



# Procedure file

Basic information	
COD - Ordinary legislative procedure (ex-codecision procedure) Directive	2008/0015(COD) Procedure completed
Geological storage of carbon dioxide (CO2)  Amending Directive 2000/60/EC <a href="#">1997/0067(COD)</a> Amending Directive 2001/80/EC <a href="#">1998/0225(COD)</a> Amending Directive 2004/35/EC <a href="#">2002/0021(COD)</a> Amending Regulation (EC) No 1013/2006 <a href="#">2003/0139(COD)</a> Amending Directive 2006/12/EC <a href="#">2003/0283(COD)</a> Amending Directive 2008/1/EC <a href="#">2006/0170(COD)</a> Amended by <a href="#">2016/0375(COD)</a> Amended by <a href="#">2016/0394(COD)</a>  Subject 3.70.02 Atmospheric pollution, motor vehicle pollution 3.70.03 Climate policy, climate change, ozone layer 3.70.13 Dangerous substances, toxic and radioactive wastes (storage, transport) 3.70.20 Sustainable development	

Key players			
European Parliament	Committee responsible	Rapporteur	Appointed
	<b>ENVI</b> Environment, Public Health and Food Safety	ALDE <a href="#">DAVIES Chris</a>	21/02/2008
European Parliament	Committee for opinion	Rapporteur for opinion	Appointed
	<b>ITRE</b> Industry, Research and Energy (Associated committee)	PPE-DE <a href="#">GROSSETÊTE Françoise</a>	27/03/2008
Council of the European Union	Council configuration	Meeting	Date
	<a href="#">Justice and Home Affairs (JHA)</a>	<a href="#">2936</a>	06/04/2009
	<a href="#">Transport, Telecommunications and Energy</a>	<a href="#">2913</a>	08/12/2008
	<a href="#">Environment</a>	<a href="#">2912</a>	04/12/2008
	<a href="#">Environment</a>	<a href="#">2898</a>	20/10/2008
	<a href="#">Transport, Telecommunications and Energy</a>	<a href="#">2895</a>	09/10/2008
	<a href="#">Transport, Telecommunications and Energy</a>	<a href="#">2875</a>	06/06/2008
	<a href="#">Environment</a>	<a href="#">2784</a>	05/06/2008
	<a href="#">Environment</a>	<a href="#">2856</a>	03/03/2008
	<a href="#">Transport, Telecommunications and Energy</a>	<a href="#">2854</a>	28/02/2008
European Commission	Commission DG	Commissioner	
	<a href="#">Environment</a>	DIMAS Stavros	

Key events			
23/01/2008	Legislative proposal published	<a href="#">COM(2008)0018</a>	Summary
19/02/2008	Committee referral announced in Parliament, 1st reading		
28/02/2008	Debate in Council	<a href="#">2854</a>	Summary
03/03/2008	Debate in Council	<a href="#">2856</a>	Summary
10/04/2008	Referral to associated committees announced in Parliament		
05/06/2008	Debate in Council	<a href="#">2784</a>	Summary
06/06/2008	Debate in Council	<a href="#">2875</a>	Summary
07/10/2008	Vote in committee, 1st reading		Summary
09/10/2008	Debate in Council	<a href="#">2895</a>	
16/10/2008	Committee report tabled for plenary, 1st reading	<a href="#">A6-0414/2008</a>	
20/10/2008	Debate in Council	<a href="#">2898</a>	Summary
04/12/2008	Debate in Council	<a href="#">2912</a>	
08/12/2008	Debate in Council	<a href="#">2913</a>	
16/12/2008	Debate in Parliament		
17/12/2008	Results of vote in Parliament		
17/12/2008	Decision by Parliament, 1st reading	<a href="#">T6-0612/2008</a>	Summary
06/04/2009	Act adopted by Council after Parliament's 1st reading		
22/04/2009	End of procedure in Parliament		
23/04/2009	Final act signed		
05/06/2009	Final act published in Official Journal		

Technical information	
Procedure reference	2008/0015(COD)
Procedure type	COD - Ordinary legislative procedure (ex-codecision procedure)
Procedure subtype	Legislation
Legislative instrument	Directive
	Amending Directive 2000/60/EC <a href="#">1997/0067(COD)</a> Amending Directive 2001/80/EC <a href="#">1998/0225(COD)</a> Amending Directive 2004/35/EC <a href="#">2002/0021(COD)</a> Amending Regulation (EC) No 1013/2006 <a href="#">2003/0139(COD)</a> Amending Directive 2006/12/EC <a href="#">2003/0283(COD)</a> Amending Directive 2008/1/EC <a href="#">2006/0170(COD)</a> Amended by <a href="#">2016/0375(COD)</a> Amended by <a href="#">2016/0394(COD)</a>

Legal basis	EC Treaty (after Amsterdam) EC 175-p1
Stage reached in procedure	Procedure completed
Committee dossier	ENVI/6/58793

