point at which responsibility is transferred to the competent authority. Such obligations will include closure and post closure requirements and will remain in place until the permit is terminated. Article 19 also requires the security to include liability, which may arise under the EU ETS, where allowances would have to be purchased at market rate and surrendered in the event of a leakage causing climate change.

A financial guarantee ensures that independent funds can meet the costs of these obligations if the operator fails to do so. This is intended to protect the public purse in the event of a failure by the operator during the permit period.

The financial security does not need to be in place prior to submission of the application for a storage permit. The potential operator shall only give proof that financial security can be established, and it is only when the permit has been granted and before commencement of injection that the financial security is required to be valid and effective<sup>21</sup>.

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<sup>20</sup> Transfer of permit between operators was not addressed in the Draft Directive

<sup>21</sup> In the original draft Directive, financial security was required to be in place when applying for a storage permit. This would however have placed an undue cost on operators who would not yet have been granted a permit. The Final directive has chosen a more commercial approach.

### ***Permit review by Commission***

The Directive provides provisions regarding permit review by Commission.

The procedure for permit review is that permit applications and draft permit shall be transmitted to the Commission for review. The Commission may issue an opinion within 4 months (non binding) but this is not an obligation. If the Commission decides not to issue an opinion, it shall inform the Member State and state its reasons<sup>22</sup>. This last provision is unclear as to which consequences it will have regarding the granting of a permit: the question is whether Member States will be allowed to issue storage permit despite the absence of opinion of the Commission or whether this provision is meant to “prolong” the review time by the Commission.

The Commission's opinion will be public, but the final decision regarding the permit remains with the national competent authority according to the subsidiarity principle. If the competent authority deviates from the Commission’s opinion, it shall state the reason.

As stated above, a Scientific Panel of technical experts will be established with the aim (among others) to assist the Commission in reviewing storage permits. This should provide better consistency between Member States and ensure better public confidence in CCS projects. .

For EFTA countries, like Norway, the duty to review permits will probably belong to ESA, with the challenge that ESA might not have the same level of competence as the EU Commission in that area. The question is also whether a similar “Scientific Panel” will be established to assist ESA, or whether the Scientific Panel established by the Commission will also review permits from EFTA countries.

### ***CO<sub>2</sub> stream***

When injecting and storing a CO<sub>2</sub> stream, the operator shall be able to show that the CO<sub>2</sub> stream in question can be accepted at the site according to the conditions laid out in the permit and that it fulfils the composition criteria set out in Article 12.

Article 12 of the Directive requires that the operator only accepts and injects CO<sub>2</sub> streams, if an analysis of the composition of the streams, including corrosive substances, and a risk assessment has been carried out, and if the risk assessment has shown that the contamination levels are in line with the following conditions:

- The CO<sub>2</sub> stream shall consist overwhelmingly of carbon dioxide
- No waste or other matter may be added for the purpose of disposing of that waste
- Incidental associated substances from the source, capture or injection process and trace substances to assist in monitoring are only allowed in the CO<sub>2</sub> stream if their concentration are 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
  - Breach the requirements of applicable community legislation

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<sup>22</sup> Within one month of submission of the draft permit

The Directive does not set a quantitative limit on CO<sub>2</sub> stream purity. The permitted levels of impurities in the CO<sub>2</sub> stream are based on their potential impacts on environmental integrity of transport and storage systems.

Guidelines are expected now from the EU Commission to help identify the composition of CO<sub>2</sub> stream<sup>23</sup>.

Finally, the operator shall also keep a register of the quantities and characteristics of the CO<sub>2</sub> streams delivered, indicating the origin, composition and identity of the producers and transporters of the CO<sub>2</sub> streams.

d) Monitoring and corrective measures (article 13)

Central to the life of the storage site is the activity of monitoring in order to ensure that the site is behaving as predicted, whether migration or leakage occurs, and whether any identified leakage is damaging the environment or human health. This will take place throughout the entire process, from operation to post closure and post transfer.

***Monitoring requirements***

Article 13 and Annex II of the Directive set out the operator's monitoring requirements of the injection facilities, storage complex and surrounding environment, and details of the monitoring plan. However, the monitoring technology employed is left to the choice of the operator, although it shall be based on "*best practice available at the time of design*".

It is claimed that to date there is little experience with methods to quantify CO<sub>2</sub> leakage from storage sites and that the development of Monitoring and Reporting Guidelines (MRG) for CCS including specific quantification approaches does not seem feasible at this point of time<sup>24</sup>. This is of concern not only to determine how many allowances will have to be surrendered pursuant to the EU ETS system, but also – and most of all - to assess the safety of storage sites. The Directive on CO<sub>2</sub> storage puts efforts both on prevention of leakage (through site characterisation, risk assessment and the establishment and updating of monitoring plan), and on corrective measures in case of leakage. However, if the methodology to quantify CO<sub>2</sub> leakage is not sufficiently developed, one can ask whether leakages can be detected properly (undetected, detected late or underestimated leakages).

It is therefore crucial to insist on the rapid development of technology and methodology to quantify both vertical CO<sub>2</sub> leakages as well as lateral migration of CO<sub>2</sub><sup>25</sup>. The establishment of the Scientific Panel that will assist the Commission in reviewing the monitoring plan will contribute positively to gather practical experience and will enable the development of future guidelines for monitoring and quantification of CO<sub>2</sub>.

The monitoring plan is a living document that will evolve and be updated at least every 5 years to take into account "changes to the assessed risk of leakage, changes to the assessed

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<sup>23</sup> Article 12-2

<sup>24</sup> "Basic Framework for an EU scientific advisory body supporting harmonized CO<sub>2</sub>-quantification approaches at CO<sub>2</sub> storage sites", Sina Wartmann and Jochen Harnisch, Ecofys, Germany, 16-12-2008.

<sup>25</sup> Bellona's statement on the document relating to the Development of Monitoring and Reporting guidelines for CO<sub>2</sub> Capture and Storage, [http://www.bellona.no/casefiles/CO2\\_monitoring](http://www.bellona.no/casefiles/CO2_monitoring)

risks to the environment and human health, new scientific knowledge and improvements in best available technology”. In practice this means that the monitoring technology employed can change during the operational phase of the site and the Competent Authority might at some stage require the use of specific technologies or methods of measurements<sup>26</sup>.

### ***Time frame of monitoring obligation – long term monitoring***

The operator is responsible for monitoring during the operational phase of the storage site on the basis of the monitoring plan, but also during the period following the closure until the storage site has been transferred to the State.

After site transfer, monitoring shall continue (performed by the competent authority) albeit at a reduced level<sup>27</sup> (see also our comments under “transfer of responsibility”).

### ***Corrective measures***

In case of significant irregularities or leakages, the operator shall immediately notify the competent authority and take the necessary corrective measures. The corrective measure plan serves as a basis, but additional or different measures can also be required. If the operator fails to take the necessary measures, the competent authority shall take them itself at the costs of the operator. As of today, there are no guidelines for remediation actions if leakage should occur.

#### e) Transfer of responsibility (article 18)

As geological storage will extend over much longer periods than an average commercial entity, the long-term stewardship of storage sites had to be arranged. The directive thus provides for sites to be transferred to Member State control in the long term. However, the polluter pays principle requires that the operator retains responsibility for a site while it presents a significant risk of leakage.

The two major issues relative to the transfer of responsibility and discussed prior to the adoption of the Directive concerned:

- the minimum duration of the post closing period (the period between site closure and site transfer)<sup>28</sup> during which the operator remains responsible
- how to demonstrate the risk of no leakage

Those two issues have now been clarified in the new wording of articles 18-1 and 18-2.

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<sup>26</sup> At Sleipner, the monitoring methods changed and were adapted over time. See SFT impact assessment 28 April 2008

<sup>27</sup> This is a major change compared to the Commission proposal : The Commission had foreseen that monitoring should cease after the transfer of responsibility (under the assumption that at the point of transfer, security and permanence of storage could be assumed and any failures would be identified under general environmental monitoring), but the final directive foresees that monitoring should continue after this point. Consequently, a further provision requiring a financial contribution from the operator to cover at least the costs of monitoring for a period of 30 years after the transfer of responsibility has been included in the directive.

