

THEMATIC REPORT

permitting sessions
at łodz meeting

hosted by the
bełchatów ccs project
september 28-29, 2011

A report from the european
ccs demonstration project
network





PERMITTING SESSIONS AT ŁÓDZ MEETING HOSTED BY THE BEŁCHATÓW CCS PROJECT, SEPTEMBER 28-29, 2011

A report from the European CCS Demonstration Project Network

This report presents the discussions, conclusions and actions agreed of a thematic workshop on CCS permitting. The workshop saw participation of representatives of six out of seven members of the European CCS Demonstration Project Network, supplemented by a representative of the EC's DG Clima and Dr. Jerry Hill from the SECARB project in the USA. The workshop was one of three parallel thematic sessions in the Network knowledge sharing event that was kindly hosted by the [Bełchatów project](#). The other two were on public engagement and storage, respectively.

The workshop was part of a series of three in 2011 (with the first being held in [Brindisi](#) in February and the second in [Compostilla](#) in June).

Participants in the permitting workshop:

- **Bełchatów**; Dorota Gała, Joanna Stefanska; Mariusz Milak; Wioletta Starczewska; Magdalena Stachera
- **Compostilla**; Daniel Fernandez & Jorge Pina
- **Don Valley**; Michael Gibbons & Russel Cooper
- **Jänschwalde**; Ewa Strzemecka
- **Porto Tolle**; Monia Politi, Sara Cainer & Pompilio Carmuscio
- **ROAD**; Hans Schoenmakers
- **SECARB (USA)**; Jerry Hill
- **DG Clima**; Martina Doppelhammer
- **DNV Network Team**; Jock Brown and Michael Kelleher

Sessions

In a break from traditions the event in Łódz was organised into topics, rather than a project to project structure. Contributions were suggested by participants at the previous meeting in Ponferrada. For each topic several participants offered to give input to discussions in 5-10 minute presentations.

The topics discussed and the presenters were:

- The Transposition of the CCS Directive - Jänschwalde and Porto Tolle;
- Financial Security and Long Term Liability - Compostilla, Don Valley and Porto Tolle;
- Different Regulatory Models - Porto Tolle;
- Acceleration of CCS Permitting through the potential use of independent bodies - Don Valley, Bełchatów and Porto Tolle;
- Acceleration of CCS permitting through having clear timelines - Compostilla;
- Acceleration of CCS permitting through adopting an early engagement with regulators - Bełchatów, Don Valley;
- SECARB (USA) integrated CCS Project - Adapting to new CO₂ injection well regulations;





- Public Acceptance/Perception issues and the permitting process - Don Valley, ROAD and Jänschwalde;
- Regulators readiness for CCS, including policy, capacity and competence - Compostilla and Bełchatów;
- Discussion on planned CCS standards being developed by CEN and ISO - Don Valley;
- Environmental impact Assessment - ROAD, Bełchatów and Compostilla;
- Research and Development Recommendations.

Bełchatów

The Bełchatów CCS project presented on four topics at the Łódz event, namely: Accelerating CCS Permitting through potential use of independent bodies, Accelerating CCS Permitting through early engagement with regulators, Regulators readiness for CCS including policy, capacity and competence; and Environmental Impact assessment.

In Poland, the Ministry of Environment is responsible for the transposition of the CCS directive into Polish Law and for permitting of CO₂ storage. A draft act to transpose the CCS directive and amend existing laws has been created and presented to the Polish Legislative Center. PGE GiEK S.A. has been actively participating in the transposition process by commenting on the draft act and incorporating its requirements into the Bełchatów project. Under the initial version of the draft act, CCS projects were required to pay a cash deposit for the liability for 70 years (20 years planned injection period, 20 years post-closure period, 30 years after hand over to authorities) in the context of CO₂ storage. Through negotiations it was decided that financial mechanisms, such as insurance policies or a bank guarantee, could be used instead of a cash deposit. However, there are currently no financial mechanisms in the market for the required length of time.

