# AT: Regulations CP

#### Substantial government investment is key – it’s a pre-requisite to private investment

Insight Economics 11

“Building Essential Infrastructure for Carbon Capture and Storage,” Report to the Global Carbon Capture and Storage Institute, http://cdn.globalccsinstitute.com/sites/default/files/publications/13361/development-carbon-capture-and-storage-infrastructure.pdf

Thirdly, one major issue for potential investors in CO2 pipelines is that substantial economies of scale exist, suggesting that it is desirable for pipelines initially to be oversized relative to current demand. Yet in this industry, which is far from being mature, there are a number of factors that militate against investing in excess capacity, including first mover disadvantage and the existence of some major risks, including the possibility of stranding a substantial part of the asset. In considering the preferred model for securing investment in an efficient pipeline network, the two alternative approaches recently raised in a discussion paper by DECC in the UK are considered. These are the decentralised model — effectively a market-driven approach — and a centralised model under which government plays a more active role. While economists generally favour the first option, largely, it must be said, on the basis of theoretical models, empirical studies undertaken by financial consultants suggest that, in the absence of government support, the private sector would be unwilling to invest in optimally sized pipeline infrastructure. This is partly the result of uncertainty in that CCS technologies are still at the demonstration phase and it is difficult to predict the circumstances in which they will be commercially deployed. This is essentially a timing issue. If and when CCS technologies become commercially attractive, there will be scope to move to a market driven model in the future. We cannot assume such an outcome in any particular timeframe, however, and in the meantime governments will need to play a significant role if investment in the industry is to occur and, particularly important for the purposes of this study, if efficiently sized pipeline infrastructure is to develop. A mixed funding model could involve government subsidies to private providers and could operate under either the decentralised or the centralised approach. Another important issue to be considered is the need for regulation to mandate terms and conditions for third party access to CO2 pipelines and storage infrastructure. Under the ‘new’ competition policy that has been developed in many countries over the past two decades, natural monopolies are often regulated so as to provide services to third parties on a basis that attempts to mimic what would have occurred under a theoretical competitive outcome. Because of the availability of economies of scale in CO2 pipelines, there are probably good grounds for classifying them as natural monopolies. In this context the EU Directive on CCS, issued in 2009, requires member countries to establish regulated third party access regimes for CO2 pipeline infrastructure and storage facilities. Whether or not storage sites constitute natural monopolies, however, is somewhat less clear. Much of the analysis underlying this approach is based on an analogy between natural gas and CO2 pipelines. Such a comparison, however, appears to be somewhat tenuous. Natural gas is a valuable commodity subject to intense competition between suppliers in wholesale and retail markets so that ownership and exclusive use of a pipeline could provide one player with a considerable competitive advantage. By contrast, with the minor exceptions of where it is used for EOR and to produce carbonated drinks, CO2 is a by-product that has no commercial value and is being transported solely for disposal although, with the introduction of a carbon price, the disposal of CO2 has a commercial value. In addition, while owners of gas pipelines may oversize them for their own use so as to give them a competitive advantage over rivals in an expanding market, CO2 pipelines in general transport a stable and consistent flow of carbon dioxide. Given the fact that CO2 has no value, together with the current state of the industry and the fact that, particularly in electricity generation, CCS will be subject to considerable competitive pressure from other technologies, it is questionable whether any significant benefit would accrue to an owner of CO2 infrastructure by denying access on reasonable terms to other players who may seek it. On the contrary, additional usage will reduce costs for every user including the owner. Investment in CO2 storage sites is currently impeded by issues concerning property rights and liability. They are often compared to waste disposal facilities. It is questionable whether they are natural monopolies or whether the public interest would be served by regulating access to them. In particular instances they may have a monopolistic position, however, in which case they would be subject to the provisions of regular competition (anti-trust) law. Conclusions This report has been prepared under the circumstances where the commercial viability of CCS has yet to be proven at a large scale. These conclusions reflect the fact that it is an infant industry. In part this is a timing issue. If and when the industry becomes commercial, with vigorous competition occurring between a number of players, then a stronger framework of economic regulation may be required. At this stage, however, the public interest case, in our view, is not proven and there is a possibility that mandatory third party access regulation of the nature of that employed for gas pipelines could discourage investment in this nascent industry. Community acceptance of the transport and storage of CO2 will be essential if the CCS industry is to meet its future potential. Government will have an important role to play in facilitating this, not just by providing information but also by working with the industry to develop a set of robust technical standards for CO2 pipelines. One approach to standard setting would be for an international agency to develop a recommended set of engineering protocols for CO2 pipelines which could then be examined by individual governments in consultation with industry and applied or modified as necessary. In evaluating the decentralised as opposed to the centralised model for facilitating the construction of an efficient network of CO2 pipelines, it is very difficult, at this stage of CCS development, to determine appropriate policy in what will be the large scale deployment stage of carbon capture and storage facilities in the future. This is because the technologies have yet to be successfully demonstrated commercially at scale. If the technologies are demonstrated to be commercially successful and if the necessary condition of an appropriate level of carbon prices is established then, in theory at least, there would seem to be little reason why the private sector would not invest in deploying CCS, including in the necessary pipeline infrastructure and storage facilities. On the other hand, there may well be ongoing risks and uncertainties for potential investors in CCS infrastructure. Indeed, while many of these will have been reduced by the end of the demonstration phase, it is unlikely that all of the risks and uncertainties will have been substantially reduced. Understanding these risks and uncertainties is particularly important in terms of setting the policy environment for building the future pipeline network that will be required for the large scale deployment of CCS. Financial analysis suggests that the private sector would be understandably unwilling to invest in the currently oversized pipelines that would provide more efficient transport in the longer term. A reasonable question then is why should taxpayers take on this risk if private investors will not? One answer is that there may well be public benefits in reducing the costs of CCS transportation, in terms perhaps of electricity prices and the carbon price being lower than otherwise, together with any social benefits that accrue from having a wider portfolio of emissions reduction technologies than may otherwise be the case. The conclusion from this analysis is that, at this stage at least, governments will probably need to play an important role in facilitating investment in CCS infrastructure for the foreseeable future. This may involve subsidising the construction of efficiently sized CO2 pipelines. Another option is for governments to develop CCS infrastructure itself and then sell it to the private sector when the risks are better understood and the uncertainties have been substantially reduced. Of these two options, the mixed funding approach has the advantage that it will be driven to a greater extent by market forces and could operate in the context of a decentralised approach.

