THINK PIECE

CCS: Legislating to quantify risk and increase the financial viability of CCS projects

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Introduction

As with all major capital projects, Carbon Capture and Storage (CCS) developments will only be sanctioned once necessary finance is sourced. Currently, sufficient funding is difficult to obtain and CCS projects are struggling to reach financial viability.

Those compiling project costs must identify and quantify risks to the project and the probability and consequences of their occurrence. Contingency sums and insurance costs to cover these risks must be added to the budget. These will become more conservative as the indeterminacy of the risks increase. Pragmatic drafting of legislation can reduce these costs by avoiding the introduction of unnecessary regulatory risk and providing for the accurate quantification of risk where it cannot be avoided.

This piece identifies a number of the provisions of the current proposed CCS Directive[1] (the 'Directive') which impose unnecessary regulatory risk and suggests that these provisions could be modified to decrease the risk based costs within CCS project budgets.

Liabilities for CO_2 Leaks

Under the Directive, the criteria for the award of a carbon dioxide (CO_2) storage permit includes that there shall be 'no significant risk of leakage'[2] when the site is characterised and assessed pursuant to specific criteria.[3] However, the criteria do not quantify what level of leakage or leakage risk is acceptable and the definition of 'significant risk'[4] given is qualitative. So there is acknowledgement that some risk of leakage must be accepted when granting a storage permit, but no quantitative indication of the acceptable level.

The Directive also provides that the 'responsibility' for closed CO_2 storage sites shall be transferred from the operator to the competent authority of the Member State, but only if 'all available evidence indicates that the stored CO_2 will be completely and permanently contained' and 'a minimum period, to be determined by the competent authority has elapsed'.[5] There are two points of note here. First, there is no limitation period for the liability of the operator. Second, the requirement that CO_2 be 'completely and permanently contained' demands a higher level of containment security than the 'no significant risk' required for the permitting of a site. So there is uncertainty as to when, if ever, the operator will be able to divest itself of a site that is no longer yielding revenue, but continues to require operating expenditure.

There is also a requirement for financial security,[6] adequate to cover the cost of, *inter alia*, CO_2 emission credits in the event that a leak occurs, to be put in place by an applicant for a storage permit before they commence CO_2 injection. Such financial security shall cover risks of leaks up until the point at which the closed storage site is transferred to the competent authority.

So potential project investors are required to provide financial security for an unquantifiable risk over a potentially indefinite timescale. Insurance products, which will spread these risks, are coming to the market, and will help; but quantification of level and duration of cover will still be required.

While CO_2 leakage can be justifiably classified as a business risk that should be borne by the system operator (as it is they who are best placed to assess and control it), the duration and level of that risk introduced under the Directive is subject to indeterminacies, outside the operator's control, which cannot be accurately assessed.

The Directive could have provided for a maximum value for leakage risk, avoiding the necessity for excessive budget allowances. One option would be to restrict the costs of any leaked emissions post-closure to the value of emission credits at the time when the CO_2 was sequestered. Alternatively (or in addition), the carbon credit value of leaked CO_2 could be reduced on a sliding scale over time from the point of closure, giving credit for the time that the CO_2 was stored and allowing post-closure financial security/ insurance coverage costs to be more accurately assessed.

Similar risk uncertainties to those described above apply in the case of the costs of system monitoring, reporting and corrective measures post storage site closure.[7]

Access to Transmission Systems

To avoid distortions of the market by anti-competitive refusal of access to, and encourage the sharing of, infrastructure and thereby reduce the cost of CCS implementation overall,[8] the Directive provides for access by third parties to all CO_2 transport networks and storage sites.[9] There are, however, a number of specified situations in which the requirement to allow such access can be avoided, an example being the 'incompatibility of technical specifications [between interfacing systems] which cannot reasonably be overcome'.[10]

If one considers the generic broad functional gas specification provided in the Directive, it includes a requirement that '[c]oncentrations of all incidental and added substances shall be below levels that would' *inter alia* 'adversely affect the integrity of the storage site or the relevant transport infrastructure'.[11] Two CCS systems

could easily meet this specification and still be mutually incompatible, presenting unreasonably high interfacing costs and timescales.