The Polish Geological Institute (PGI) is the government’s scientific body and acts as an independent technical body in Poland. The PGI is also advising PGE GiEK S.A. on technical matters related to the storage of CO₂. PGI act as a technical CO₂ storage consultant, undertaking research on behalf of the Bełchatów CCS project and will provide support during the storage permitting process. PGI will also play an important role as the Geological Bureau of PGE GiEK S.A. in phase II of the CCS project by performing tasks aimed at accelerating the permitting, including supporting activities with public administration and community. According to the draft act, PGI will take up a role as the National Administrator for Underground CO₂ Storage Sites (KAPS), including monitoring during both operation and post closure periods, and will act as the Polish state’s competent technical body on CO₂ storage.



Due to the unique nature of a CCS projects there is a need for many different regulators to be involved in the permitting process and hence there is a need to engage them early in the project lifecycle. In Poland, the Ministry of Economy is responsible for the permitting of transportation of CO₂ and pipeline corridors. It is anticipated that the transport corridors for CO₂ pipelines will be implemented through either amendments to the existing Energy law or the development of a new Gas Act. A proposal for an Act on transporting corridors was put forward to the Standing Committee of Council of Minister in May 2011. However, in June 2011 work on the Act, which aims to simplify the existing procedures, was suspended.



Additionally the Ministry of Economy’s responsibilities are such that they have supported PGE GiEK S.A. activities obtaining funding for the CCS project through the European Energy Programme for Recovery (EEPR), NER300 and the Norwegian Financial Mechanism (NFM). The Ministry of Environment is responsible for processing storage permits. A strong relationship exists between PGI and the Ministry of Environment which has been favourable for PGE GiEK S.A during preparation of applications. Two applications for seismic, drilling and gravimetric work in the Wojszyce and Lutomiersk-Tuszyn areas have been submitted to the Ministry of Environment during phase I of the CCS project. The President of the Energy Regulatory office will also have a role in the administration of the CO₂ transport and storage infrastructure in Poland as they will be responsible for awarding permits, and has supervision and inspection duties associated with these permits.

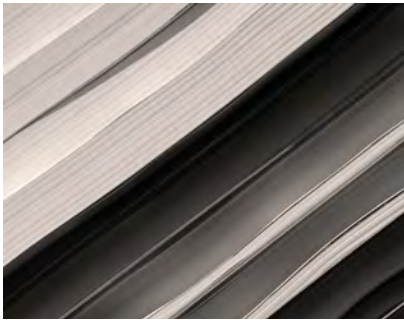
An Environmental Impact Assessment (EIA) is required for the award of environmental decisions in Poland. PGE GiEK S.A. always engages a specialist consultant to undertake EIA studies on its behalf. An EIA study was prepared for the capture plant and a decision was awarded in 2009. Following significant changes to the CCS project, changes will also need to be made to the environmental decision and the EIA study. In order to get an environmental decision for the capture plant PGE GiEK SA was required to present the Bełchatów project to the Regional Directorate of Environmental Protection. Through the presentation, PGE GiEK S.A. gained initial acceptance for the intended procedure and scope for the EIA and established a good relationship with the local authorities. One of the challenges of the EIA process for large scale CCS projects is the R&D aspect, which can mean that information submitted in the EIA study may change as the project develops. Ultimately this could mean that a project is delayed due to the need to update the EIA study and the environmental decision.

Compostilla

The Compostilla project presented on four topics at the Łodz event, namely: financial security and long-term liability; acceleration of CCS permitting through having clear timelines; regulators readiness for CCS, including policy, capacity and competence; and environmental impact assessment (EIA).