## Documentation gateway

Legislative proposal		<a href="#">COM(2008)0018</a>	23/01/2008	EC	Summary
Non-legislative basic document		<a href="#">COM(2008)0013</a>	23/01/2008	EC	
Document attached to the procedure		<a href="#">COM(2008)0030</a>	23/01/2008	EC	Summary
Document attached to the procedure		<a href="#">SEC(2008)0054</a>	23/01/2008	EC	
Document attached to the procedure		<a href="#">SEC(2008)0055</a>	23/01/2008	EC	
Committee draft report		<a href="#">PE407.716</a>	05/06/2008	EP	
Economic and Social Committee: opinion, report		<a href="#">CES1203/2008</a>	09/07/2008	ESC	
Amendments tabled in committee		<a href="#">PE409.630</a>	18/07/2008	EP	
Amendments tabled in committee		<a href="#">PE409.631</a>	24/07/2008	EP	
Amendments tabled in committee		<a href="#">PE409.632</a>	24/07/2008	EP	
Committee opinion	<b>ITRE</b>	<a href="#">PE404.776</a>	15/09/2008	EP	
Committee report tabled for plenary, 1st reading/single reading		<a href="#">A6-0414/2008</a>	16/10/2008	EP	
Text adopted by Parliament, 1st reading/single reading		<a href="#">T6-0612/2008</a>	17/12/2008	EP	Summary
Commission response to text adopted in plenary		<a href="#">SP(2009)402</a>	29/01/2009	EC	
Draft final act		<a href="#">03739/2008/LEX</a>	23/04/2009	CSL	
Follow-up document		<a href="#">COM(2014)0099</a>	25/02/2014	EC	Summary
Follow-up document		<a href="#">COM(2015)0576</a>	18/11/2015	EC	Summary
Follow-up document		<a href="#">SWD(2015)0246</a>	18/11/2015	EC	
Follow-up document		<a href="#">COM(2017)0037</a>	01/02/2017	EC	Summary
Follow-up document		<a href="#">COM(2019)0566</a>	31/10/2019	EC	Summary
Follow-up document		<a href="#">COM(2023)0657</a>	24/10/2023	EC	

## Additional information

National parliaments	<a href="#">IPEX</a>
European Commission	<a href="#">EUR-Lex</a>

## Final act

[Directive 2009/31](#)  
[OJ L 140 05.06.2009, p. 0114](#) Summary

Final legislative act with provisions for delegated acts

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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**PURPOSE:** to establish a legal framework for the geological storage of carbon dioxide (CO<sub>2</sub>).

**PROPOSED ACT:** Directive of the European Parliament and of the Council.

**BACKGROUND:** on 10 January 2007, the Commission adopted an integrated package of measures in the area of energy and climate change, inviting the Council and the European Parliament to approve:

- an EU commitment to reduce greenhouse gas emissions by at least 20% by 2020 compared to 1990 levels, as well as the aim for a 30% reduction by 2020, subject to the conclusion of an international agreement on climate change;
- a binding target for the EU of a 20% share of renewable energy sources in energy consumption by 2020, and a 10% target for biofuels.

This strategy was approved by the European Parliament and EU leaders during the March 2007 European Council. The European Council invited the Commission to present concrete proposals, particularly on the provisions for sharing the effort between Member States to achieve this objective. The series of measures presented is the response to this invitation. It includes a proposed set of key interdependent measures to be taken, as outlined below:

- a proposal for a directive amending Directive 2003/87/EC, to improve and extend the European Union Greenhouse Gas Emission Trading Scheme (see [COD/2008/0013](#));
- a proposal for a decision on the effort to be made by Member States to reduce their greenhouse gas emissions, in order to respect the Community's commitments to reduce these emissions by 2020 (see [COD/2008/0014](#));
- a proposal for a directive aiming to promote renewable energy (see [COD/2008/0016](#)).

Included among the proposals that make up this set of measures are: a proposal for a regulatory framework on carbon capture and storage; a communication on the demonstration of carbon capture and storage; and a new Community framework on State aid in the area of the environment.

**CONTENT:** Energy efficiency and renewables are in the long term the most sustainable solutions both for security of supply and climate. However, we cannot reduce EU or world CO<sub>2</sub> emissions by 50% in 2050 if we do not also use the possibility to capture CO<sub>2</sub> from industrial installations and store it in geological formations (carbon dioxide capture and storage, or CCS).

This legal framework is designed to ensure that CO<sub>2</sub> capture and storage is an available mitigation option, and that it is done safely and responsibly. The proposal ensures that CO<sub>2</sub> capture is regulated under Directive 96/61/EC, concerning integrated pollution prevention and control for certain industrial activities, and that both CO<sub>2</sub> capture and pipeline transport are regulated under Directive 85/337/EEC, concerning the assessment of the effects of certain public and private projects on the environment. Its main objective, however, is the regulation of CO<sub>2</sub> storage and the removal of barriers in existing legislation to CO<sub>2</sub> storage.

The proposal specifies that the objective of geological storage is permanent containment, and that storage in the water column is prohibited. This shall not apply to geological storage of CO<sub>2</sub> undertaken for research, development or testing of new products and processes.

As regards site selection and exploration permits, the proposal stipulates that Member States determine the areas to be made available for storage, the conditions for site use, and the provisions governing exploration.

The proposal provides for review of draft permit decisions on storage by the Commission. The Commission may offer an opinion, which the competent authority would take into account in making its permitting decision. A further provision relevant in this context is the conferring of the Environmental Impact Assessment Directive (85/337/EEC as amended by 97/11/EC) on CO<sub>2</sub> storage sites in Article 29 (paragraph 1, point b), which ensures impact assessment and public consultation.

The proposal also covers operation, closure and post-closure obligations, including CO<sub>2</sub> acceptance criteria, monitoring and reporting obligations, inspections, measures in case of irregularities and/or leakage, and provision of a financial security.

One chapter establishes provisions concerning transport and storage. Finally, general provisions take account of the competent authority, cross-border cooperation, penalties, reporting and the relevant comitology procedures.

Annex I specifies detailed criteria for the requirements on site characterisation and risk assessment of Article 4. Annex II specifies detailed criteria for monitoring requirements of Article 13.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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Following the Commission's presentation of the climate-energy package, the Council held a public policy debate, focusing on the [proposal for a directive](#) on the promotion of the use of energy from renewable sources.

In view of the nature of the climate-energy package, two horizontal questions focused on the ambition of the package as a whole and on sustainability criteria, and two questions were addressed to energy ministers focusing on renewable energy sources and on the trade in guarantees of origin.

The presidency summarised the debate along the following lines:

- Delegations welcome the climate-energy package in general as well as the proposal on the promotion of the use of energy from renewable sources. Early adoption of the instrument has been urged by several delegations;
- The national targets are considered to be very ambitious - some even think they are too ambitious - and, in order to achieve them, there is inter alia a need for (i) much flexibility on how to achieve them; (ii) increasing public support for renewable energies and; (iii) certainty with respect to the support schemes, including the guidelines on state aid for environmental protection. In this context, it is crucial to have some assurance that, after 2014, the successor to these guidelines will be equally supportive.

