irgc international risk governance council

Submission by the International Risk Governance Council to the European Commission regarding the regulation of carbon dioxide capture and storage

16 April 2007

Introduction

1. The International Risk Governance Council (IRGC) is a foundation based in Geneva, Switzerland, whose mission is to anticipate, understand, and develop recommendations for the risk governance of emerging, global systemic risks. We do so through project work involving international partnerships of experts drawn from government, industry and academia. Further information on IRGC, including the memberships of our Board and Scientific and Technical Council as well as information describing our sources of income, may be obtained from our website www.irgc.org.

2. In 2006 IRGC began work on a project focusing on the regulation of deep underground storage (sequestration) of captured carbon dioxide (CO_2). The project objectives are the development and evaluation of a number of possible alternative regulatory frameworks and the synthesis from them of proposals for an international regulatory framework for CO_2 capture and storage (CCS) risk governance. The project is jointly led by Professor Granger Morgan (Head, department of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh USA) and Professor Elizabeth Wilson (Humphrey Institute of Public Affairs, University of Minnesota). This interim note introduces our thinking to the EU consultation.

3. All IRGC projects work is done by a project sub-group, sub-contractors and collaborating expert organisations. Project activities seek and integrate the views of other experts and key stakeholders through surveys, technical workshops, seminars, or other means. Project deliverables and their conclusions are subject to approval by the IRGCôs Scientific and Technical Council (S&TC) and will be published only after the successful completion of an external peer review and of any revisions required by that review.

4. Recognising that the IRGC project will not produce its final peer-reviewed deliverables until the projectôs conclusion (Autumn 2007), we have prepared this summary note to introduce our current thinking into the decision processes which include the public consultation which ends on 16th April 2007.

Over-arching policy imperatives

5. IRGC believes CCS is an important technology to enable major greenhouse gas emission reductions. Combustion of fossil fuels is likely to remain an important part of the worldôs energy mix for many decades and stabilization of atmospheric concentrations of greenhouse gases require deployment of CCS and alternative technologies now. Such deployment requires a regulatory regime able to manage environmental, health, and financial risk and to establish mechanisms to manage long-term care and project liability. IRGC believes it is very important to create a regulatory regime appropriate to, first, demonstrating the safety and efficacy of CCS pilot projects and, second, assuring the business and regulatory environment which is needed for the establishment of large-scale commercial CCS activities.

6. IRGC urges policy makers to always consider the risks, costs, and benefits of CCS against the alternative õdo nothingò risks and costs of worsening climate change due to inaction.

7. We identify three key issues: firstly, legal enabling for the rapid start of diverse full-scale demonstration projects, potentially under interim regulation to verify technology safety and efficacy; second, providing financial confidence for risk appraisal of commercial investment to make a profit; thirdly, resolving the long-term liability contractual risk of slow CO_2 leakage to the atmosphere. [See para 24].

8. Our interim recommendations focus on five main policy areas:

   8.1. The need for action to be taken at an international level
   8.2. The need to promptly commence large-scale CCS demonstration projects
   8.3. The need for regulation to evolve as scientific and technical knowledge expands
   8.4. The need to address long-term management and liability issues at storage sites
   8.5. The need for transparency in communication to publics, and between nations

Action is required at an international level

9. Investment costs of CO_2 capture installations in the power sector can be particularly high and this may deter or prevent many countries ï not only developing and less-developed nations ï from implementing CCS. If maximum cost-reduction benefit is desired from early pilot projects, then a regionally cohesive approach could be used within the EU, in which technology transfer and learning (sharing of information) are maximised. To enable cross-comparison of technologies, harmonised standards are useful, particularly for monitoring, measurement and verification.

10. To obtain maximum global benefit in the medium term (15-30 years), IRGC believes that CCS policy should be developed in ways that encourage the appropriate use of industrial technology in developing countries. We endorse inclusion of CCS within the Clean Development Mechanism (CDM) to facilitate developing countries moving toward a lower-carbon energy path and to build operating experience in these countries at the earliest possible opportunity and ask the European Union and its Member States to support its inclusion within the CDM.

11. The inclusion of CCS within the CDM is contentious. It is possible that the EU could identify distinctions between CCS styles which may be more, or less, acceptable: 1) CCS of CO_2 naturally occurring with oil and particularly gas; 2) CCS from capture of combusted fuel, injected to aquifers; 3) CCS re-injected to produce more oil (EOR).

12. If subsurface CCS development is to be maximised, then harmonisation of CCS risk regulation and management between EU Member States is important at all levels of government. This can enable storage sites to lie under more than one nation, enable transport of CO_2 internationally, and ensure that any seepage is properly accounted for within and beyond the EU.