<sup>28</sup> In the original draft Directive, the transfer of responsibility was only subject to the demonstration of no risk of leakage without any specific post closure period, while the Davies Report (Report A6-0414/2008 dated 16-10-2008 see ref over) suggested in addition “*a post closure interim period of at least 50 years*”. Such solution would have significantly increased the operator’s obligations and could have compromised the deployment of CCS projects due to the economic burden it would have constituted for investors.

Under the new article 18-1, a storage site that has been closed shall be transferred to the State when

- all available evidence indicates that the CO<sub>2</sub> will be completely contained for the indefinite future,
- a minimum period before transfer to be determined by the competent authority has elapsed. This minimum period shall be no shorter than 20 years, unless the competent authority is convinced that the criterion referred to under § 18-1 (a) is met before the end of that period
- a financial contribution for the post-transfer period covering at least the costs for monitoring for 30 years has been made and
- the site has been sealed and the injection facilities have been removed.

Article 18-2 provides criteria for how to demonstrate that the CO<sub>2</sub> is completely and permanently contained thus providing better certainty and comfort for operators than in the draft Directive<sup>29</sup>. Indeed, *“the operator shall prepare a report documenting that the condition referred to in paragraph 1(a) has been met and submit it to the competent authority for the latter to approve the transfer of responsibility. This report shall demonstrate, at least:*

- *(a) the conformity of the actual behaviour of the injected CO<sub>2</sub> with the modelled behaviour*
- *(b) the absence of any detectable leakage*
- *(c) that the storage site is evolving towards a situation of long-term stability*

The Commission will prepare and adopt guidelines on the assessment to be made prior to transfer of responsibility. The Scientific Panel should also assist the Commission in reviewing draft decisions approving the transfer of responsibility.

#### f) Operator’s liabilities for leakage

The operator is liable for any damage caused during the period of operation of a storage site until the responsibility is transferred<sup>30</sup>.

Under the Directive, leakage of stored CO<sub>2</sub> will be the event that determines liability and liability will occur both in terms of damage to the environment (local) and damage to the climate, resulting from any failure of permanent containment (recital 30 of the Directive). The directive does not provide specific provisions regarding the liability but refers to existing EU legislation, particularly the Environmental Liability Directive 2004/35/EC (“ELD”)<sup>31</sup> and the EU ETS Directive 2003/87/EC (now amended).

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<sup>29</sup> The original draft Directive did not specify criteria regarding demonstration of no leakage and the reference to *“all available evidence”* and *“completely and permanently contained”* was open to wide interpretation

<sup>30</sup> After site transfer, the responsibility of the operator can be reactivated in the event the transfer was based on fault of the operator, including cases of deficient data, concealment of relevant information, negligence, wilful deceit or malpractice. In such case the competent authority shall recover from the former operator the costs incurred after the transfer of responsibility has taken place (Article 18-7)

<sup>31</sup> Note that only very few countries have implemented this directive and Norway is not among them.

(i) According to the CO<sub>2</sub> storage Directive article 35, the ELD will apply with regard to the prevention and remedying of environmental damages caused by “the operation of storage site”. Reference to this directive is however not sufficient to cover expected environmental damages caused by CO<sub>2</sub> leakage as it only applies in narrow circumstances<sup>32</sup>.

First, the ELD is amended only to apply for damages caused by the “*operation of storage site*”. It means that liability between closure (after the “operational phase”) and the transfer of responsibility to the State is not covered by the liability scheme under ELD.

Second, the ELD only covers environmental damages caused by airborne elements as far as they cause damage to water, land or protected species or natural habitat. This means that damages caused by offshore storage sites and damages affecting only human health (and not the environment) will not impose liability on the operator.

Finally, damages discovered 30 years after the emission, event or incident causing the damage are statute-barred.

(ii) Liability for climate change as a result of leakage will require the surrender of EU ETS allowances. The challenge remains to measure leakages from the storage complex and this task is more complicated than measuring emissions from industrial installations. As mentioned above, there is little knowledge on methods for quantification of CO<sub>2</sub> leakage from CO<sub>2</sub> storage sites. The Monitoring and Reporting Guidelines under the Emissions Trading Directive are in the process of being amended in view of the inclusion of CCS in the ETS.

(iii) transboundary issues

The Directive is silent on the issue of transboundary migration of CO<sub>2</sub>, where leakage in one Member State causes damage in another. Liability issues and transboundary issues will be more detailed in section 4 and 5 of this report.

### 2.2.2 *Transport and third party access to transport and storage network*

Once a likely storage area for CO<sub>2</sub> has been identified it becomes possible to plan for the most feasible routes to transport the CO<sub>2</sub> off site. Pipeline transport is likely to be the preferred method of transport in most parts of the EU although ship transport is also an alternative- Depending on the location, greater use of CCS could lead to significant pipeline networks across the continent. Over land we would expect the CO<sub>2</sub> to be transported by pipeline, while either pipelines or ship may be possible for offshore transport.

The Directive makes only few provisions in relation to transport and relies mostly on existing legislation. Construction of both onshore and offshore transport infrastructure will be left to national property and planning legislation and will require an environmental impact assessment under Directive 85/337/EC as amended by Council Directive 97/77/EC (IEA Directive). A licence might also be required under the relevant legislation to transport the CO<sub>2</sub><sup>33</sup>.

Insofar as the Directive addresses transport, Member States are required to ensure that users are able to gain access to the CO<sub>2</sub> transport network and storage network. Article 21 specifies the objectives that apply to fair and open access. Such arrangements are necessary as access to

<sup>32</sup> ClientEarth p23, [http://www.clientearth.org/clientearth\\_ccs\\_directive\\_legal\\_review\\_oct08.pdf](http://www.clientearth.org/clientearth_ccs_directive_legal_review_oct08.pdf)

<sup>33</sup> For ex in the Norwegian petroleum Act

CO<sub>2</sub> transport networks and storage sites could become a condition to enter into the internal electricity and heat market, depending on the relative prices of carbon and CCS.

Third party access to the pipeline system means that the pipeline owner has a duty to enter into a contract in respect to a third party wishing to transport CO<sub>2</sub>. The pipeline owner consequently cannot by the power of ownership decide who shall be permitted to use the transport facilities.

The same applies for the storage site: the storage site operator has the duty to enter into a contract in respect to a third party wishing to store CO<sub>2</sub>.

Access to transport and storage network is however not an unlimited right and a different treatment can be justified.

In that respect the Directive provides some guidance on how to establish such a system and mentions inter alia different elements to be taken into account: the transport and storage capacity which is available or can reasonably be made available, the technical specification requirements as well as the proportion of the State's CO<sub>2</sub> reduction obligations pursuant to international legal instruments, and to community legislation intended to be met through CCS.

Lack of capacity can justify the refusal to give access to the storage and transport network. If the pipeline or storage site is used to the operator's capacity, new customers can not require access. Consequently existing users of the pipeline or storage network would not be subject to reducing their use when new players wish to enter the market. However, to favour market opening, Member States shall take the necessary steps to increase capacity, as far as it is economic to do so or when a potential customer is willing to pay for this.

### 2.2.3 Capture

The Directive does not specially focus on capture of CO<sub>2</sub> at its industrial source, but instead takes the approach that capture will be dealt with under existing legal regimes, notably the Integrated Pollution Prevention and Control regime (IPPC Directive 96/61/EC). In addition, revisions to the EU ETS have brought capture of CO<sub>2</sub> within the emission trading scheme<sup>34</sup>. The Directive provides also a "capture ready" provision, by way of amendments to the Large Combustion Plants Directive (Directive 2001/80/EC).