- The importance of the indicative trajectories for reaching the targets has been confirmed, but here also, flexibility seems to be necessary;
- Solidarity has been highlighted as another essential aspect;
- Balance is needed between competitiveness, security of supply and sustainability;
- The importance of trade in guarantees of origin has been underlined as a flexible instrument which should enable and not hinder Member States to reach their targets, as well as the continuation of current national support schemes for renewables;
- The contribution of energy efficiency is considered as essential to achieve the objectives;
- With respect to biofuels, there is broad support for ambitious sustainability criteria. However, these criteria should not diminish the competitiveness of European industry nor should they lead to trade barriers since import of and trade in biofuels will be necessary to achieve the target in this field. Moreover, the cost-effectiveness of the sustainability scheme will have to be ensured;
- Several delegations have indicated that sustainability criteria should apply to all forms of biomass. In this context, consistency between the renewables directive and the fuel quality directive is essential;

Lastly, the need for cost efficiency has been underlined as an essential element.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Council held a policy debate on key aspects of the climate action and energy legislative package with a view to the adoption of political guidelines to be given by the European Council on 13 and 14 March 2008. The European Council conclusions will provide guidance for further examination of the package.

Other questions related specifically to the EU emissions trading system (ETS), the non-ETS sectors and to the proposed framework for geological storage of carbon dioxide. At the end of the meeting, the presidency summarised the outcome of the debate as follows:

- the presentation of the climate action and renewable energy package by the Commission is a welcome response to the objectives and targets endorsed by the EU heads of state and government last year;
- Ministers welcome the direction of the proposed new design features of the EU ETS, such as the increased harmonisation of allocation, including the use of auctioning, as a way of enhancing the cost-effectiveness of the required emission reductions. In this respect, the need to anticipate greater flexibility for the realisation of different objectives was identified;
- carbon leakage remains a key concern that should be addressed appropriately;
- it will be important to clarify the methodology used to determine the reduction of emissions and the objectives in terms of renewable energies;
- work on the ETS review by the EU, the sharing of the non-ETS effort, the framework for storage of carbon dioxide and renewable energy sources must progress at the same rate;
- there is a need to make headway on the technical issues as quickly as possible in order to reach a final agreement with the European Parliament in early 2009 at the latest.

Ministers held an exchange of views on the international aspects of the package with Mr Yvo de Boer, Executive Secretary of the UN Climate Convention. The package contains the following proposals:

- a [Directive](#) amending Directive 2003/87/EC in order to improve and extend the EU greenhouse gas emission allowance trading system;
- a [Decision](#) on the effort of EU Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020;
- a [Directive](#) on the promotion of the use of renewable energy sources;
- a [Directive](#) on the geological storage of carbon dioxide.

The legislative package, to be examined under the Parliament-Council codecision procedure, was presented by the Commission with a view to implementing the objectives, targets and commitments undertaken by EU heads of state and government in March 2007:

- a 20% reduction of greenhouse gas emissions by 2020 compared to 1990;
- a 30% reduction in greenhouse gas emissions by 2020 compared to 1990 as its contribution to a global and comprehensive post-2012 agreement;
- saving 20% of the EU's energy consumption compared to projections for 2020;
- a 20% share of renewable energies in overall EU energy consumption by 2020;
- a 10% minimum target for the share of biofuels in overall EU transport petrol and diesel consumption by 2020;
- to develop and define the necessary technical, economic and regulatory framework to bring environmentally safe carbon dioxide capture and sequestration to deployment with new fossil-fuel power plants.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Council held a public debate on key aspects of the climate change and renewable energy legislative package. Ministers confirmed the need to achieve ambitious objectives in the fight against climate change whilst preserving European potential for economic growth.

EU member states and the Commission stressed the importance of reaching a timely agreement with a view to facilitating a broader convergence on a global scale, in the run-up to the international meeting to take place in Copenhagen in December 2009.

The discussions concentrated on key aspects of the package, namely:

On the EU emission trading system (ETS) review:

- the allocation method; redistribution and use of auctioning proceeds and rules for auctioning,
- risks of "carbon leakage": relocation of energy-intensive industries outside the EU,

- EU-wide cap: replacement of the current system of national allocation plans by the setting of an EU-wide cap,
- reference year or period to be used for verified emissions data,
- new entrants reserve: quantity of allowances set aside for new entrants,
- small installations: size of installation to be potentially excluded from the scope of the ETS.

On effort-sharing (amongst member states in sectors not covered by the ETS):

- scope: sectors not to be covered by the EU ETS,
- reference year or period for calculating the reduction targets per country,
- intermediate targets: effectiveness of using indicative or compulsory intermediate targets;
- on cross-cutting issues between EU ETS review and effort-sharing,
- trigger 20-30%: adjustment clause enabling the EU to move from the independent 20% commitment to a more ambitious target to which a future international agreement will commit the EU,
- degree of flexibility for member states to meet their commitments in a cost-efficient way.

On carbon capture and storage (CCS):

- storage permits,
- composition of CO<sub>2</sub> stream,
- transfer of responsibility after closure of a storage site,
- modalities of the financial security provision to be made by applicants for storage permits,
- conditions of access to transport networks,
- capture readiness.

On sustainability criteria for biofuels:

- minimum greenhouse gas emission saving requirement,
- environmental and social criteria,
- methodology for calculating the greenhouse gas emission saving.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Council took note of a progress report on climate change-energy legislative package prepared by the Presidency and held a public policy debate on the main outstanding issues identified in it.