So, an organisation currently costing a European CCS project would have to allow for either a very high CO_2 purity design specification to offer the best chance of compatibility with third party infrastructure, or, the cost of dedicated transport and storage infrastructure.

This could be avoided if the provision of cross-European standard system design criteria were allowed for in the Directive. These would only require sufficient detail to ensure that systems designed in accordance with them would be compatible with one another, and many similar examples exist. The result would be increased assurance that a project in development would be compatible with eventual CCS infrastructure and a concomitant reduction in budget risk allowances, and therefore cost.

Potential Cost of Remedial Actions

Under the Directive, the contingent financial risks associated with corrective measures which may be required in the case of 'significant irregularities[12] or leakages' from storage sites fall to be covered by the operator, with the minimum actions required defined in a 'corrective measures plan'.[13] The plan is submitted as part of the application for a storage permit,[14] and is reviewed and approved by the Member States' competent authority.[15] The operator remains liable for corrective measures at all times up until the transfer of the storage site to the competent authority.[16] This is an onerous, but reasonable, burden on the project budget.

However, there is an additional indeterminate risk introduced by the Directive. Provisions allow the competent authority to require that corrective measures, which 'may be additional to or different from those laid out in the corrective measures plan',[17] be taken at the operator's cost. The competent authority is also empowered and, in some circumstances, required, to take these corrective measures itself and thereafter recover the cost from the operator.[18] This applies another, unquantifiable, financial risk to the project, which is outside the control of the operator.

Similar observations apply to the 'post-closure plan'; which is to be submitted at permit application but updated prior to site closure in line with, the then current, best practice.[19]

Ensuring that technical developments in remedial works and site closure are applied to projects is necessary, but the method used, namely, simply applying the entire financial risk burden without providing a method for its assessment, is not. This is avoidable; the provisions could, for example, restrict the cost of the application of best practices to a level at which the additional cost of the best practice methods would be a pre-determined multiple of the cost of the methods in the original permit. Where best practice application costs exceeded these levels, but was considered essential by the competent authority, then the differential cost would be covered by the competent authority, which, after all, would have sanction over whether the additional cost was incurred.

Summary

CCS projects will be expensive and it is up to policy makers and legislators to assist in sourcing the finance required. But, by providing a certain and pragmatic regulatory structure which avoids, so far as possible, the need for excessive contingency and insurance sums in project budgets, regulators can also help to reduce the overall cost of these projects and hence increase the viability. With the inclusion of more imaginative solutions to the peculiar challenges that CCS presents, the current Directive could have been improved in this regard.

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[1] *Directive of the European Parliament and of the Council on the geological storage of carbon dioxide.*
[2] *Article 4(3).*
[3] *Article 4(2) and Annex 1.*
[4] *Article 3(16a).*
[5] *Article 18(1).*
[6] *Article 19.*
[7] *Article 17(2).*
[8] *Preamble, (38).*
[9] *Article 20.*
[10] *Article 20(2)(c).*
[11] *Article 12(1). This specification is included to ensure conformity with the 1996 London Protocol to the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (the London Convention).*
[12] *'significant irregularity' is defined in Article 3(16) as 'any irregularity in the injection or storage operations or in the condition of the storage complex itself, which implies the risk of a leakage or risk to the environment or human health'.*
[13] *Article 16(2).*
[14] *Article 7(6) and Article 9(6).*
[15] *Article 10 of the Directive also includes a requirement that the draft storage permit, and hence the corrective measures plan, be made available to the Commission who may issue a non-binding opinion on it.*
[16] *Similar comments could be made in this case, as are made above regarding CO2 leakage risks, with reference to the uncertainty as to the temporal extent of the financial exposure.*
[17] *Article 16(3).*
[18] *Article 16(3), (4) and (4a).*
[19] *See Articles 7(7), 9(7), 17(3) and 17(4a), together with Annex II.*