The IPPC Directive imposes a permitting regime on certain industrial activities, specified in Annex I, to control releases of contaminants into and pollution of the environment. Article 32 of the directive amends the scope of the IPPC directive to include activities capturing CO<sub>2</sub> for the purpose of geological storage and requires plant operators to obtain a permit for capture. The effect of this provision is that any new or existing operation proposing to capture CO<sub>2</sub> would be required to obtain an additional operating permit under the IPPC regime.

Article 34 of the Directive amends the Large Combustion Plants Directive (Directive 2001/80/EC) to include in a article 9a an obligation on all new built combustion plants with a

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<sup>34</sup> Position of the European Parliament adopted at first reading on 17 December 2008 with a view to the adoption of Directive 2009/.../EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2008-0610+0+DOC+XML+V0//EN&language=EN>

rated electrical output of 300 MW or more to have suitable space on the site for CCS equipment to be retrofitted ( “capture ready” definition).

#### 2.2.4 *Enhanced Hydrocarbon Recovery*

Enhanced Hydrocarbon Recovery (EHR), which refers to the recovery of hydrocarbon additional to that produced naturally by water injection or other means, is not as such included in the scope of the Directive. However, where EHR is combined with geological storage of CO<sub>2</sub>, the provisions of the Directive for the environmentally safe storage of CO<sub>2</sub> will apply (recital 20). *“In that case, the provisions of this Directive concerning leakage are not intended to apply to quantities of CO<sub>2</sub> released from surface installations which do not exceed what is necessary in the normal process of extraction of hydrocarbons, and which do not compromise the security of the geological storage or adversely affect the surrounding environment. Such releases are covered by the inclusion of storage sites in the EU ETS Directive (...).”*

#### 2.2.5 *Supplementary legislation at EU level relevant for CCS projects*

- Directive 85/337 on assessment of effect of project to environment : applicable to capture, transport and storage
- Directive 96/61 (IPPC) concerning integrated pollution prevention and control : applies to capture from an installation covered by the directive
- Directive 2000/60/EC establishing a framework for community action in the field of water policy
- Directive 2001/80 on the limitation of certain emissions of certain pollutants : capture ready
- Directive 2004/35 on environmental liability (ELD) applies to the operation of the storage site
- Directive 2006/12/EC on waste
- Regulation EC No 1013/2006 on shipments of waste

## **Section 3      Regulatory Situation of CO<sub>2</sub> Storage in Norway – The Current Regime**

### **3.1 Introduction**

The current regime is complex and confusing as the legal problems and solutions vary according to the different forms of injection; CO<sub>2</sub> may be either injected into petroleum reservoirs or into natural aquifers in the subsoil, located either in the Norwegian Continental Shelf (NCS) or in the Extended Economic Zone (EEZ). Injection may be either part of offshore petroleum activities, be independent of such activities, or be combined with it in different ways. Linked to petroleum activity, injection may be carried out either as part of a production strategy to obtain enhanced oil recovery, or as a means to avoid emissions of CO<sub>2</sub> to the atmosphere. If CO<sub>2</sub> is taken from onshore activities, the injection may itself take place

from installations that are or have been used for petroleum purposes, from installations that have been specially constructed for injection purposes, or from pipelines directly from the shore into the reservoir/aquifer<sup>35</sup>.

Thus far, CCS projects carried out in Norway have been addressed on a case by case basis with support from existing environmental legislation (particularly the Pollution Control Act of 13. Mars 1981 nr.6) and legislation applicable within the petroleum sector (particularly the Petroleum Act of 29 November 1996 nr.72). However, these regulations have not had CCS in mind, and they are not sufficient to address all legal aspects of CCS activities, either when conducted in a pure Norwegian context, or in a European context implying an open market.

Most of the CCS activities, from capture to storage are covered by the Pollution Control Act and require a pollution permit. When such activities are also connected to petroleum activities, the Petroleum Act applies in addition to the Pollution Control Act. This results in a dual of regime and a risk of overlapping.

### 3.2 The current regime for CCS in Norway

We will recall how the Pollution Control Act and the Petroleum Act can apply to CCS activities and how they have been applied in practice (point 3.2.2 and 3.2.3).

However, we will first shortly address the issue relative to who is vested in the right to use aquifers and reservoirs for injection purposes.

Recommendations on which issues should be taken into consideration when implementing the new permitting system established by the draft directive will be discussed in section 4.

#### 3.2.1 State's right to use underground

The State has the property right to underground petroleum resources and other natural resources located on the Norwegian Continental Shelf and the land territory. As owner, the State has the exclusive right to decide and to control such use and to regulate all aspects regarding CO<sub>2</sub> storage. This right includes the right for the State not to allow any storage, or to give priority to another use of the underground, for example to give priority to petroleum projects in preference to CCS projects.

The right to use reservoirs is subject to a permit, delivered in the form of a lease. Permits are granted pursuant to the Petroleum Act and/or to the Continental Shelf Act (or by both), depending on the type of reservoir and whether such reservoir is or is not connected to petroleum activities<sup>36</sup>.

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<sup>35</sup> Norwegian Research Council Project no 151393/210 "Large scale CO<sub>2</sub> Sequestration on the Norwegian Continental Shelf: a technical, Economic, legal and Institutional Assessment", . Document prepared in collaboration between SINTEF Petroleum Research, CO<sub>2</sub>-Norway AS, Norwegian School of Management, CICERO and Faculty of Law University of Oslo.

<sup>36</sup> When aquifers and reservoirs are used for petroleum activities, either to deposit CO<sub>2</sub> as waste or to enhance oil recovery, a permit is required pursuant to the Petroleum Act. When aquifers are used for disposal of CO<sub>2</sub> as a waste from petroleum activities, it is unclear whether a permit pursuant to the 1963 Continental Shelf Act is also

### 3.2.2 Regulation of CCS activities through the Petroleum Act of 29. November 1996 nr.72

#### 3.2.2.1 Scope of application

From a legal point of view, an important distinction is made between injections connected to petroleum activities and injections not connected to petroleum activities. For injections connected to petroleum activities, the Petroleum Act finds application and gives an acceptable framework to regulate most issues connected to such injections: exploration, development and management of the installation, coordination with competing rights, third party access, decommissioning and safety measures. However some important issues such as long term monitoring and long term liabilities are not addressed upfront.

The Petroleum Act and its regulatory provisions, including provisions on impact assessment, are applicable to the following activities<sup>37</sup>,

- injection of CO<sub>2</sub> (regardless of its source) in a petroleum reservoir for EOR
- injection and storage of CO<sub>2</sub> which is separated from natural gas so that it can meet the market specifications (for example, at the Sleipner or Snøhvit field )
- probably injection of CO<sub>2</sub> (regardless of its source) through an existing or former facility used for petroleum activity
- disposal of CO<sub>2</sub> from a power plant delivering heat and electricity to a petroleum activity on the Norwegian continental Shelf

Not covered by the Petroleum regulations is the injection and disposal of CO<sub>2</sub> as waste from land-based industry, which is transported by pipeline or ship to an installation that is not (and has not been) connected to a petroleum activity. However, this situation might be common in the future.

#### 3.2.2.2 Sleipner

The Sleipner Field gives a good illustration on how the Petroleum Act applies to CCS in Norway<sup>38</sup>:

The CCS at the Sleipner field is carried out as part of the production activity on the field. The CO<sub>2</sub> capture is not carried out for enhance oil recovery, but is necessary as part of the gas processing at the production site to ensure that the CO<sub>2</sub> content of the produced gas meets sale specifications. As a waste from petroleum activities, the CO<sub>2</sub> storage activity is connected to petroleum activity and as such subject to the Petroleum Act.

The Petroleum Act implies/implied the following:

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necessary. For other resources than petroleum resources, the 1963 Continental Shelf Act is applicable and a permit is required. It should be considered whether all use of reservoirs other than petroleum reservoirs for disposal purposes should be covered by the same act, regardless of what is the source of the CO<sub>2</sub>. See Norwegian Research Council Project no 151393/210.