Large-scale CCS demonstration projects are urgently needed

13. The EU plans to encourage at least 12 large-scale CCS demonstration projects before 2015. To obtain maximum learning value, these would ideally be chosen to address knowledge gaps in capture, transport, injection and storage (IPCC Spec Report CCS

Ch5). This may require regulatory or licensing intervention, to prevent perceived ñwinningòtechnologies from domination. If regulation allows or encourages the evolution of diverse industrial organisation chains, then experience will be gained in a range of sites. Persistent challenges appear to be reducing the costs of capture, and to demonstrate site performance, with small seepage rates, in a representative range of geological settings.

14. IRGC believes that existing EU institutions can be adapted to manage the risks associated with these early CCS demonstration projects. Adaptation may enable more rapid and simpler strategic changes to the existing regulatory framework to manage health, safety, environmental and liability risks. A key decision will be to classify CO_2 as a waste, or to make CO2 a specially classified substance for the purposes of Waste and Water Directives.

15. There is, at the present time, no proven model for construction costs, operating costs or income to support commercial CCS investments. The value of carbon in the EU emission trading scheme would need to be well above current levels to form the basis for CCS commercial viability. Therefore, specific policies and incentives will need to be instituted within the EU to get early full-scale demonstration projects off the ground.

16. If maximum learning from these early CCS demonstration projects is desired, then sharing of available data by governments, companies and academia needs to be specifically encouraged, rather than such data being seen as proprietary. One potential mechanism is through linking early incentives and policies with data collection and transparency. Empirical data from early full-scale CCS projects will form the knowledge base upon which a long-tern regulatory framework can be built.

17. Careful siting is crucial to management of future risk, especially in storage performance. This is essential for early CCS projects, where poor site performance could cause disproportionate damage to the reputation of the technology. Licensing of these early storage sites should include demonstration of long-term predictable containment.

Regulation should evolve as scientific and technical knowledge expands

18. Regulation should evolve as scientific and technical knowledge expands from pilot projects. Policy makers will need to adapt existing regulation to account for specific features of CCS but, at this demonstration project stage, should not ñlock-inòrigid regulatory instruments that cannot be adapted to incorporate new knowledge.

19. Development of a comprehensive CCS regulatory framework that can satisfactorily govern the risks of CCS during the demonstration period of CCS and beyond to commercialisation will take a number of years. This could be accomplished through continuous improvement within existing regulatory bodies, or through establishment of new bodies to coordinate and integrate emerging knowledge and establish the long-term regulatory and legal framework that will be necessary for large-scale commercial deployment. On a project-scale, such an iterative approach has already been adopted by the 2006 IPCC Guidelines on National GHG Inventories (2006). In either case, the goal is to guard against becoming locked into a sub-optimal regulatory structure that was appropriate for early demonstration projects, but is not conducive to widespread commercial deployment of CCS.

20. We are cognisant of the need for regulatory stability for financial investors, so we urge that the adaptive regulatory process be structured in a way that balances risk-based management and regulatory predictability.

Long-term management and liability issues

21. No investment can occur before legal operation is assured. Onshore and offshore regulation and guidance must explicitly address CO_2 and associated substances, to remove legal uncertainty. Ownership rights of subsurface pore space and mineral rights affected by CO_2 storage differ between nations, and in the long term should ideally be harmonised across the EU.

22. Pilot projects are the first step needed to take CCS from a technology to a commercial business. Given that most elements of CCS technology are established, managementôs current need is some confidence that investment decisions made now will earn a satisfactory economic rent, that a predictable regulatory framework will apply, and that liability issues will be resolved. Even if CCS is included within EU-ETS, then additional financial incentives or guarantees to limit potential financial loss may be needed to underwrite profitability of todayôs pilot projects.

23. Commercial projects require a stable market price of ú20-25 per tonne of CO_2 (IPCC, 2005, cite $25-30) or equivalent incentive (investors could, for example, benefit from tax breaks). Such financial certainty will be needed to provide investors with encouragement to commercialise CCS technology in the power generation sector where emission reductions are needed most urgently and at the largest scale.

24. The long-term liability and ownership of planned or unplanned CO_2 seepage to the atmosphere needs to be systematically addressed, both for environmental health and safety considerations and to quantify the contractual risk. This difficulty arises first, from the absence of experience with full-scale CCS projects, and second, from uncertainties related to climate governance and carbon markets. How will seepage be charged? Prospectively or retrospectively? To the party generating the CO_2 generation, injecting the CO_2 for storage, or to the government? These decisions will impact industrial organization of CCS and has implications for all actors within the industrial chain, for those who may insure site operators, and for those who take the investment and operational decisions, particularly in jurisdictions which include the concepts of public and directorsôliability.

25. To help government manage risk, the insurance sector could establish mechanisms to manage liability. For industrialised countries, insurers are organisations experienced in arms-length evaluation of technology risk, and could potentially be persuaded to evaluate the long-term viability of storage sites. An advantage of insurance is that medium and small companies, incapable of self-insurance, are enabled to compete in the CCS chain, including storage.