The climate change-energy package complements existing measures aiming at reaching the overall objective - endorsed by the European Council in March 2007 - of a 20% reduction in greenhouse gases by 2020 and of achieving a 20% share of renewable energies in overall EU energy consumption by 2020, including a 10% target for renewable transport fuels. The progress report was presented to both Council formations Energy and Environment as it deals with the package as a whole.

The Energy ministers' debate focused on a proposal for a directive on the promotion of the use of energy from renewable sources, with the aim of providing input for further work of the Council and its preparatory bodies under the incoming French Presidency.

The Presidency progress report points out the main outstanding issues identified in all four legislative proposals in the package.

As far as the Renewables Directive is concerned, these are the following: targets (level of the national renewable energy targets, conditionality of the renewable transport fuel target and the indicative trajectory and its consequences), long lead-time projects, the systems of trading in guarantees of origin and reinforcing measures.

One part of the report is devoted to the progress made on the sustainability criteria for biofuels, which are considered necessary to ensure that the production of biofuels does not have negative consequences that outweigh the benefits arising from their use. In February 2008, Coreper established an ad hoc working party with the task of drawing up a common sustainability scheme for biofuels for the purposes of the renewables and fuel quality directives. The working party met on several occasions and made progress on numerous issues. However, some issues need to be addressed further: the level and date of application of the second stage for the minimum greenhouse gas emissions saving requirement, the environmental and social sustainability of biofuel production which would apply also in third countries and the methodology for calculating greenhouse gas emissions saving.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Committee on the Environment, Public Health and Food Safety adopted the report by Chris DAVIES (ALDE, UK) amending the proposal for a directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006.

The main amendments adopted by the Committee (first reading of the co-decision procedure) are as follows:

**Purpose:** MEPs wish to point out that the Directive establishes a legal framework for the transport and environmentally safe geological storage of carbon dioxide (CO<sub>2</sub>) to contribute to the fight against climate change. The purpose of geological storage is to provide an alternative to the release of CO<sub>2</sub> into the atmosphere by containing it permanently and safely underground in such a way as to prevent, or where that is not feasible, to eliminate as far as possible any negative impact on human health or the environment. Enhanced hydrocarbon recovery shall be excluded from the scope of this Directive.

**Scope and prohibition:** the Directive shall not apply to geological storage of CO<sub>2</sub> undertaken for research, development or testing of new products and processes, nor to the geological storage of CO<sub>2</sub> or gas mixtures containing CO<sub>2</sub> being injected for the purpose of and as a measure to increase the exploitation of hydrocarbons in the storage site. It shall, however, apply to demonstration and commercial projects with a total intended storage of 100 kilotonnes or more. Storage on the sea bed shall not be permitted.

Selection of storage sites: Member States should make a realistic assessment of the storage capacity available within their territory and send these assessments to the Commission before 2012. This information should be made public. The storage site selected should not jeopardise other energy options such as renewables or the security of the EU's energy supply. Moreover, the Directive shall not affect essential economic interests of Member States related to hydrocarbon reservoirs.

Exploration permits: the procedure for granting exploration permits must be non-discriminatory and take account of the fact that it is directly linked to the procedure for the subsequent award of storage permits. Exploration permits shall be granted for a limited volume area and a maximum three-year period, to enable the activities for which the exploration permit has been granted to be carried out. The period of validity of an exploration permit shall not exceed the estimated time required to carry out the activity for which it was issued. A competent authority may extend an exploration permit if its period of validity is not sufficient to complete the activity in question and the activity has been carried out in accordance with the exploration permit. In this case, an extension shall be for a period of no more than three years. Member States shall retain the right to refuse storage permits on serious grounds. Lastly, MEPs believe that the explorer, who will generally have made substantial investments, should be favoured over competitors in the granting of the storage permit.

Applications for storage permits: applications to the competent authority for storage permits shall include at least the following information: (i) a financial assessment of the cost of capturing and safely storing CO<sub>2</sub>; (ii) the total quantity of CO<sub>2</sub> which may be injected and stored, depending on the characteristics of the storage area, as well as the prospective sources, composition of CO<sub>2</sub> streams; (iii) injection rates and pressures, the location of injection facilities and the transport methods; (iv) the description of measures to prevent significant irregularities; (v) the availability of transport linking the site with prospective capture points, as well as its economic viability, having regard to the distance of the storage site from such points; (vi) proof of financial standing of the applicant and of its ability to put in place the adequate security or other equivalent provision; (vii) a proposed public information and consultation plan.

Commission review of draft storage permits: MEPs recommend that Member States introduce the following procedure:

1. applicants for storage permits shall provide the competent authority with two copies of all documentation required;
2. the competent authority shall, upon receipt of the documentation from the applicant, provide the Commission with details of each application for a permit and all other material that shall be taken into account by the competent authority when it seeks to make a decision on the award of a storage permit;
3. the Commission shall confirm receipt of the required documentation to the competent authority upon its arrival;
4. the competent authority shall inform the Commission of any draft storage permit decision. The Commission shall, within three calendar months of the date of submission, issue a consultative opinion on the draft permit;
5. a decision by a Member State to award a storage permit shall be made public as shall any consultative opinion issued by the Commission.

Transfer of responsibility: where a storage site has been closed, the responsibility for the closed site, including all ensuing legal obligations, shall remain with the operator for a post-closure interim period of at least 50 years. Transfer to the competent authority shall only occur at the end of this period if and when all available evidence indicates that the stored CO<sub>2</sub> will be completely contained for the indefinite future and the criteria laid down in the storage permit for transferring responsibility have been met.

Monitoring: in the case of geological storage under the seabed, the monitoring requirements shall be adapted to the uncertainty and operational difficulties associated with managing CCS technology in the marine environment.

Financial mechanism: in Member States which allow storage on their territory, a financial instrument shall be established and maintained through annual contributions paid by storage site operators upon commencement of CO<sub>2</sub> injection and until the closure of the storage site. The fund shall be used to cover the costs of monitoring, oversight and remediation incurred by the competent authority after transfer of responsibility.

