

9. Legislative aspects of the CO₂ storage

BORIS ANTAL¹ and ĽUDOVÍT KUCHARIČ²

¹Ministry of Environment of the Slovak Republic, Ľudovít Štúr's square, 812 35 Bratislava

²State geological Institute of Dionýz Štúr, Mlynská dolina 1, 817 04 Bratislava, Slovak Republik

A broad range of problems accompanying the final part of the CCS chain - geological disposal - must have a sufficient support in the functional legislation setting up the factual, temporal and environmental aspects of long-term and safe storage of CO₂. The current situation can be characterized as follows:

9.1 European framework

A Working Group of the European Commission (EC) for the Capture and Geological Storage has been originated in the framework of the Second European Climate Change Programme (ECCP II). The Group stressed the need to establish policy and regulatory frameworks for CCS. The Communication on Sustainable Power Generation from Fossil Fuels of January 2007 set out an action plan for the Commission, which requires a design of an appropriate regulatory framework. Following the European Council meeting in Brussels in March in 2007, have been established the main objectives:

- to reduce greenhouse gas emissions by 2020 at least on 20 %; in the case of an international agreement the emissions reduction should reach 30 %;
- to achieve 20 % share of renewables in the EU energy consumption by 2020, including 10 % share of biofuels.

Furthermore, the Member States and the Commission, in the context of meeting the above mentioned objectives, press for a necessary technical, economic and regulatory framework to bring environmentally safe capture and geological storage of carbon in industrial use.

To achieve these objectives, including guaranteeing energy security and combat climate change, the European Commission presented on the 23rd January 2008 an integrated climate and energy package, which consisted of four legislative proposals:

1. Directive on the Promotion of Energy from Renewable Sources,
2. Revision of the Emissions Trading Directive,
3. Decision setting targets for individual Member States to reduce emissions in sectors that are not a subject to emissions trading,
4. Directive on Carbon Capture and Storage.

The planned Directive on Carbon Capture and Storage was designed to promote this new technology, whereas, the EU cannot omit fossil fuels (coal) as a major source

of energy in the near future. An intention was to create a legislative framework that will encourage an investment in the CCS and set up parameters so that emission emitters of energy generation took a better position to promote this technology, instead of buying emission permits.

Subsequently a Working Group (to the European Commission) started with the assessment of the draft of the Directive, which proclaimed intention to support the development of demonstration projects - repositories on which to test out the technology provided, or with EU assistance this technology would be gradually introduced into industrial applications.

The first meeting of the Working Group to the European Commission took place on January 28, 2008, in Brussels.

The Ministry of the Environment was entrusted to represent the Slovak Republic by compilation of the Directive. Directly in the creation process were involved B. Antal, Section of Geology and Natural Resources from above mentioned Ministry and Ľ. Kucharič, as an expert on the CCS issue from the State Geological Institute of Dionýz Štúr, Bratislava.



Fig. 9.1. Deputies of the Slovak Republic during break in the Working Group meeting in the Justus Lipsius building in Brussels (from the right: B. Antal, Ľ. Kucharič)

In total, 19 workshops took place and one bilateral meeting with representatives of the Bureau. Finishing works on the Directive were conducted at the Commission level. A total of 10 completed draft versions of

the Directive had been processed, till the Directive passed in the European Parliament. Finally the DIRECTIVE 2009/31/EC was approved by the European Parliament on the 23rd of April 2009.

The deadline for member states to bring into force the laws, regulations and administrative provisions of the CCS Directive was June 25, 2011.

Documentation about expansion of the CCS legislation into EU countries is given in the following text (Shogenova, et al., 2013):

By the end 2011 the transposition of the Directive into national law was approved by the European Commission (EC) in Spain only, but was approved at national/jurisdictional level in 12 more countries (Austria, Denmark, Estonia, France, Greece, Ireland, Italy, Latvia, Lithuania, Slovakia, Sweden, The Netherlands). Romania, Bulgaria, Portugal, Slovenia, three regions of Belgium and United Kingdom finished transposition of the CCS Directive at the national level in spring 2012. Implementation in the UK was completed in February 2012 and by end March 2012, implementation at national level was also completed in Bulgaria, Portugal and Romania. The European Commission had assessed national submissions of CCS legal acts transposing the Directive, and approved these in Denmark, the Netherlands, Italy, France, Lithuania, Malta, Portugal, Romania and Slovakia by June 2012. Czech Republic, Hungary and Finland finalised publishing their laws in May-July 2012. The CCS Directive has been transposed into German law at the end of August 2012. One region of Belgium, Croatia, Norway and Poland had not finished the transposition of the CCS Directive by December 2012.

Italy, France and The Netherlands permit CO₂ storage (except for seismic areas in Italy) and support demonstration projects via their climate/energy strategy. Lithuania, Slovakia and part of Belgium permit CO₂ storage, but they do not explicitly support the development of CO₂ storage projects. Eight countries prohibited CO₂ storage in their territory, except for research, either permanently (Estonia, Ireland and Finland) or temporarily (Austria, Czech Republic, Latvia, Poland and Sweden). Onshore CO₂ storage is forbidden until 2020 in Denmark. Storage of limited amount of CO₂ only can be permitted up to 2030 in Bulgaria and up to 2018 in Germany. Italy, Greece and Belgium do not permit storage in proscribed areas.