<sup>37</sup> See Petroleum and Energy Directorate, Impact Assessment dated 30-04-2008 and Norwegian Research Council Project no 151393/210

<sup>38</sup> IEA, Legal aspects of storing CO<sub>2</sub> p 37 [http://www.iea.org/textbase/nppdf/free/2007/legal\\_aspects.pdf](http://www.iea.org/textbase/nppdf/free/2007/legal_aspects.pdf)

- The activity of storage has been permitted as part of the conditions for approval of the PDO (Plan for Development and Operation) of the Sleipner's field.
- The PDO was subject to an impact assessment and was submitted and approved by the Ministry of Petroleum and Energy.
- Any deviation and alteration of the terms and conditions on which the PDO has been submitted or approved is subject to notification to the Ministry.
- The Petroleum Act also requires the owners of the Sleipner facility to accept third party access to the facility on negotiated terms.
- When the field is depleted, a decommissioning plan will have to be submitted to the Ministry.
- The decision taken by the Ministry on the decommissioning will also set conditions with regard to future monitoring of the CO<sub>2</sub> that has been injected into the Utsira formation, and a time limit for the liability of the licensees. Such conditions regarding future monitoring and time limit for liability are not known upfront.
- Any pollution damage resulting from CCS on the Sleipner field is subject to strict liability by the licensee under the Petroleum Act.
- As regard to safety, the petroleum activities shall be conducted in such a manner as to enable a high level of safety to be maintained and further developed in accordance with technological development.

At the Snøhvit field, the process of separating CO<sub>2</sub> from the extracted gas is done onshore and CO<sub>2</sub> is then transported and injected in a geological formation called the "Tubåen formation".

### *3.2.2.3 The Petroleum Act can qualify to regulate future CCS activities*

In its impact assessment, OED concluded that the petroleum legislation gives a satisfactory basis to fulfil most of the draft Directive's requirements, but subject to a few modifications; the scope of application of the Petroleum Act should be extended or specific provisions should be adopted in order to cover injection and storage which are not connected to petroleum activities. Specific rules regarding transfer of responsibility, however, would need to be adopted. It is also suggested that the Petroleum Act could serve as a model regarding the development and management phase of the site, as those issues are not addressed in the Draft Directive<sup>39</sup>.

At the present time, a new Petroleum Bill dated November 2008 and currently under a hearing procedure, provides specific modifications to the Petroleum Act among them provisions regarding third party access to the petroleum installations. In particular it is suggested in a new article 4-8 paragraph 3 to extend this right for CO<sub>2</sub> storage activities. The consultation document also suggests, that CO<sub>2</sub> storage activities not connected to petroleum activities should be regulated through the Petroleum Act. Surprisingly, no reference to the expected Directive on CO<sub>2</sub> storage is made in the document.<sup>40</sup>

We are of the opinion that it is premature to regulate details of CO<sub>2</sub> storage through the Petroleum Act and that it would be more appropriate to wait until a larger debate and consultation is made regarding implementation of the newly adopted Directive.

<sup>39</sup> Petroleum and Energy Directorate, Impact Assessment dated 30-04-2008

<sup>40</sup> Høringsnotatet - Petroleum Bill dated 24 November 2008

### 3.2.3 Regulation of CCS activities through the Pollution Control Act of 13. Mars 1981 nr.6

#### 3.2.3.1 Overview

The Pollution Control Act applies to geological storage of CO<sub>2</sub> as “pollution” is defined as, inter alia, the introduction to air, water, or into the ground of solid matter, fluid or gas (...) which is or may be harmful or detrimental to the environment.

The Pollution Control Act applies to sources of pollution within the Norwegian land territory and Norwegian territorial water. Outside this area, the main rules of the Act apply to regular sources of pollution from the exploration and exploitation of subsoil natural resources on the Norwegian part of the continental shelf, including decommissioning of facilities.

Aquifer and reservoirs on the continental shelf are therefore most likely covered by the Act. It also applies to pollution sources in the EEZ (including its subsoil) or pollution that threatens the EEZ, if the source is a Norwegian vessel or installation. However, the act does not cover injection in the EEZ outside the continental shelf from foreign vessels or installations<sup>41</sup>. In the future, and assuming that the EU directive on CO<sub>2</sub> storage is implemented in Norway, this gap could be problematic as it can reasonably be expected that foreign entities will deliver their CO<sub>2</sub> to Norwegian storage sites through non-Norwegian vessels, or that injection installations will be owned by foreign entities. In such a case, no pollution permit would be required under the existing legislation, and the Pollution Control Authority will not be able to control the activity.

The most relevant provisions of the Pollution Control Act applying to CO<sub>2</sub> storage activities relate to the pollution permitting system (chapter 3), provisions regarding inspection and control measures (chapter 7), provisions ensuring the compliance of the act, or decisions made pursuant thereto (chapter 9), and penalty provisions (chapter 10). The Act also contains provisions relating to pollution damages.

As CO<sub>2</sub> storage is an activity that may create a risk of pollution, it has to be authorised either through regulations, or through an individual pollution permit pursuant to § 11. In practice, it is more likely that a pollution permit is required both for the company that carries out the injection, and for the activity that wants to deliver CO<sub>2</sub> to an installation for injection<sup>42</sup>.

The Pollution Control Authority however is empowered to issue regulations requiring that any person wishing to engage in certain types of activities that by their nature may lead to pollution shall apply for a permit. The authority can also require to be informed on activities that may involve serious pollution at an early stage of the planning process, and require the performance of an environmental impact assessment to determine the effects of such activity on the environment (§13). The authority is also responsible for monitoring the pollution situation from individual sources, and can require information and can carry out inspections. It shall also ensure compliance with the Act.

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<sup>41</sup> Norwegian Research Council Project no 151393/210

<sup>42</sup> Norwegian Research Council Project no 151393/210, page 31

### 3.2.3.2 Sleipner

So far, the Pollution Control Authority has issued two permits: one permit for the Sleipner field and one permit for the Snøhvit field.

At the Sleipner field, the Pollution control authority issued an injection permit on the following conditions:

- maximum yearly quantity of CO<sub>2</sub> to be injected
- obligation to report on actual injected quantity of CO<sub>2</sub>
- obligation to monitor injected CO<sub>2</sub> and report the results - including obligation to surrender a monitoring plan.

### 3.2.3.3 The Pollution Control Act can qualify to regulate future CCS activities in Norway

In its impact assessment, SFT concluded that the Pollution Control Act gives a sufficient basis to ensure most of the requirements of the draft Directive, but that new regulatory provisions should be adopted (for example through a new chapter in the Pollution Regulation) in order to promote consistency with EU Member States. SFT also recognises that some of the obligations addressed to Member States cannot be regulated through the Pollution Control Act as they are outside the aim of the Act: particularly provisions allowing third party access to storage or transport and provisions giving exclusive or preferential rights to permit holders to use geological storage<sup>43</sup>.

## **Section 4      Recommendations on How CO<sub>2</sub> Storage should be Regulated in Norway Following the Adoption of the Directive**

### **4.1      Summary of the current legal system**

As described above in section 3, the current regulatory system is complex and confusing as two sets of rules and authorities are involved in CO<sub>2</sub> storage activities. Some legal issues such as long term monitoring and liabilities, are not addressed upfront, thus resulting in uncertainties for operators.

It seems that both the Norwegian Control Authority and the Oil and Energy Department could be candidates to become the future “competent authority” responsible for fulfilling the duties established by the future CO<sub>2</sub> Storage Directive. They are both qualified to implementing the Directive’s requirement through existing legislation, subject to some necessary adjustments.