26. Insurers are likely to assess liability from three perspectives: Environmental Impairment Liability Coverage; Directors and Officers Liability; and, anything related to ñimpacts from climate changeò(with this third already emerging as a source of legal action). The first of these is a standard cover provided by the insurance industry. The second is already presenting problems for insurers and insured (in many unrelated fields). The third element presents particular problems for insurers and will require the design of liability regimes which acknowledge the dual role of governments and insurers in creating a risk transfer mechanism.

27. An unhelpful scenario would be that insurers withdraw cover, or more normally, introduce exclusions to cover. That would hinder the ability of small and medium developers and operators to transfer the risk. In such circumstances, commercial CCS would be restricted to very large corporations that were able and willing to self-insure. Governments may find themselves powerless in influencing insurance decisions.

28. As a method of site operation which maintains greater government control, we therefore recommend governance and regulation that enables a transition from a storage site in which operators are liable, with insurers comfortable with their being so, to one in which the long-term responsibility is handed over to a public authority provided that good site performance is predicted, measured and verified, and that the necessary regulatory requirements have been met at the date of transfer from private to public ownership. As stored CO_2 will have a lifetime of many millennia, this seems a prudent way of linking the life of the risk to the life of the entity responsible for it. Indeed, we envisage no private enterprise as willing to take on a risk lasting 1,000 years or more. To transfer liability, say at 20-30 years after site closure, would seem a sensible way to proceed.

29. The knowledge that liability will be transferred could lead to fears amongst the public that CCS is not safe ï perhaps people would assume because of the transfer of liability that it was not. It is therefore essential to mandate good site selection and operating practices, perhaps by requiring operators to post some sort of financial assurance, like a bond, with payments adjustable based on the monitoring of site and operator performance. A portion of these payments could be placed into a central fund that would be used to cover the cost of long-term care once liability has been transferred to the government.

30. Deferring the payback of a bond until the end of the injection period (or, alternatively, the liability period, which may not be the same) would reward operational and safety excellence over the lifetime of the project ï and infer the use of the projectôs lifetime as the period for judging the long-term safety of the site. A small portion of the bond would not be refunded but go into a central fund to cover the cost of long-term care. Such a transfer of responsibilities will also need to account for poor performance. The amount paid into the central care fund could be adjusted to reward well-performing sites (with the assumption that long-term care and costs will be lower) and proportionally increased for poor performing sites. The adjustable contribution rate would incorporate risk based performance metrics, reward strong project management and avoid the moral hazard of having all sites contribute an amount regardless of actual performance.

31. Sanctions and penalties will need to be available and imposed on poor performers.

Communication

32. If a regulatory and financial environment in which CCS can develop safely can be created, there are sufficient arguments to seek public acceptance of the technology and process. Past experience of failures to gain public acceptance of new technologies has hindered their introduction and profitability. We suggest that several key communication needs are addressed:
    - 32.1. To develop and sustain trust in the technology and its safety, primarily through independent educational communications designed to build an informed public opinion
    - 32.2. To position CCS as one of a suite of climate change mitigation measures (including renewable energies, conservation and efficiency initiatives)

32.3. To present CCS as a technology that will be adopted worldwide and which has a potential global benefit

32.4. To assure the public of the environmental integrity and public safety safeguards of the entire CCS process and, particularly, of storage sites

32.5. To distinguish between concerns regarding the impact on the global ecosystem and concerns that are specific to populations near storage sites

32.6. Above all, to consider the impact on public perception of any policy initiative which involves a handover of responsibility and liability for a site; this can increase the public perception of risk and has been a problem for the nuclear industry.

33. We believe it is very important to immediately and transparently inform the public of any event which indicates a problem with CCS; in particular, we feel that any leakage or accident at an early stage in the development of CCS could have a long-term impact on the reputation of CCS, worldwide and such events are managed better by open admission than attempts to limit knowledge of them. Additionally, research efforts focusing on risk mitigation and remediation strategies need to accompany project deployment.

34. Institutions should be structured to avoid informational asymmetries between site operators and regulators as this both adds to risk and increases the possibility of provoking an adverse public reaction.

35. Regulation of CCS by a competent and trustworthy body or agency will be paramount in assuring the public that the technology is deployed with adequate oversight and safeguards. A combination of agencies and different levels of public participation might be involved, depending on the country and the setting. These can emerge after learning from pilot projects.

36. Finally, we advise policy makers to address and resolve the issue of the conflicting messages of, on the one hand, low-price energy being a policy driver and, on the other hand, the expense of mitigating climate change being a social cost that all must bear to some extent. These messages often emanate from different parts of governmental structures, and their contradiction remains an obstacle to full public understanding of how climate change mitigation can be achieved.