As part of the EEPR funding, CIUDEN technological development plants (TDPs) are currently being constructed. For the 30MWt capture plant applications for permits for operation have been made, with the final contracts due to be completed at the end of the year. The CO₂ storage law in Spain only applies to storage over 100kt, so it is not applicable to the CIUDEN TDP, but in general Spanish mining law which covers “the use of the underground for any kind of storage” applies. Exploration permits have been awarded for the TDP, as have permits for seismic activities which are required for exploration. The CIUDEN permitting process is working as a test of the regulatory system for CCS in Spain. For the Compostilla project, exploration permits to drill wells and undertake seismic analysis have been granted under, the previously mentioned, Spanish mining law.

In the view of the European Commission, Spain is the only member state to have fully transposed the CCS directive into national law by the June 2011 deadline. Under Spanish law the liabilities relate to closure, post-closure and also emissions trading obligations.





* The EU CCS Directive guidance documents require that the bottom-line contingency
* should be 25% excluding surrender of emissions allowances. The guidance documents
* relating to the directive were published after transposition of the directive into Spanish
* law and so were not taken into account in this process. The period of liability following
* the injection phase will be a post-closure period of 20 years before transfer to the
* competent authority, then a 30 year period of liability following that. A cap on the liability
* of CCS is currently being considered, although it is not clear when a decision is
* expected.

* Normally the Spanish Ministry of Environment requests joint environmental impact
* assessments for all constituent parts of a project. However, the Compostilla project has
* proposed to submit separate Environmental Impact Assessments for each part of the
* project due to the complex nature of the project and related public consultations. In
* addition, the pipeline and storage infrastructure could be used for other CO₂ sources, so
* transport and storage need to have their permits separate from the capture and power
* plants. Initial EIA's have been submitted for the capture and transport parts of the
* project and an EIA for the storage site will be submitted following storage characterisation.
* A major challenge of the environmental permitting process for capture plant is the effect
* it has on environmental permits and emissions from a power plant. When CO₂ is removed
* from flue gases, the remaining flue gas components are concentrated, including emissions
* of environmentally sensitive substances subject to the Large Combustion Plants Directive
* (LCPD). Emissions limits in the LCPD are defined in mg/Nm³, hence when CO₂ is removed
* and the remaining flue gas is more concentrated, emissions may no longer comply with
* permit conditions despite there being no increase in total emissions. Currently there is
* no approach in the directive for emissions concentrated due to the removal of CO₂ from
* flue gases. For Oxy-fuel combustion processes the removal of Nitrogen (N₂) before
* combustion in addition to the removal of CO₂ further concentrates emissions in the flue
* gases, compared with conventional generation. It is noted that the emissions of the
* Compostilla plant per unit of electricity generated are lower than those of conventional
* generation. The EIA for the CO₂ pipeline is analogous with that of a natural gas pipeline,
* but with the possibility for further studies related to the dispersion at a vent or accidental
* rupture.

* **Don Valley**

* The Don Valley project presented on three topics at the Łódz event, namely: acceleration
* of CCS permitting through the potential use of independent bodies; public acceptance/
* perception issues and the permitting process; and the development of standards for the
* CCS Industry.



* In the UK, the Department for Energy and Climate Change (DECC) is responsible for
* issuing drilling licenses in the CCS and the oil and gas industry. The approach taken by
* DECC to date has been to use the same philosophy with the licensing process as with the
* oil and gas industry. Don Valley is of the view that this approach will prevent the CCS
* industry developing because the oil and gas industry has uncapped liability. The project's
* view is that liabilities need to be capped at a reasonable level or public funding needs to
* be increased. The UK is currently considering a post-closure liability period of 40 or 50
* years, before the hand-over to a public body.



It was also noted that no financial products are available in the market to mitigate the liability due to the long period required to be covered and that there are few projects over which to spread the risk.