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<sup>43</sup> Impact Assessment on Draft Directive on CO<sub>2</sub> storage, SFT 24-04-2008

In the next section we will make recommendations on which considerations should be taken into account when regulating CCS in Norway following the adoption of the CO<sub>2</sub> Storage Directive. Our recommendations are primarily motivated by environmental considerations. Indeed, we find it important to place CO<sub>2</sub> storage activity in an environmental perspective, independent from petroleum activity. As a matter of fact, and as specified by the CO<sub>2</sub> Storage Directive, CO<sub>2</sub> storage is meant as an instrument to mitigate global warming. Conflicting interest with the petroleum industry can therefore be a reality.

Based on this environmental perspective, we will make recommendations inter alia on which entity (“competent authority”) and which legal instrument (existing legislation or new legislation) are most suitable to fulfill the Directive’s requirements.

## 4.2 General Recommendations

We have three general recommendations:

### 4.2.1 *Free standing legislation covering all aspects of the CCS chain*

We should consider whether a independent legislation should be established for CCS activities or whether we should use the existing legislation and adapt it (the Pollution Control Act and to a lesser extent the Petroleum Act).

Our first impression is that the regulatory framework should not only regulate CO<sub>2</sub> storage but should also regulate all aspects of the CCS chain, i.e. capture, transport and storage. Indeed, stakeholders need an instrument that clearly identifies the rights and responsibilities of the actors involved in all stages of CCS projects. This goal could be better achieved through free-standing legislation.

Amendments to the existing legislation (Petroleum Act and Pollution Control Act) would increase the complexity of the applicable legislation (see section 3). The establishment of a new free standing legislation (with reference to existing legislation when appropriate) would allow a better comprehension of the whole system, and consequently a better predictability for Norwegian and foreign partners involved in such projects. As a result it would promote a wider deployment of CCS projects.

### 4.2.2 *Removal of the distinction between activities connected and activities not connected to petroleum activities*

We recommend removing the distinction between injections connected to petroleum activities and injections not connected to petroleum activities; the link to petroleum activities is not always easy to identify. Moreover, in a European market where we expect to import CO<sub>2</sub> from foreign countries and transport it through common pipelines, the source of CO<sub>2</sub> (petroleum waste, or not) should not have incidence on the applicable legislation.

### 4.2.3 *Clarification of permits required in the CCS chain*

It must be identified clearly which permits are necessary for each activities involved in the CCS chain and which entity shall grant them:

- Permit to use reservoirs/aquifer: depending on the reservoir, regulated either by the Petroleum Act or the Continental Shelf Act.
- Pollution permit: for capture, injection, and storage
- Exploration permit
- Storage permit
- permit to transport CO<sub>2</sub> by pipeline or ship

We should also consider whether or not the granting of permits should be gathered by one and unique authority, which would address pollution issues as well as other issues.

### 4.3 Specific recommendations

#### 4.3.1 *Exploration phase*

The exploration is decided when Member States consider that it is necessary to generate further information for the selection of the site. It presupposes that pre exploration work has been performed. We assume that the State, as owner of the underground would perform such pre-exploration.

- In section 2 we have mentioned the conflicting interest between the legitimate expectation of the exploration right holder to have a priority in the granting of the storage permit, and the principle according to which the granting of storage permit shall be open to all entities and be non-discriminatory. It would indeed be prejudicial to other potential operators, who wish to apply for a storage permit, but are not involved in the exploration work.

We mean that the exploration right holder should be given a preferential right, but with certain conditions in order to limit competition distortion<sup>44</sup>.

As provided in the final Directive, the exploration right holder should only have a preferential right during a limited period of time and this right should be subject to the permit holder's compliance with the permit conditions during all the exploration work.

In addition to those conditions provided in the directive, we are of the opinion that in the event that the exploration right holder cannot claim its preferential rights (because the conditions are not fulfilled), we should provide a mechanism to allow the transfer of the intellectual and commercial rights of the data collected during the exploration phase under fair conditions. One solution could be to establish, as a condition of the exploration permit, a mechanism to determine in advance which objective criteria will be taken into account for assessing the selling price of such data.

- The performance of the exploration work should be under the control of the authority granting the exploration permit. This authority should require from the exploration

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<sup>44</sup> Note that Petroleum exploration permit does not provide any preferential right.

right holder a continual duty to inform about the progression of the exploration work as it is required in Australia<sup>45</sup>. This would allow the competent authority to better assess whether the exploration work is following the expected schedule and consequently whether a prolongation of the permit should or should not be allowed. This would also allow potential applicants for a storage permit to be ready to compete for storage application when the exploration work meets its expiring date.

#### 4.3.2 *Development of official standards for site characterisation and selection*

A major challenge for the oil, gas and coal industries has been the lack of publicly available and recognized best practice guidelines. These should explain how to efficiently implement legal and regulatory frameworks, how to adopt concurrent best engineering practices, and how to manage the risks and uncertainties throughout the storage cycle.

DNV has assembled key industry players and launched a joint industry project (JIP) to develop a standard methodology for characterising, selecting and qualifying proper sites for geological storage of CO<sub>2</sub> – both offshore and onshore<sup>46</sup>. The development of standard practice should ensure that the geological storage of CO<sub>2</sub> is implemented in a transparent and clear way.

A governmental body should establish official standards based on the work performed by DNV, other private or public companies, or organisations. We recommend the Ministry of Environment as the best suited body. We also recommend that the Ministry of Environment is given the necessary budget and resources to perform this task.

#### 4.3.3 *Financial Security*

The operator of a storage site shall give proof that financial security can be established when applying for a storage permit and this security shall be valid upon commencement of the injection. Such financial security shall remain in place until transfer of liability to the State.

Several types of financial guarantees are available at different costs for the operators, for example a bank guarantee, cash deposit, mortgage or parent company guaranty. In Norwegian legislation, financial securities are required for landfill rights owners and in this area, the time horizon is also long (30 years)<sup>47</sup>.

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<sup>45</sup> Greenhouse Gas Geological Sequestration Bill 2008 , clause 56 providing that “ the holder of an exploration permit must immediately notify the Minister of the discovery of an underground geological storage formation that is likely to be geologically suitable for the injection and permanent storage of a greenhouse gas substance. The bill provides three categories of storage formation that correspond to the title holder's improving level of knowledge about the formation : a "potential greenhouse gas storage formation", an "eligible greenhouse gas storage formation" and finally an "identified greenhouse gas storage formation".

<sup>46</sup> Developing a unified approach to qualifying CO<sub>2</sub> storage sites: [http://www.engineerlive.com/Oil-and-Gas-Engineer/Environment\\_Solution/Developing\\_a\\_unified\\_approach\\_to\\_qualifying\\_CO2\\_storage\\_sites/21157/](http://www.engineerlive.com/Oil-and-Gas-Engineer/Environment_Solution/Developing_a_unified_approach_to_qualifying_CO2_storage_sites/21157/)

<sup>47</sup> See guidelines provided by the Norwegian Pollution Control Authority regarding financial securities related to land fill (in Norwegian) <http://www.sft.no/publikasjoner/avfall/2150/ta2150.pdf>

A bank guarantee could be an alternative, although a 20-50 year perspective is not a normal time horizon for such security. However, the wide deployment of CCS in Europe could contribute to increase the demand for such products and consequently create more offers. One should be careful about such bank guarantee conditions and how they can be terminated.

Assuming that the competent authorities accept it, we would be in favour of a parent company guarantee as this would imply less cost for the operators and it is most likely that site operators will be part of a company group and consequently be able to provide such guaranty. However the solidity of the mother company shall be thoroughly assessed.

#### *4.3.4 Financial Mechanism (required by article 20 of the Directive)*

The financial contribution made by operators is meant to cover at least the costs of monitoring borne by the competent authority for a period of 30 years after the transfer of responsibility.

Such contribution does not constitute a financial guarantee, but can almost be assimilated to a tax aimed at covering the costs for long term monitoring performed by the State.

Contributions do not need to be attached to a particular storage site. The fund should be managed globally in a pool and contributions from operators put into a common pot. One should consider whether the national managing of such a fund should be given to the competent authority or left to another state financial institution.