Norway and Poland, countries with sufficient storage capacity that support demonstration projects, had not finished the CCS Directive transposition process by December 2012. Altogether 20 operating, developing and planned CCS pilot and demonstration projects, including capture and full chain CCS, have been identified in nine European countries. Results of the CCS Directive transposition in Denmark and the unfavourable climate of opinion in Germany resulted in the abandonment of two planned onshore projects by Vattenfall in these countries. The process of transposing the CCS Directive into national law and its assessment by the EC will be continued and reported to the European Parliament in 2013.

9.2 Slovak framework

A new law regarding geological storage of CO₂ had to be formed within two years after the approval by the EP. Creation of the law has been implemented under the auspices of the Ministry of the Environment with cooperation with the Ministry of Economy including the Main Mining Office and stakeholders from the industrial sphere. The works were carried out according the time schedule, set by the European Commission. A delay against the deadline was two weeks only, due to rather complicated process of clarifying positions of the relevant spheres.

Recent legislative regulation in force at the territory of Slovakia was transposed by applicable Act (258/2011 Coll.). Here is referred to that the Act does not apply to storage for the research purposes, development or testing of new equipment and technological processes with the total projected quantity of stored carbon dioxide less than 100,000 tons (§ 1 Object of the Act). However, these "small" research repositories are subject of environmental impact assessment (EIA) - to screening (24/2006 Collection of Laws, as amended by other regulations).

Another modification of the Act No. 245/2003 Coll. (on integrated prevention and control of environmental pollution, § 11. 1, letter l) introduces an obligation for the operation of the combustion plant with a rated electrical output of 300 MW and an assessment of conditions for storage of carbon dioxide in geological environment, in particular, whether:

1. Are there in the wider area of operation available appropriate sites under a special regulation?
2. Is an installation of carbon capture facility technically and economically feasible?
3. Are the equipments for the transport of carbon dioxide into the repository technically and economically feasible?

Under the current stagnant implementation process – a development of building repositories and also severely depressed trading permit to discharge CO₂, it can be expected that the European Commission extends the requirement to store CO₂ for the existing industrial equipment with lower rated electrical output in the near future.

The Act is based on the EC Directive and enacts a number of specific provisions. The first one is an actual site selection - practically only such structure can be used for permanent storage of CO₂, which can not be used for any other purposes.

The Act in a nutshell, defines the conditions for obtaining a storage permit, authorization applications to store, and change, check, update and revocation of authorisation of the storage permit. There are set up the criteria and procedures in the storage and monitoring of storage sites and associated surface and injection facilities and storage complex. The Act stipulates remedies and additional remedial measures when detecting leakage of carbon dioxide, or a significant deficiency in the storage complex is identified. Also a procedure for the closure of

storage and conditions after their abandonment of the transition of responsibility to the competent authority are set up. Moreover specific guidelines on how to choose the appropriate structure for storage and the monitoring procedure governing the storage site are introduced in the Annexes of this Act.

Very essential is a part devoted to the transition the responsibility for the storage site to the State and State rights to take control of the repository in certain cases and the impact of law on financial obligations created by the operator. Those provisions are directly related to the fact that the process of dissolution ("neutralization") of CO₂ in the collector takes several hundred years and the same is valid also for lasting obligations to monitor and ensure the repository and to perform the monitoring. This is connected with considerable financial claims, particularly on the state budget.

A more detailed description of certain specific features of the permanent storage of carbon dioxide in the geological environment (258/2011).

The actual wording of the Act is divided into 25 paragraphs and into the XI Articles that discuss laws that have affected the novel conceived Act; e.g.: Act. 44/1988 Coll. on the Protection and Use of Mineral Resources (the Mining Act); Act of the Slovak National Council No. 51/1988 Coll. (about Mining Activities, Explosives and State Mining Administration); Law No. 223/2001 Coll. (the Waste Act); Law No. 364/2004 Coll. On Water and amendment of the Slovak National Council. 372/1990 Coll. on Offences, as amended (Water Act); Act. 572/2004 Coll. on Emissions Trading; Law No. 24/2006 Coll. on Environmental Impact Assessment, etc. The Act itself contains two annexes, the first of which establishes the criteria and procedures for assessing the storage complex, while the second one is devoted to monitoring activities.

Under the Act No.569/2007 Coll., on Geological Works, carbon dioxide storage into geological environment has been incorporated into stage of the geological deposit survey (§ 3 letter h).

Storage site

As a storage site (§ 3) shall be considered an area of a geological unit into which carbon dioxide is stored and where associated superficial and injection facilities are built.

As a storage site cannot be considered a natural rock structure or an underground space that is reasonably preferred to the exploration, exploitation and storage of hydrocarbons, to geothermal utilisation, storage of radioactive wastes and other wastes in underground spaces, or for any other uses of underground storage for energy purposes, including options, that are strategic for the security of energy supply and renewable energy development.