It is not clear what the definition of an independent body is, but Don Valley assumes this is a government funded agency such as the Infrastructure Planning Board. The project's opinions is that there should be no need for independent bodies and that if there is a good relationship between the regulator and applicant it will reduce the cost burden to the project and allow it to be implemented faster and more effectively. Depoliticising decisions and having an informed basis will streamline the process and not additional bodies, which run the risk of making the process less transparent from a public perspective. Currently the Infrastructure Planning Commission (IPC) which is responsible for permitting major infrastructure projects in the UK, including CO₂ pipelines, insists on publishing all information on it's website for transparency reasons. This initiative runs the risk of discouraging companies from engaging with the regulator until a project has reached a certain level of development.

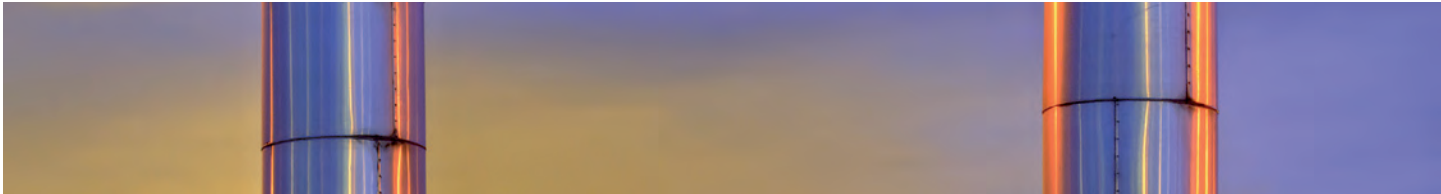
During 2011 National Grid has undertaken an initial consultation process with stakeholders along the proposed route corridor with respect to the Yorkshire and Humber CCS pipeline project, which includes the Don Valley project. This consultation process included a letter drop, village hall meetings, and engaging with local politicians and representatives. The concerns addressed by attendees at these meetings were similar to those expressed in consultations for natural gas pipelines. The major issues raised related to disruption to residents caused during construction, socio-economic issues related to disruptions caused to farming and agriculture, benefits and consequences of following similar routes to other pipelines and infrastructure, the proximity to residential areas and the risk of effecting drain and water courses crossed by the pipeline. It is interesting that generally there is a low level of knowledge about CCS; however the link with climate change and the environment is seen in a positive light. As part of the development program testing of high pressure pipelines is being undertaken. The route of the pipeline is in an area where a natural gas pipeline was recently constructed, and the project is generally view in a positive way.

Following the consultation process three route options were considered by the project and the Don Valley project now has a preferred pipeline route which is to be made public in October 2011.

Don Valley also reported on an initiative by the Canadian SCC secretariat to create standards for the entire CCS value chain. This has been put forward to ISO and CEN. In August CEN met and a decision was taken to develop standards in parallel to ISO rather than in collaboration with. The plan is to issue these standards within three years. It is the opinion of UK industry, developed through the Carbon Capture and Storage Association (CCSA), that the creation of standards may prevent the creation of innovative solutions and new technologies, which are crucial to this new industry. Should there be a shared concern amongst project members of the Network, there could be a need for further discussions outside the network to develop a combined approach.







Jänschwalde

The Jänschwalde project contributed to two topics at the Łodz event, namely: the transposition of the CCS Directive and public acceptance/perception issues and the permitting process.

The transposition of the CCS directive into German law has recently encountered some obstacles - during the last session of the Bundesrat (upper house of the German parliament) no majority could be found for the CCS Draft Law. The main reason for that was an 'opt out clause' in the law itself, without which some of the federal states (Länder) would not vote for the transposition. Equally, its inclusion meant that some Länder, such as Brandenburg, which is in favour of the transposition and where the Jänschwalde project plans to store CO₂ underground, opposed the transposition as it is currently proposed. According to this clause federal states would have the competence to implement their own CCS Law and even forbid the storage of CO₂ on their territory.

The German Constitution includes a special procedure to resolve the stalemate. The Federal Government and the Bundestag (lower house of the German parliament) may call a Conciliation Committee which has the right to propose amendments to the Draft Law. Unfortunately there is neither a legally foreseen timeline for calling the committee nor for the committee to find a solution so that the process could take a long time.