The contribution level should be predictable for operators and should at least be proportionate to the capacity of the storage site in volume units of CO<sub>2</sub>.

It would be fair if the contribution level is periodically adjusted to take account of changes to the assessed risk of leakage.

##### *4.3.4.1 Development of infrastructure*

In the context of CCS, as large pipeline networks are expected to be involved, it appears more appropriate to realise the pipeline infrastructure for the transportation of CO<sub>2</sub> through Private and Public Partnership (PPP). Private parties could take on responsibility for constructing, operating and co-funding the projects. Public funding might be required to build pipelines, and a public party could play a role in co-funding. The public party can also play a role in laying out a CO<sub>2</sub> pipeline network, by providing upfront a large backbone connection. However, in a national context, it might be more appropriate to let private entities lay out the network gradually according to their needs. In the future, large volumes of CO<sub>2</sub> from foreign sources are expected to be imported in Norway for permanent storage. Large infrastructure will then be necessary and will have to be carefully planned, and the public party might have a larger role to play in this respect.

##### *4.3.4.2 Third party access to transport and storage network*

Norway will have to establish a system ensuring that users are able to gain access to the CO<sub>2</sub> transport network and storage network in a fair and non-discriminatory manner.

In practice, it is likely that Norway will use the system established for petroleum activities providing third party access to petroleum installation and upstream pipeline gas network as a model (§ 4-8 of the Petroleum Act and Regulation 2005-15-20 nr. 1625 relative to third parties use of installation) that is based on fair and non-discriminatory access. As mentioned earlier, the Petroleum Act is under revision and the creation of a new paragraph is suggested to extend the provisions relative to third party access to the transport and storage of CO<sub>2</sub><sup>48</sup>.

In our opinion, it is important to provide clear provisions ensuring that:

- The storage permit holder will have a preferential right to store CO<sub>2</sub> in the geological formation he has been granted a permit for
- The pipeline owner is given a preferential right to use his transport network
- The storage permit holder and the pipeline owner shall not have to reduce the use of their facilities when new operators wish to enter the market
- The CO<sub>2</sub> producer located closed to a storage site shall have a preferential right to use such storage site and the transport network connected to it

Regarding the implementation of a system of third party access, in practice there are two options: one possibility is to determine the tariffs and the other terms and conditions to which third parties will be able to use the transport or storage network in advance (negotiated access); the other possibility is to leave the negotiation of the price and other conditions to the parties involved (regulated access).

#### 4.3.5 Competent authorities

*According to the Directive, Member States shall establish or designate the competent authority or authorities responsible for fulfilling the duties established under the Directive. Where more than one authority is designated, the work of these authorities undertaken pursuant to this Directive shall be coordinated” (article 22).*

Although the Directive gives to the competent authority a central role, no provisions are made relative to the competence and experience required or to whether such an authority should be independent from other authorities acting in similar sectors. The risk at stake is a potential conflict of interest in case an authority is given a double role. For example, giving the role of the competent authority to OED could influence its own assessment of CO<sub>2</sub> projects as OED would have to balance petroleum interests with storage interests.

In our view, the issue of the competent authority raises several questions:

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<sup>48</sup> Energy Bill Proposal, November 2008. In our opinion, this Energy Bill is not in compliance with the Directive requirements. Indeed, according to the Petroleum Act, when parties have failed to reach an agreement regarding the use of facilities, the Department can give them injunctions. On the contrary, the Directive provides in article 22 that *Member States shall ensure that they have in place dispute settlement arrangements, including an authority independent of the parties with access to all relevant information, to enable disputes relating to access to CO<sub>2</sub> transport networks and to storage site to be settled expeditiously, taking into account the criteria referred to in article 21.* Such dispute settlement arrangement, presupposes that each party may present its view of the conflict and that the authority acts as an arbitrator.

- a) should Norway have one unique authority assuming all obligations during all stages of the CCS project (Issuance of permit, operational phase, closing and post transfer)?
- b) or, should Norway have several competent authorities assuming a different role depending on the stage of the CCS project (authority delivering permit, authority of control during the operational phase, authority at site closure and transfer of responsibility)?
- c) under which Department should Norway place the authority /authorities (the Department of Environment, the Department of Oil and Energy, the Department of the Commerce and Industry)?
- d) should Norway establish a new authority or should it use existing authorities?

These questions are important and might also affect the choice of the legislative instrument that will be used to implement the Directive (an amendment to the Petroleum Act, an amendment to the Pollution Control Act, or free-standing legislation).

We do not yet have a definitive position on these issues. However, we find it important to take into consideration the following elements:

The selection phase is set as the crucial phase of a CCS project. As stressed in the Directive, a site should only be selected if there is neither significant risk of leakage nor significant environmental or health risks. This means that environmental aspects are the most decisive aspects.

We suggest therefore that the Ministry of the Environment, through the Pollution Control Authority (SFT), should be involved at the very early stage of the process of selection of a site. The petroleum sector will inevitably play a major role in this phase as the technology employed is similar to the one used for petroleum activities and the sector has experience in the field. However, the Oil and Energy Department should not be given a larger role than necessary.

Beside a role within site selection (and the exploration phase), the OED could also play a role when former petroleum installations are used to inject CO<sub>2</sub> or for EOR . Outside these activities, which are naturally connected to petroleum activities, we do not find logical nor justified to give a specific role to OED and are more in favour of giving the largest role to SFT.

We believe that SFT is the most appropriate authority to fulfil the Directive's obligations during the operational phase of the CCS project (monitoring, inspection, reports, and remediation actions).

Following site transfer, the responsibility should not remain with SFT but should be given to a different authority.

In short, we foresee the following system

- Creation of a new Ad Hoc Authority, gathering representatives from SFT and OED, for site selection and issuance of permits (exploration and storage)
- Designation of SFT as the competent authority during the operational phase of the site (from injection to transfer of responsibility)
- Designation of the Ministry of Environment or Ministry of Commerce and Industry as the entity taking over the storage site after transfer of responsibility.

#### 4.3.6 *External controller*

We are of the opinion that an external controller should be involved at all stages of the storage projects, not only to secure sufficient environmental integrity, but also to allow and promote equal and fair treatment of storage. This is particularly relevant when the geological storage of CO<sub>2</sub> is to be linked to the ETS and the carbon market. It would also promote public confidence.

Such an external controller could be an accredited independent entity having a duty to verify all phases of storage projects:

During the operational phase of the project and until the transfer of responsibility, the operator is responsible for monitoring, for reporting the monitoring to the competent authority. However, it might not be in the interests of the operator to declare all leakages particularly when financial penalties are involved. The risk of under-reporting could be avoided if an accredited independent entity was involved in the monitoring. The use of independent entities could also present the advantage that common standards could be developed more easily, thus achieving more consistency between Member States.

An external controller could also play a role in the monitoring during the post closure phase and assist the operator in preparing (or elaborate) the report which serves as a basis for site transfer assessment. An external controller could continue monitoring on behalf of the State after site transfer if it appears necessary to do so.

#### 4.3.7 *Liabilities*

Leakage is the event that will trigger liability. Liability for damage will mainly occur in terms of damage to the local environment and damage to the climate. However, leakages can also result in other type of damages, for example damages to property rights or other natural resources.

##### 4.3.7.1 *Liabilities for damage to the environment*

Liability for damage to the local environment from CCS activities is covered under the Environmental Liability Directive (ELD) which provides detailed provisions on the measures to be taken in case of events causing local environmental damage. As stated in Section 2, the ELD Directive has a limited scope of application and is not sufficient to cover all aspects of damage to the environment arising from CO<sub>2</sub> leakage in the CCS chain. In addition, this Directive is not yet implemented in Norway.

National legislation remains applicable for the aspects not covered by the ELD Directive and in any case until the ELD Directive is implemented in Norway. Some adjustments to Norwegian rules on liability could be appropriate to take account of the long time frame of CO<sub>2</sub> storage and to clearly identify the liable parties.