?Schwarzenegger Clause?: the Committee on the Environment, Public Health and Food Safety adopted a new provision, entitled the ?Schwarzenegger clause?, which introduces an emissions performance standard for new power-producing combustion plants with a rated output of 300 MW or more. MEPs point out that, after 2015, these large power-producing combustion plants will be permitted to emit a maximum of 500 g of CO<sub>2</sub>/kWh based on an annual average. By 31 December 2014, the Commission shall conduct a review of the provisions. The review shall consider in particular the emission performance standard, the possibility of widening the scope to include existing installations and installations other than those generating electricity, and of introducing derogations to address the concerns of Member States that may be unable to comply with the requirement referred to in the Directive.

Commission reports: on the basis of experience acquired with the capture, geological sequestration and transport of carbon and in the light of changes in the international situation, the Commission shall, by 31 December 2012, publish a report on progress with the development and deployment of technology enabling the capture and storage of CO<sub>2</sub> produced in association with power generation from fossil fuel sources. The Commission shall carry out a review of the Directive, taking into account technical progress and the most recent scientific knowledge.

Transposition into national legislation: lastly, MEPs want to give Member States not one but two years to transpose the Directive into national legislation after its publication.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Council held an in-depth discussion of the three draft legislative measures within their competence, i.e. [the review of the EU greenhouse gas emission allowance trading system](#) (EU ETS); [effort sharing outside the EU ETS](#) and the [Directive on the capture and storage of carbon](#).

The discussion brought out the clear will to succeed in arriving at an agreement with the European Parliament by the end of 2008 so that a first-reading could be reached before the end of the current legislature.

The Council intends to step up its discussions in close collaboration with the Commission so that the EU may continue to have a leading role in combating climatic change at international level. With this in mind, the Presidency instructed the Permanent Representatives Committee to prepare the negotiations on the package with the European Parliament without delay, in order to come to an agreement at first reading.

Discussions related principally to the following:

- measures applicable to the energy sector within the EU ETS: discussions showed that an auctioning rate of 100 % in the energy



sector was accepted by most delegations. However some specific situations might justify derogations of limited duration and extent, in particular because of insufficient integration of the energy sector at European level;

- pre-allocation of the income from auctions: the discussion showed that although some Member States thought that the use of the income from auctions was a matter for national competence, voluntary commitments could be given consideration;
- financing capture and storage of CO<sub>2</sub>: the Council was prepared to examine the possibilities of combining several options, including national and Community financing, to supplement the contribution of the private sector;
- the risk of "carbon leakage" (i.e. relocation of energy-intensive undertakings outside the EU), and the measures to be taken to protect both the environment and the competitiveness of industry in Europe: the Council showed its determination to provide clear answers to the problems which might arise from "carbon leakage". In this connection, it examined the need to lay down quantitative and qualitative criteria within appropriate periods of time, and arrangements for the sectors which were the most exposed to world competition.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The European Parliament adopted by 623 votes to 68 with 22 abstentions, a legislative resolution amending the proposal for a directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006. The report had been tabled for consideration in plenary by Chris DAVIES (ADLE, UK), on behalf of the Committee on the Environment, Public Health and Food Safety. The amendments were the result of a compromise between the Council and the Parliament. MEPS secured the funding of demonstration projects by ensuring that 300 million ETS allowances will be awarded to large scale CCS projects in the EU.

The main amendments - adopted under the 1st reading of the codecision procedure - were as follows:

**Objective:** the compromise text clarifies that the directive establishes a legal framework for the environmentally safe geological storage of carbon dioxide to contribute to the fight against climate change. The purpose of environmentally safe geological storage of CO<sub>2</sub> is permanent containment of CO<sub>2</sub> in such a way as to prevent and, where this is not possible, eliminate as far as possible negative effects and any risk to the environment and human health.

**Scope and prohibition:** the Directive shall not apply to geological storage of CO<sub>2</sub> undertaken for research, development or testing of new products and processes with a total intended storage below 100 kilo tonnes. Furthermore, the storage of CO<sub>2</sub> in a storage site with a storage complex extending beyond the frontiers of the EU will not be permitted.

**Selection of storage sites:** Member States retain the right to determine the areas from which storage sites may be selected pursuant to the requirements of this Directive. This includes the right of Member States not to allow for any storage in parts or in the whole of their territory. Member States who intend to allow geological storage of CO<sub>2</sub> in their territory shall undertake an assessment of the storage capacity available in parts or in the whole of their territory, including by allowing exploration pursuant to the Directive. The Commission may organise an exchange of information and best practices between those Member States. A geological formation shall only be selected as a storage site, if under the proposed conditions of use there is no significant risk of leakage, and if no significant environmental or health risks exist.

**Exploration permits:** the procedures for the granting of exploration permits must be open to all entities possessing the necessary capacities and permits must be granted or refused on the basis of objective, published and non-discriminatory criteria. The duration of a permit should not exceed the period necessary to carry out the exploration for which it is granted. However, Member States may prolong the permit where the stipulated duration is insufficient to complete the exploration in question and where the exploration has been performed in accordance with the permit. Exploration permits shall be granted for a limited volume area

**Storage permits:** no storage site may be operated without a storage permit, and there shall be only one operator for each storage site, and no conflicting uses must be permitted on such site. Priority for the granting of a storage permit for a given site shall be given to the holder of the exploration permit for that site, provided that the exploration of that site is completed, that any condition set in 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.

**Applications for storage permits :** applications to the competent authority for storage permits shall include at least the prescribed information, inter alia: (i) the total quantity of CO<sub>2</sub> to be injected and stored, as well as the prospective sources and transport methods, the composition of CO<sub>2</sub> streams, the injection rates and pressures, and the location of injection facilities; (ii) description of measures to prevent significant irregularities; (iii) proof that the financial security or other equivalent provision as required will be valid and effective before commencement of injection .