Currently in Germany there is no consensus on what the country's future energy strategy should be, due to strong opposition to nuclear, coal and lignite generation. The opposition to coal and lignite fuelled power is a key factor in the opposition to CCS, along with negative sentiments towards the onshore storage of CO₂.

Consultations relating to the permitting process for transport and storage have not yet started on the Jänschwalde project. In anticipation of the consultation process, an information campaign was initiated in 2008, including an information centre and a monthly newsletter. A CCS council was set up by the Brandenburg government as a platform for stakeholder consultations accompanying the permitting process. Members of the council are representatives of the Ministry of Economy in Brandenburg, concerned municipalities, environmental organizations, civil initiatives and Vattenfall. Subsequently, the activities of the council have been suspended until the transposition of the CCS directive.

The Jänschwalde project has an exploration license under the mining law to look for a storage site, but the Brandenburg Government has publicly stated that no exploration for a storage site will take place without the transposition of the CCS directive into German law. This came in response to local protests, which have halted the storage part of the Jänschwalde project. In 2008, when the first CCS law was drafted, there was a political will to introduce this technology in Germany. However, a change of government in 2009 has led to changes in the agenda along with the national sentiments towards CCS. For now the future of CCS in Germany is uncertain.

Porto Tolle

The Porto Tolle project contributed to three topics at the Łodz event, namely: transposition of the CCS Directive, financial security and long-term liability; different regulatory models; and an update of the coal thermal power plant project.





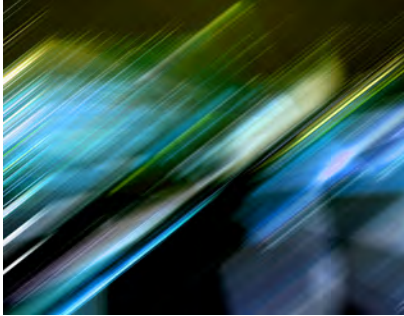
The Italian parliament the 28th July of 2011 officially approved the legislative decree that transposes the CCS Directive 2009/31/EC. This is awaiting official publication and requires some additional decrees in order to be effective. The regulatory framework for CCS establishes an outline of measures to ensure the geological storage of CO₂, indicates the criteria in order to identify storage areas, defines procedures for issuing exploration and storage permits, outlines the operators obligations and liabilities during operation and the post closure period, defines procedures for the Transfer of Responsibility and obligations for Financial Security and Financial Mechanism.

In May 2011 the ruling of the State Council (n. 3107/2011) voided the Porto Tolle EIA decree for the following two reasons: it did not include adequate comparison of alternative project design's (gas and coal); and in relation to the proposed carbon monoxide emissions. It is noted that there are differences between the imposed carbon monoxide emissions values prescribed by the EIA decree and the reference values in the Best Available Technology Reference (BREF) document. In July 2011, the Italian government implemented the art. 5 bis of the National Law while in August 2011 integrated art. 30 of the Veneto Regional Law establishing the Po River Park Authority. These two events have allowed Enel to submit the Porto Tolle project to a fast track revision of its EIA and also allowed it to overcome the void by the Council of State on the previously approved Environmental Compatibility Decree (ECD). In August 2011, the Ministry of Environment, notified Enel that the EIA procedure would re-started and Enel was requested to resubmitted documentation in order to get a new Environmental Authorization from the Ministry of Environment together with Ministry of Cultural Heritage and Activities. Once environmental authorization is granted, a new construction authorization can be awarded by the Ministry of Economic Development.

ROAD

The ROAD project presented on two topics at the Łodz event, namely: public acceptance/perception issues and the permitting process; and environmental impact assessment.