- As of today, the Norwegian Statute of Limitations of 18. Mai 1979 nr. 18 provides in its article 9 nr.2 (1) that the absolute limit to claim compensation for damages is 20 years starting from the date of the incident. This seems way to short given the long time frame of CO<sub>2</sub> storage liabilities. We should consider extending this time limit until the transfer is made to the State. Any damages occurring after the site is transferred would be of the responsibility of the State even if the event causing emission occurred prior to transfer.
- As regards the liable party, one should establish clear rules regarding who in the CCS chain is liable and for what. As of today, the liable party is different depending upon whether the Pollution Control Act or the Petroleum Act is applicable. While according to the Petroleum Act, as a general rule, the liable party is the licensee holding a petroleum title, the Pollution Control Act applies the polluter pays principle and renders the party causing the damage liable. Joint and several liabilities could be considered.

#### *4.3.7.2 Liability for damage to the climate change*

Damage to the climate system is addressed through the inclusion of facilities for capture and storage of CO<sub>2</sub> into the EU ETS. Any leaked emissions from the site will require the surrender of allowances. At the national level, it will result in their inclusion in the Norwegian Greenhouse Gas emissions Trading Act<sup>49</sup>.

An interesting issue, which should be clarified, relates to who should be responsible for surrendering allowances in case of leakage in the CCS chain. This question assumes that all leakages occurring in the CCS chain create - as a principle - an obligation to surrender allowances. The issue is particularly relevant when a third party assumes responsibility for collecting and injecting the carbon dioxide from emitters.

Norway should provide guidelines regarding responsibility of the different actors in the chain and who shall surrender allowances in case of leakages. Such guidelines should be based on the polluter pays principle, implying that the immediate polluter should be made responsible for surrendering allowances. This means that if a leakage appears in the transport part of the chain, or in the storage site, operators of those activities would be responsible for surrendering allowances. This would make each actor involved in the chain more responsible over its activity as financial consequences would be involved.

It should be noted that the requirement for the operator of storage site to buy credits in case of leakage might not be sufficient as it is not a penalty in itself: it simply sends the operator back to the EU ETS with liability for climate damage limited to the current carbon price. This creates an unusual situation whereby if the carbon price is relatively low compared to the costs of monitoring and preventing leakages, the penalty to buy credit might be an inadequate

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<sup>49</sup> Norwegian Greenhouse Gas emissions Trading Act 2004-12-17 nr 99 <http://websir.lovddata.no/cgi-lex/wiftzok?bas=nl&emne1=klimakvoteloven&button=S%F8k&sok=fast>

tool<sup>50</sup>. Norway should therefore provide a robust system of penalties in case of leakage that reflects the damage caused.

Remediation/mitigation following a leakage should also be addressed in the permitting system through the corrective measure plan. In that respect, Norway should provide guidelines for remediation actions in case of leakage. If a leakage occurs, the liable part must act according to these guidelines to stop the leak as soon as possible.

#### *4.3.7.3 Liability for damages to property rights or to other natural resources*

Leakage of CO<sub>2</sub> can also cause damages other than environmental damages. Examples include harm to employees or public health as a result of CO<sub>2</sub> leakage, reduction in property values in the vicinity of a leaking storage site or business interruption from neighbouring properties where remediation is required. CO<sub>2</sub> leakage can also damage hydrocarbon or water resources. Indeed CO<sub>2</sub> may move underground into areas containing resources such as hydrocarbons or water resources preventing or damaging their utilisation. The question is how to address such liabilities.

Such liability will be addressed through the general Norwegian liability rules. It is most likely that the basis for liability will be negligence, implying therefore the demonstration of negligence, damage and causality. Negligence would arise where the operator failed to exercise reasonable care in managing the storage site, thus resulting in a CO<sub>2</sub> leakage causing damage. However, a leakage will not necessarily imply that the storage site has not been properly managed. One should expect that if the site operator has complied with the conditions of the storage permit, the monitoring obligations and generally with all obligations required, or implied by the permitting system, it will be difficult to demonstrate negligence on his part. In addition, a successful claim would need to show causation, i.e. that the CO<sub>2</sub> caused the harm in question. This could be difficult to establish in practice. Assuming that negligence, damage and causality are demonstrated, the compensation would be limited to what was reasonably foreseeable.

## **Section 5                      Legal barriers at International level and transboundary issues**

### **5.1 Barriers at the International level for Offshore CO<sub>2</sub> storage**

There are two international agreements governing the deposition of material to the sea and seabed which are relevant for CO<sub>2</sub> injection: the London Convention (a worldwide agreement) and the OSPAR Convention (the corresponding agreement for the Northern European States). Until recently both limited the scope for depositing CO<sub>2</sub> in the marine environment.

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<sup>50</sup> ClientEarth p.24

### 5.1.1 OSPAR Convention – missing ratification

The OSPAR Convention prohibits dumping into the sea and seabed. It was amended however in June 2007 to allow the storage of CO<sub>2</sub> in geological formations.

Under the amended OSPAR regime, the storage of CO<sub>2</sub> will only be permitted where:

- disposal is into a geological formation;
- the injection stream consists overwhelmingly of CO<sub>2</sub> (although it may contain incidental associated substances derived from the source material and the capture, transports and storage processes used);
- no wastes or other matter are added to the CO<sub>2</sub> for the purpose of disposal.

The intention is that the CO<sub>2</sub> is retained permanently and will not lead to significant adverse consequences for the marine environment, human health, or other uses of the maritime area.

However, the OSPAR amendment needs to be ratified by at least 7 contracting parties (Parties to the Convention) before the amendment can enter into force. Until then, the OSPAR Convention remains a legal barrier for the following activities (considered dumping):

- Injection of CO<sub>2</sub> through an Offshore Installation (used for petroleum activities)
- Injection of CO<sub>2</sub> through a non petroleum installation if the CO<sub>2</sub> is transported by ship

However, if the CO<sub>2</sub> is transported from land through a pipeline and injected through a non-offshore installation, it is not considered dumping. The same applies where storage is taking place as part of Enhanced Oil Recovery.

### 5.1.2 London Convention –cross border issue

The Protocol to the London Convention was amended in November 2006 to permit CO<sub>2</sub> storage under the seabed. This amendment came into force on 10 February 2007. However the Protocol still prohibits the cross-border export of CO<sub>2</sub> for disposal into a sub-seabed formation. Indeed article 6 provides that "*Contracting Parties shall not allow the export of wastes or other matter to other countries for dumping or incineration at sea*"<sup>51</sup>. Amendments to solve this issue are expected within a short time.

## 5.2 Transboundary issues

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<sup>51</sup> On 25-27 February 2008, a Legal and Technical Working Group on Transboundary CO<sub>2</sub> Sequestration Issues was tasked to look into the compatibility of Article 6 with CCS activities. The Group took the view that transboundary transport of CO<sub>2</sub> would not be allowed under the section, and that "other countries" includes both other Contracting Parties and third-party states. The group proposed an amendment which would allow CO<sub>2</sub> transport for storage in another state and deliberate migration of CO<sub>2</sub> across borders from a storage site (although they reached no conclusion on whether this amounted to "export"). It was agreed that unintentional migration of CO<sub>2</sub> across borders would not fall foul of Article 6. The Group also drew up some framework for procedures where export is between a Contracting and non-Contracting Party. Any amendment had to be submitted by April 25, 2008 at the latest for consideration by the 3rd Meeting of the Contracting Parties in October 2008.

<http://www.ucl.ac.uk/cclp/ccsprotocol.php>

### 5.2.1 *Problem to be addressed*

Transboundary issues can arise when the CO<sub>2</sub> chain has connection with more than one state. For example, the CO<sub>2</sub> is produced in a state other than where it is stored; or the CO<sub>2</sub> is transported by a ship registered in another state than the state where the CO<sub>2</sub> is produced, or transported by cross-border pipelines; or the CO<sub>2</sub> is stored in a reservoir crossing several boundaries.