**Conditions for storage permits:** the competent authority shall only issue a storage permit if certain conditions are met and the compromise text stresses the financial soundness of the operator. It also requires that in the case of more than one storage site in the same hydraulic unit, the potential pressure interactions are such that both sites simultaneously can meet the requirements of the Directive.

**Commission review of draft storage permits:** Member States shall make the permit applications available to the Commission within one month after receipt. They shall also make available other related material that shall be taken into account by the competent authority when it seeks to make a decision on the award of a storage permit. They shall inform the Commission of all draft storage permits and any other material taken into consideration for the adoption of the draft decision. Within four months after receipt of the draft storage permit, the Commission may issue a non-binding opinion on it. If the Commission decides not to issue an opinion, it shall inform the Member State within one month of submission of the draft permit and state its reasons.

**Monitoring:** Member States shall ensure that the operator carries out monitoring of the injection facilities, the storage complex (including where possible the CO<sub>2</sub> plume), and where appropriate the surrounding environment for the purpose of, inter alia, detecting significant irregularities and updating the assessment of the safety and integrity of the storage complex in the short- and long-term including the assessment of whether the stored CO<sub>2</sub> will be completely and permanently contained.

**Inspections:** competent authorities must organise a system of routine and non-routine inspections of all storage complexes. Routine inspections shall be carried out at least once a year until three years after closure and every five years until transfer of responsibility to the competent authority has occurred. They shall examine the relevant injection and monitoring facilities as well as the full range of relevant effects from the storage complex on the environment and on human health.



**Transfer of responsibility:** where a storage site has been closed all legal obligations relating to monitoring and corrective measures pursuant to the requirements laid down in this Directive, the surrender of allowances in cases of leakage and preventive and remedial action, shall be transferred to the competent authority on its own initiative or upon request from the operator, if certain conditions are met. These include whether a minimum period, 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 all available evidence indicates that the stored CO<sub>2</sub> will be completely and permanently contained.

When the competent authority is satisfied that the conditions are met, it shall prepare a draft decision of approval of the transfer of responsibility which will specify the method for determining that the site has been sealed and the injection facilities have been removed, as well as any updated requirements for the sealing of the storage site and for the removal of injection facilities. In cases where there has been fault of the operator, including cases of deficient data, concealment of relevant information, negligence, wilful deceit or malpractice the competent authority shall recover from the former operator the costs incurred after the transfer of responsibility has taken place.

**Financial mechanism:** the operator, on the basis of modalities to be decided by Member States, must make a financial contribution available to the competent authority before the transfer of responsibility has taken place. The contribution from the operator shall take into account those criteria referred to in Annex I and elements relating to the history of storing CO<sub>2</sub> relevant to determining the post-transfer obligations, and cover at least the anticipated cost of monitoring for a period of 30 years. This financial contribution may be used to cover the costs borne by the competent authority after the transfer of responsibility to ensure that the CO<sub>2</sub> is completely and permanently contained in geological storage sites after the transfer of responsibility.

**Information to the public:** Member States shall make available to the public the elements relating to the geological storage of CO<sub>2</sub> in accordance with applicable Community legislation.

**Review:** the Commission shall transmit to the European Parliament and to the Council a report on the implementation of this Directive within nine months of receiving Member States' reports. In the report that intervenes by 30 June 2015 on the basis of experience with the application of this Directive, in light of the experience with CCS and taking into account technical progress and the most recent scientific knowledge the Commission shall assess, in particular:

- whether permanent containment of CO<sub>2</sub> in such way as to prevent and reduce as far as possible negative effects on the environment and any resulting risk to human health and the environmental and human safety of CCS has been sufficiently demonstrated;;
- whether the procedures regarding the Commission's reviews of the draft storage permits (Article 10) and the draft decisions on transfer of responsibility (Article 18) are still required;
- experience with the provisions on CO<sub>2</sub> stream acceptance criteria and procedure;
- experience with the provisions on third-party access and with the provisions on transboundary cooperation;
- the provisions applicable to combustion plants with a rated electrical output of 300 megawatts or more;
- prospects for geological storage of CO<sub>2</sub> in third countries;
- further development and update of the criteria referred to in Annex I and Annex II;
- experience with incentives for applying CCS on installations combusting biomass;
- the need for further regulation on environmental risks related to CO<sub>2</sub> transport;

and will present a proposal for revision of the Directive if appropriate.

Where permanent containment of CO<sub>2</sub> in such way as to prevent and, where this is not possible, eliminate as far as possible negative effects and any risk to the environment and human health, and the environmental and human safety of CCS have been sufficiently demonstrated, as well as its economic feasibility, the review shall examine whether it is needed and practicable to establish a mandatory requirement for emission performance standards for new electricity-generating large combustion installations.

**Transposition:** 2 years after publication.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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**PURPOSE:** to establish a legal framework for the geological storage of carbon dioxide (CO<sub>2</sub>).

**LEGISLATIVE ACT :** Directive 2009/31/EC of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006.

**CONTENT:** following a first reading agreement with the European Parliament, the Council adopted this Directive which establishes a legal framework for the environmentally safe geological storage of carbon dioxide (CO<sub>2</sub>) to contribute to the fight against climate change. The purpose of environmentally safe geological storage of CO<sub>2</sub> is permanent containment of CO<sub>2</sub> in such a way as to prevent and, where this is not possible, eliminate as far as possible negative effects and any risk to the environment and human health.

Carbon dioxide capture and geological storage (CCS) is a bridging technology that will contribute to mitigating climate change. It consists of the capture of carbon dioxide (CO<sub>2</sub>) from industrial installations, its transport to a storage site and its injection into a suitable underground geological formation for the purposes of permanent storage. The Directive notes that this technology should not serve as an incentive to increase the share of fossil fuel power plants. Its development should not lead to a reduction of efforts to support energy saving policies, renewable energies and other safe and sustainable low carbon technologies, both in research and financial terms.