The ROAD project is well advanced within the permitting process, with a preliminary EIA having been submitted for the entire project in June 2011. The competent authorities are now processing the permits and issuing clarifications. Publication of permits is expected at the end of October 2011. By the end of December 2011, the ROAD project expects to have definitive permits. In the permitting process for the capture plant, the ROAD project has gained valuable experience on topics including: monitoring and measurement, experience with authorities, and technical issues. The issue of monitoring and measurement relates to the environmental permit for the power plant, whose emissions limits are governed by the LCPD. As with the Compostilla project the removal of CO₂ from flue gases concentrates the remaining flue gas components including dust, SO_x and NO_x emissions in the gases emitted to atmosphere. For the ROAD permit measurements of these emissions will be made on the combined flue gases from the power plant without CO₂ removal and those from the capture plant with CO₂ removed. The permit will require the emissions concentration values to be measured on the combined stack gases from the power plant and capture plant, but the emission concentrations for the capture plant and power plant must be calculated separately and retrospectively.





ROAD has worked closely with the authorities developing the project. Both parties have similar goals in that they hope to learn from the construction and operation of the ROAD project.

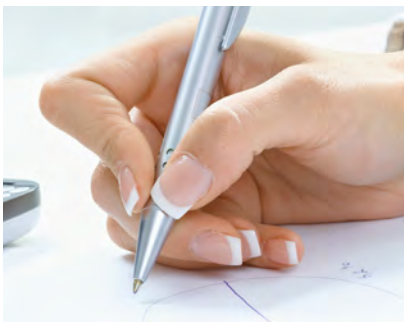
With regard to the safety contours for the pipeline there has been some debate over the calculation method used. Currently there is no validated calculation method for contours, so a conservative approach was adopted. After some consideration by the authorities the proposed approach has been accepted, although it has meant more measures have been put in place than would otherwise be required.

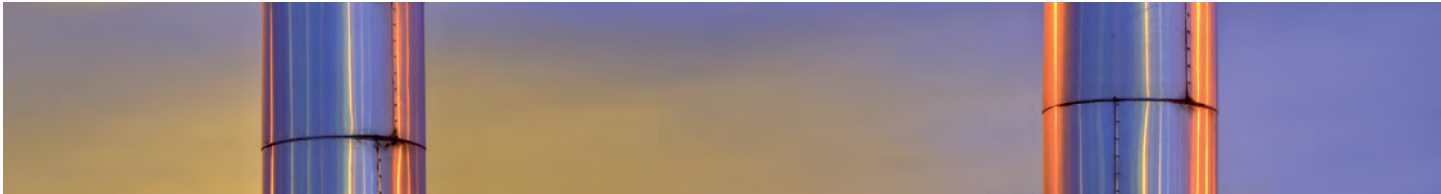
The ROAD project has been through a consultation process, which was organised in conjunction with the responsible authorities. The permits will be subject to a final public consultation later this year between October and December, when the final permits will be issued. During this period the public has the opportunity to respond in writing or at planned town hall meetings.

SECARB

Gerry Hill from SECARB was the guest presenter, where he presented the SECARB demonstration project at Plant Barry and the experiences gained in the permitting process there. The Southern Company operates the Plant Barry power station where a 25MW demonstration of capture technology using Mitsubishi Heavy Industry (MHI) technology. Construction began in April 2010, with commissioning commencing in June 2011. A 12 mile long pipeline connects the capture facility of the Alabama based project to the Citronelle saline aquifer formation where between 100 and 300 kt/y CO₂ will be injected for the three year research period. Due to delays in the permitting process there has been no injection at this stage.