Furthermore a rock structure with significant reserves of groundwater, including natural healing and natural

mineral resources and any collector of fresh water cannot be considered as a storage site. For storage complex is considered to be a repository and associated geological environment that must affect the overall integrity and security of storage.

The legislative financial demands on the process of storing

Claims for financial coverage of storage activities start at the beginning of approving permits for CO₂ storage, even in the stage of application for a storage permit. The applicant for a permit shall declare that he disposes of sufficient financial resources to build storage, to carry out operation and disposal to address any significant deficiencies. An adequate bank account with access rights has to be established by governing body for this purpose. This adequate financial security determines a District Mining Authority due to size of the repository and the planned volume of CO₂ to be saved. These funds are from the time of issue of the storage permit available to the relevant District Mining Office, which, if the conditions specified in the permit, may dispose of them for predetermined purposes (§ 16).

An amount of "reasonable financial provision" may decrease in the event of smooth course of the operation when the process of gradual creation of "Financial Compensation" (§ 17) can be open. Provided during repository operation the primary containment of storage site will change and thereby the risk of CO₂ leakage will be increased, the volume of financial security will be increased adequately.

Upon completion of repository operation, after its sealing, and removing unnecessary equipment, and before moving responsibility for the storage site to the relevant District Mining Authority, this stipulates appropriate level of funding to ensure the tightness of the primary storage site and storage complex monitoring for a period of 30 years (§ 17). Funds in excess of the specified amount shall be released in favour of the former operator. A financial compensation (§ 17) generates an operator during repository operation annually charged to expenditure at the height indicated by the relevant District Mining Office to ensure the tightness of the primary storage site and storage complex monitoring.

The obligation transition

The relevant District Mining Authority on its own initiative or at the request of the operator assumes responsibility for the site and performs the duties related to the monitoring and remedial and other measures to ensure its tightness (§ 15) under the following conditions:

- The tightness of the primary structure was ensured and at least twenty years have passed after repository closure, if the District Mining Office doesn't provide otherwise. Furthermore, the financial liability has been fulfilled (§ 17) and the storage site has been sealed and the injection facilities have been removed.

- In the case where an operator is unable or does not want to eliminate leakage or significant deficiency or fails to respect terms of a storage or his actions will increase the risk of leakage or it does not address it, the District Mining Authority shall withdraw an authorization the operator to store and take over the responsibilities associated with the management and operation of the repository (§ 8). All costs associated with the removal of significant deficiencies to seal the repository go to the expense of the operator or to the detriment of established financial compensation and financial security (§ 16, § 17).

In conclusion of the legislative excursion a practical overview of the legislative process repository is introduced here:

1) At the very beginning the first step of a repository building is search and exploration of suitable geological structure, which is possible only on the basis of an exploration permit - exploration of that site is considered as deposit geological survey, and only person authorized to carry out survey can perform it (569/2007 Geological Act)

2) Upon completion of the geological exploration of the geological structure or in the event of conversion to a varying degree of exploitation shall be made a settlement of reserves (§ 34a, 44/1988 Coll. Mining Act) with the calculation of the volume of the structure and the **subsequent approval and the decision of the Commission for approval of mineral reserves** of the Ministry of Environment.

3) Subsequently, the holder of exploration area or mining area to the present geological structure applies for the "**Certificate of Appropriateness of Natural Rock Structure** and underground space for the storage of gases and liquids" at the Ministry of Economy (Government Regulation No. 107/2010).

4) A future operator shall submit the storage permit to the relevant District Mining Authority – if the storage site is located in the area belonging two District Mining Authorities, the one decides on the territory of whom the

greater part of the complex is located (258/2011 Coll. 44/1988 Coll.)

9.3 Summary

Specific provisions of the Directive (Article 4, Site Selection), which have not been translated into a transposed law, is the right of a Member State to determine the areas from which storage sites may be selected for the permanent storage of CO₂ as well as to allow or disallow the storage in parts of its territory or in the whole extension of its territory.

The provision is partly reflected in the Geological Act (§ 24, 569/2007 Coll.), which enacts the obligation of the State (Ministry of Environment) to define areas in which it is allowed a) to conduct geological exploration on hydrocarbons (oil and combustible gas), b) to establish in natural rock structures and underground spaces permanent storage of carbon dioxide in geological environment. Specified areas are published by the Ministry of Environment on its website with an annual update (www.minzp.sk).

There is no mention in the Directive adopted by the EP and EC regarding permitting or prohibiting a Member State for CO₂ transport through its territory or export CO₂ emissions in a case when CO₂ storage is forbidden on its territory. The problem will be surely a subject of conflicts of interest at the time of development of the method of deposition and building CCS infrastructure.

Solving these issues as well as others that will be emerge during a stage of demonstration projects will be a subject of the Directive revision, which is established for the March 31, 2015 (Article 38, review), in the frame of which the Commission has an obligation based on experiences of the implementation of the CCS and the related technological advancement and the latest scientific knowledge to assess a topicality of the Directive adopted by the European Parliament on the 23rd April 2009 and, where necessary, to submit a proposal for its revision.