Preliminary estimates, carried out with a view to assessing the impact of the Directive indicate that seven million tonnes of CO<sub>2</sub> could be stored by 2020, and up to 160 million tonnes by 2030, assuming a 20 % reduction in greenhouse gas emissions by 2020 and provided that CCS obtains private, national and Community support and proves to be an environmentally safe technology. The CO<sub>2</sub> emissions avoided in 2030 could account for some 15 % of the reductions required in the Union.

Whether to use carbon capture and storage (CCS) or not is still a matter for independent decision by each EU Member State. For Member States that wish to do so, the Directive sets the framework and conditions for use of CCS technology in Europe. It introduces requirements for the separation and capture of CO<sub>2</sub>, and for its transport by pipeline. It explains the procedure for the identification and safe use of storage sites in rock deep underground. The legislation provides for a private operator to pass responsibility to a Member State for the very long term storage of CO<sub>2</sub>, but only after there is near absolute certainty that the possibility of leakage has been reduced to zero.

The Commission also proposes that all new power plants be built as 'capture-ready', capable of being equipped with CCS facilities during their operational lifetimes.

In order to ensure harmonised application throughout the European Union, the Commission will review draft storage permits and draft decisions on closure prepared by national authorities before their final approval.

Operators are obliged to monitor storage sites and report to Member State's authorities, both while storing carbon dioxide and after the closure of sites and the cessation of storage activities. Responsibility for a site reverts to a public authority when sufficient proof is obtained that the carbon dioxide will be completely and permanently contained.

Scope: the Directive will apply to the geological storage of CO<sub>2</sub> in the territory of the Member States, their exclusive economic zones and on their continental shelves within the meaning of the United Nations Convention on the Law of the Sea (Unclos). It does not apply to geological storage of CO<sub>2</sub>, with a total intended storage below 100 kilotonnes, undertaken for research, development or testing of new products and processes. The storage of CO<sub>2</sub> in a storage site with a storage complex extending beyond the area referred to above is not permitted. Further, the storage of CO<sub>2</sub> in the water column is not permitted.

It should be noted that this Directive forms part of the climate-energy legislative package containing measures aimed at fighting climate change and promoting renewable energy. (See also [COD/2008/0013](#), [COD/2008/0014](#), [COD/2008/0016](#), [COD/2007/0019](#) and [COD/2007/0297](#)). The package is designed to achieve the EU's overall environmental target of a 20 % reduction in greenhouse gases and a 20 % share of renewable energy in the EU's total energy consumption by 2020.

ENTRY INTO FORCE: 25/06/2009.

TRANSPOSITION: 25/06/2011.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Commission presents a report on the implementation of Directive 2009/31/EC on the geological storage of carbon dioxide (CCS), based on Member States reports sent to the Commission between July 2011 and April 2013.

General progress on the implementation of the CCS Directive: the report shows that all Member States notified transposition measures to the Commission (the date set for transposition was 25 June 2011.)

- Whilst the majority of Member States have completed transposition of the Directive; Austria, Cyprus, Hungary, Ireland, Sweden and Slovenia have not yet notified complete transposing measures. On account of this partial non-communication the Commission addressed reasoned opinions to these six Member States in November 2013 and will check that the measures are finalised by spring 2014.
- Member States took different approaches to the transposition of the CCS Directive. While several decided to only amend existing legislation, most Member States opted for a combination of new specific legislation on the geological storage of CO<sub>2</sub> and amendments to existing legislation. 17 Member States made amendments to their environmental legislation and eight of these made changes also to their mining legislation.
- Most Member States assigned responsibilities to multiple authorities, as CCS intersects with a number of different regulatory areas. The most frequently chosen competent authorities are environmental bodies (18 Member States), followed by institutions responsible for the fields of economy, energy and mining.
- The assessment of potential CO<sub>2</sub> storage sites is ongoing, with several Member States issuing exploration permits and the Commission reviewing the draft permit issued by the Netherlands for intended permanent storage of up to 8.1 Mt CO<sub>2</sub> in a storage reservoir on the Dutch continental shelf. An appraisal of CO<sub>2</sub> storage capacity was provided by the EU GeoCapacity project, which estimated for the 21 participating Member States theoretical storage potential of 87 Gt CO<sub>2</sub> (69 Gt in deep saline aquifers, 17 Gt in depleted hydrocarbon fields and 1 Gt in unmineable coal beds).
- Member States that authorise CO<sub>2</sub> storage on their territory have communicated implementation of the provisions on monitoring, reporting and inspections, leakages and significant irregularities, closure and post-closure obligations, as well as the two financial mechanisms established by the CCS Directive.
- Some Member States have reported a decision not to allow CO<sub>2</sub> storage on their territory due to unsuitability of their geology for CO<sub>2</sub> storage (Finland, Luxembourg and the Brussels Capital Region of Belgium). Some other Member States have also not allowed geological storage of CO<sub>2</sub> (Austria, Estonia, Ireland, Latvia, Slovenia, Sweden) or restricted it (Czech Republic, Germany). As regards Member States which restrict or prohibit CO<sub>2</sub> storage on their territory, some transposed only the provisions of the Directive that deal with capture and transport aspects of CCS, while others transposed all the provisions of the Directive, including the storage related Articles.

Ensuring consistent implementation of the CCS Directive across the EU: the report notes that assessments made in the context of the [EUs Roadmap for moving to a competitive low carbon economy in 2050](#) and the [Energy Roadmap 2050](#) see CCS, if commercialised, as an important technology contributing to the transition to a low carbon energy system in the EU.

The Commission underlines the importance of consistent implementation of the CCS Directive across the EU, in particular regarding the selection, operation, closure and post-closure of storage sites and the assessment to retrofit large combustion plants for CO<sub>2</sub> capture. It therefore pursues infringement cases for partial non-communication of transposing measures and it is checking whether the notified measures conform in substance to the CCS Directive.