The SECARB project must comply with drinking water permitting which is administered by the Environmental Protection Agency (EPA) and has undertaken an Environmental Assessment (EA). The findings of the EA showed that mitigation measures needed to be taken because there are wetlands in the area and also gopher tortoise burrowing along the planned pipeline route. With the mitigation measures taken into account it was deemed that there are no significant environmental impacts. In order to facilitate research in CO₂ injection, the US has set up a permit for experimental technologies, such as CCS, in addition to a permit for commercial storage. Both permits are administered by the EPA, the experimental permit at a state level and the commercial permit at a federal level. There is a separate permit for EOR, which is administered by state oil and gas boards. The EPA has developed extensive site characterization requirements, well construction, monitoring of well integrity and liability which are included in the commercial permit. Currently the permit for injection of CO₂ is delaying the project, as the capture plant is operating and the pipeline is complete, but CO₂ captured is being vented. The permit delays are being caused by indecision by authorities as to whether the project should have an experimental permit or a commercial permit. To satisfy the requirements of the experimental permit SECARB have had to agree to completely remove the pipeline at the end of the experimental phase. The EPA is concerned that it will be transferred into a commercial EOR operation with nearby wells drilled in conjunction with EOR operator Denbury. It is unclear as to when a resolution will be reached that allows injection, but SECARB remain hopeful that they will be able to inject and store CO₂ in early 2012.





DG CLIMA

In response to the recent halt in transposition of the CCS directive in Germany the EC CLIMA gave an update of the transposition process throughout Europe and also explained the process the EC could follow with member states that have not transposed the CCS directive. Of the 26 member states, only one has fully transposed the directive, but the remaining 25 are at various stages in the transposition process. A number of member states have partially transposed the directive and have the political will to complete the process. At the other end of the spectrum the transposition process has not started for some member states and is low priority because they do not have storage capacity. The commission has some financial leverage to speed up the transposition process through NER300 and EEPF funding mechanisms, particularly the NER300 which requires transposition of the directive. As the first step in the legal process has begun with Member States, not compliant have been issued formal notices by the commission. Member States now have two months in which to respond, after which the EC has the right to take legal action. There is then the opportunity for Member States to implement before a second court appearance and potential financial penalties. It is not clear if there is the political will within the EC to follow the described procedure strictly.







Conclusions

The Lodz workshop brings to an end the meeting agenda for 2011 and a second year for the permitting theme. The network projects are at different stages of progress and the discussions give others the opportunity to learn and also provide the opportunities to overcome major permitting issues together. Interaction with North America through the SECARB project at this meeting showed that there are issues where collaboration and joint solutions could move the CCS industry forward at a faster pace. The conclusions taken away from this workshop include:

- Recently, the state governments of Germany have blocked the transposition of the CCS directive into German law. It is believed that this is mainly due to opposition to the use of coal and lignite for power generation and onshore storage of CO₂. With such a high number of countries yet to fully transpose the CCS directive, there are lessons that must be learned from Germany.
- Liability under the CCS Directive and through associated permitting processes is probably the major concern for CCS operators as there are no existing financial mechanisms for insurance or bank guarantees over the lifetime of the storage sites. The CCS Directive requires that companies are liable for 30 years post closure, which is a financial burden with no market mechanism for mitigation currently available. Is it possible for the Network to consider investigating a parallel track to permitting on liability as it is such a major issue for all CCS projects? This is a global CCS issue and it is noted that US projects are starting to work with finance and insurance market players that are also likely to be involved in European projects, so collaboration could help move things forward.
- A likely future challenge for power plants fitted with capture technology is compliance with emissions levels in the Large Combustion Plants Directive (LCPD). Once CO₂ is removed from the flue gas stream, emissions of dust, NO_x and SO_x covered by the LCPD become more concentrated and may no longer comply with permits. At this stage there is no method in the LCPD for dealing with the removal of CO₂, the current method based on the O₂ content may not be appropriate for plants fitted with CCS. It is noted that methodologies have been developed by regulatory bodies in the US that may be applicable in the European context and is another area for inter-continental collaboration.
- The emergence of CCS standards both by the ISO and CEN bodies will need monitoring and may be a major issue for the Network to consider in the next couple of years.

A new approach was trialed at this workshop and feedback from participants suggested that although the structure of the knowledge sharing offered more focus, a balance is required to ensure projects are able to update each other on progress.