Transboundary CCS activities raise several legal issues among which questions relative to:

- which state is liable to surrender allowances in case of leakage
- which court of justice has the legal venue to examine a claim and according to which law

### 5.2.2 *State's liability to surrender allowances*

Transboundary leakages can happen at different stages of the CCS chain and for example; during transport by transboundary pipelines; during transport by a ship having a different flag state than the CO<sub>2</sub> producer or the CO<sub>2</sub> storage site; during or after injection, in the event of CO<sub>2</sub> leakage in another state than the state performing the injection (CO<sub>2</sub> can migrate faster than expected, or in a different direction than expected and proceed under a border).

Which state is liable to surrender allowances in case of leakage, will most likely be depending on which state has "jurisdiction" or "control" over the "activity" causing the damage<sup>52</sup>. Indeed, according to the Rio Declaration from 1992 article 2, "*States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction*". The question is what is to be considered as an "activity".

- For a cross-border reservoir, it is reasonable to say that the State where CO<sub>2</sub> is injected has "jurisdiction" or "control" over such activity and will be liable to surrender allowances in case of leakage occurring in another state.

The situation is however more complicated when several states are each injecting CO<sub>2</sub> in a unique but cross-border reservoir. Although the IPCC guidelines of 2006 recommend addressing this issue by way of treaties, other models could consist in a prorated distribution of liability based on how much CO<sub>2</sub> each state has stored in the reservoir, or that each state remains liable for leakages occurring in its jurisdiction.

- When CO<sub>2</sub> is transported by pipelines crossing several states, the issue will probably need to be resolved by way of treaties as states have different views regarding the question of jurisdiction.
- Finally, for leakages occurring from ships located in another state than their flag state, the question relative to which State has "jurisdiction" over such ship is unclear and difficult to apprehend. It is however suggested that the flag state should be considered

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<sup>52</sup> Ansvar for utslipp etter norsk rett og forholdet til klimavoteregimet etter Kyotoprotokollen, Gustav Haver, Marius nr. 355 p.227

as having the primary jurisdiction over ships outside territorial waters and passing through foreign territorial waters, while ships passing through internal waters should be under the jurisdiction of the territorial State<sup>53</sup>.

The aforementioned possible rules regarding State's liability to surrender allowances can have impact on States' incentives to be involved in transboundary CO<sub>2</sub> storage. Indeed, emission allowances are in principle given to the State where the CO<sub>2</sub> is produced. The other countries involved in the CO<sub>2</sub> chain do not get allowances, but can only risk to have to surrender allowances in the event of leakage. An open question is how to create incentives for those states to be involved in CO<sub>2</sub> chain.

### 5.2.3 *Conflicts of law and conflicts of jurisdiction*

Environmental damages occurring in a transboundary CCS chain, will raise questions relating to conflicts of laws and conflicts of jurisdiction i.e. in which country the claim shall be presented and according to which law the claim will be examined; possible solutions can be the country where the leakage occurred, the country where the damage occurred, the country of the victim's domicile, or the country where the CO<sub>2</sub> generating the damage was produced.

According to the Lugano Convention to which Norway is a party, and which provides rules on which State has jurisdiction to examine a case, the general rule is that conflicts falling within the scope of application of the convention shall be examined in the State where the defendant has his domicile. Alternatively, in matters relating to tort, delict or quasi-delict, in the courts for the place where the harmful event occurred, or may occur<sup>54</sup>.

In the event that Norwegian courts have the competence to examine a conflict, the question remains to which law (Norwegian or foreign law) the Norwegian court will apply to solve the conflict. Which law is applicable is decided according to conflict of law rules. The Pollution Control Act provides in its article 54 rules determining in which case Norwegian law is applicable and provides that the victim can claim the application of the law of the State where the polluting event or activity took place.

In contractual relationships, it is common to provide contractual provisions regarding such issues: contractors will agree in advance which courts in which country will have competence to settle a dispute and will agree on the law under which the conflict will be solved.

## **Section 6                      Summary of our Main Conclusions**

Together with the rest of the Climate and Energy package, the adoption of the Directive on the Geological storage of CO<sub>2</sub> in record time constitutes in itself an achievement for the EU, given the time between the initial proposal from the Commission in January 2008 and the final adoption by the Parliament in December 2008.

The Directive does not make CCS mandatory but enables it by providing a legal framework to

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<sup>53</sup> Ibid, Marius nr. 355 p. 268

<sup>54</sup> Lugano Convention of 16 September 1988. The Bruxelles I Convention is not applicable in Norway..

manage environmental risks and remove barriers in existing legislation. Whether CCS is taken into practice will be determined by the carbon price and the cost of the technology. To achieve commercialisation by 2020 and demystify CCS for all players, the ZEP concluded that a total of 10-12 demonstration projects were required.

In this report we have given a picture of the new EU legal framework on the geological storage of CO<sub>2</sub>, in order to anticipate some of the legal issues and challenges that Norway might meet when implementing the Directive in its national legislation.

Implementation in Norway will first happen if and when the Directive is integrated into EEA, as Norway is not part of the EU but is part of the EEA. The attributions given to the Commission by the Directive will then probably belong to ESA with the challenge that ESA might not have the same competence as the Commission.

In Europe Norway is one of the countries with best experience in the field of CCS. It is therefore important that Norway is given the possibility to actively participate in the system of "information exchange" between competent authorities from Member States. Similarly, it is important that Norway and other EFTA countries receive from ESA the same level of competence/assistance as the one that the Scientific Panel will provide to the Commission. A solution could be to provide that the Scientific Panel also reviews permit of EFTA countries. Experts from Norway should also be given the possibility to participate in the Scientific Panel.

Although Norway has more than 10 years experience with CCS, no specific rules exist in Norway to regulate the activity. The implementation of the Directive on geological storage will give Norway an opportunity to build a solid and well considered legislation. CO<sub>2</sub> storage activities (Sleipner and Snøhvit) have so far been addressed on a case by case basis with support from existing legislation, particularly the Petroleum Act and the Pollution Control Act. However because they do not have CCS in mind, this results in a complex and confusing regime.

In this report we have made several recommendations on how Norway could regulate CO<sub>2</sub> storage following the adoption of the Directive and which considerations should be taken into account. Our main recommendations are the following:

- Norway should implement the Directive by way of a free standing legislation and not through amendments to existing legislation. The free standing legislation should cover all aspects of the CCS chain, and not only geological storage, and clearly identify rights and duties of all actors involved.
- The distinction between activities connected to petroleum activities and activities not connected to petroleum activities should be removed. The source of the CO<sub>2</sub> (regardless of whether is a waste from petroleum activities) should not have any incidence on the applicable regime.
- The appointment or establishment of the "competent authority" should be primarily motivated by environmental considerations and to a less extent by petroleum considerations. Most of the obligations stipulated by the Directive should be delegated to the Ministry of Environment (through the Pollution Control Authority - SFT) and only to a lesser extent to the Ministry of Oil and Energy. We foresee

- Creation of a new Ad Hoc Authority, gathering representatives from SFT and OED, for site selection and issuance of permits (exploration and storage)
  - Designation of SFT as the competent authority during the operational phase of the site (from injection to transfer of responsibility)
  - Designation of the Ministry of Environment or Ministry of Commerce and Industry as the entity taking over the storage site after transfer of responsibility.
- Norway should involve an accredited independent entity at all stages of the storage projects, not only to secure sufficient environmental integrity (monitoring) but also to allow and promote equal and fair treatment of storage.
  - A governmental body should establish official standards for site characterisation and selection.
  - Norway should provide guidelines for remediation actions to stop leakages as soon as possible.
  - Norway should provide a robust system of penalties in case of leakage.
  - Norway should create incentives to encourage States' involvement in transboundary CO<sub>2</sub> storage.

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## REFERENCES

### EU legislation

EU Directive on geological Storage of CO<sub>2</sub> adopted on Wednesday 17 December 2008:

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