In addition to checking the transposition of the CCS Directive and reviewing draft storage permits, the Commission performs other activities in order to support consistent implementation of the CCS Directive throughout the EU. In September 2009 an Information Exchange Group of experts from Member States was set up. In March 2011 four guidance documents were published with a view to providing an overall methodological approach to implementation of the key provisions of the CCS Directive.

The next Commission report, will be transmitted to the European Parliament and the Council by 31 March 2015.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Commission presented a report on the implementation of Directive 2009/31/EC on the geological storage of carbon dioxide ("CCS" Directive).

The report is the second report on the implementation of the CCS Directive and covers the period from May 2013 to April 2016. It is based on the reports submitted by 26 Member States.

The Commission considers that the legislation of 16 Member States fully complies with the Directive to date. It considers that the provisions of the CCS Directive have been applied consistently throughout the reference period in the Member States of the Union.

The main findings are as follows:

Assessment of storage capacity: some Member States (Belgium, Czech Republic, Germany, Romania, Poland, Slovenia, Spain) have made progress in their assessment of storage capacity, but the implementation of CCS projects will require new, more thorough assessments.

However, even in cases where the evaluation has not been positive, many authorised power stations provide space for the equipment required for CO<sub>2</sub> capture and its compression and are designed so that the CCS can be subsequently connected without major modifications in the structure.

In addition, new power plants generally go beyond legal requirements and reserve land for this purpose in the event that conditions change.

Other issues related to implementation include:

Selection of storage sites: in most cases, Member States have not defined new areas in which storage sites can or cannot be selected. Only Poland has established a storage area. Five German Länder are currently preparing decisions.

New storage stock assessments have been carried out, are under way or are planned in Bulgaria, Germany, Greece, Hungary, Italy, the Netherlands, Sweden and the United Kingdom.

Applications for exploration and storage permits: only Spain has received applications for exploration permits. Only one project resulted in an application for a storage permit in the United Kingdom and a license application is currently under review in Italy.

Research projects linked to the CCS Directive: although the demonstration and marketing of the CCS have not progressed during the reference period, a number of Member States, as well as the European Union, support or plan to support more research activities aimed at improving techniques and knowledge related to the underground storage of CO<sub>2</sub>.

CO<sub>2</sub> transport and storage networks: two regional CCS networks seek to develop common cross-border solutions for transport and geological storage of CO<sub>2</sub> - the North Sea Basin Taskforce and the CCS The Baltic Sea. Other countries are studying the possibility of setting up platforms for emissions from the power generation and industrial sectors in certain port areas.

## Geological storage of carbon dioxide (CO<sub>2</sub>)

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The Commission presented a report on the implementation of Directive 2009/31/EC on the geological storage of carbon dioxide (CCS Directive).

This report constitutes the third CCS Directive implementation report covering the period of May 2016 - April 2019. It is based on the reports submitted by Member States and Norway. Only 22 countries submitted reports in time to be considered in this report.

The Commission stated that the provisions of the CCS Directive have been correctly applied across the reporting period in the EU Member States, which have submitted reports to the Commission by 30 June 2019.

The main findings are as follows:

Assessment of storage capacity

The Netherlands estimates a theoretical storage capacity of approximately 1.7Gt in the North Sea, primarily in depleted gas fields. The NORDICCS project reported storage capacity in Denmark in saline aquifers of 22GtCO<sub>2</sub> and of 2Gt in hydrocarbon fields. Germany has estimated a storage capacity in selected major gas fields of approximately 75Gt CO<sub>2</sub> and between 20 and 115Gt CO<sub>2</sub> in saline aquifers. 80% of the aquifers are situated in States that ban storage.

Selection of storage sites

Few countries have determined new areas from which storage sites may or may not be selected. Norway has identified possible CO<sub>2</sub> storage sites on the Norwegian shelf and published a compiled atlas of these sites. Czech Republic has considered one storage site LBR-1 for a pilot CCS project located in the south-east of the country.

Exploration and storage permits applications

An application for two storage permits and one update of a permit are under preparation as part of the Dutch CCS Porthos project. Norway has awarded an exploration permit for CO<sub>2</sub> storage on the Norwegian Continental Shelf in January 2019. One application for exploration permit has been filed in Andalusia, Spain.

## Feasibility for CCS retrofitting

The CCS Directive requires that when applying for license, operators have to assess the technical and economic feasibility of carbon capture, transport and storage. If the assessment is positive, space on the installation site must be set aside for the equipment necessary to capture and compress CO<sub>2</sub>. Such assessments were carried out in Estonia (one), France (one), Germany (six), Romania (six) and Poland (eight). The assessments find that CCS is not economically feasible.

Some further difficulties were found for some of the plants in Estonia geological conditions are considered unfavourable, while in Germany plants do not have access to suitable storage sites. Despite low feasibility level in the assessments, most of the power plants (e.g in Poland, Estonia, Germany) are setting aside land for the installation of CO<sub>2</sub> capture equipment.

## CO<sub>2</sub> transport and storage networks

The North Sea Basin Task Force with the UK, the Netherlands, Norway, Germany and Belgium and the Baltic Sea Region CCS network with Estonia, Germany, Finland, Norway and Sweden remain two main CCS regional networks that work to develop common, transboundary solutions for the transport and geological storage of CO<sub>2</sub>. The cooperation with Member States bordering the North Sea has been reported also under the projects of common interest (PCIs). Sweden is considering future cooperation primarily with Norway on storage as there is a number of private companies interested and currently investigating such an opportunity. CO<sub>2</sub> hubs are under development in Fos-sur-Mer, le Havre and Dunkerque in France.

## Conclusion

The Commission concluded that despite the continuous lack of positive assessment for technical and economic feasibility for CCS retrofitting, power plants are nevertheless setting aside land should the conditions change in the future. A considerable number of Member States and Norway continue to support or plan to support in the near future, through their national programmes or funds, research and demonstration activities on CCS. Furthermore, many countries are involved in a number of European research and collaborative projects.