#### **Government funding key to security and optimal construction**

Chrysostomidis et al. 9 – Ioannis Chrysostomidis and Paul Zakkour, Environemtal Resources Management; Mark Bohm and Eric Beynon, Suncor Energy; Renato de Filippo, Eni SpA; Arthur Lee, Chevron Corporation (“Assessing issues of financing a CO2 transportation pipeline infrastructure” Energy Procedia Volume 1, Issue 1, Pages 1625–1632, February 2009, http://www.sciencedirect.com.proxy.lib.umich.edu/science/article/pii/S1876610209002148)//MR

¶ **Government funding can enable the project to operate commercially at a comparative cost of service** (~8$t/CO2)¶ to Option 1 even when Tranches 2, 3 and 4 are not realised (i.e. see Figure 4.4 at 40% capacity utilisation). In this¶ sense, **governments through favorable financing** or other types of support **can provide security to first mover over**¶ **future capacity up-take and mitigate risks in order to promote optimised deployment options for** a **CCS** scenario¶ such as the one modelled.

#### Federal funding key to investor confidence—*jump-starts* the private industry

Klass and Wilson 8 - \*Professor of Law @ Minnesota, \*\*Professor of Public Policy @ Minnesota

Alexandra and Elizabeth, “CLIMATE CHANGE AND CARBON SEQUESTRATION: ASSESSING A LIABILITY REGIME FOR LONG-TERM STORAGE OF CARBON DIOXIDE,” http://www.law.emory.edu/fileadmin/journals/elj/58/58.1/Klass\_Wilson.pdf

What is unique about CCS, however, is the scale of projects and necessary deployment. A lowered liability cap within a strict liability **federal** fund for the first dozen or so full-sized CCS projects could help industry to gain the **confidence and experience** for the transition to a full commercial CCS deployment. Such a cap would let first movers manage the financial risk of new CCS technologies and serve to more rapidly transition from demonstration projects to commercial deployment. Although claimants could still resort to tort or environmental law to obtain compensation for those claims not covered by the strict liability fund, if the total fund amounts are high enough, and the in-fund liability caps low enough, this may help encourage operator development of initial projects. Care should be taken, however, to ensure that such a cap does not become permanent as—in addition to removing normal incentives for responsible operator behavior—it may create a negative public backlash toward CCS, which may adversely affect future project siting.

#### Public funding key to catalyze the private sector

Posner 10 – Global Director of Energy, The Climate Group (Rupert, “Carbon Capture

 and Storage: Mobilising Private Sector Finance” The Climate Group, Ecofin, and the Global CCS Institute, September 20 2010 http://www.theclimategroup.org/\_assets/files/CCS-report.pdf)//MR

**In the current stage, where CCS plants are yet to be**¶ **demonstrated at scale, projects will** most likely **have to be**¶ **funded** almost **exclusively by public sources. Public funding**¶ **will** likely **need to cover both the upfront capital costs**¶ **and also the long-term fuel inefficiencies** created by CCS.¶ **As the amount of private sector capital that is available**¶ **to follow that public funding is limited, public funding**¶ **should be focused on a few projects** instead of the current¶ trend of being spread across a suite of technologies and¶ locations. **Once the first plants are up and running, there**¶ **should be little difficulty in attracting large scale private**¶ **sector funding for other CCS plants.**

#### Funding key – private sector won't do it without government incentives

Stephens 9

[Jennie, Energy Technology Innovation Policy, Harvard Kennedy School, Heleen de Coninck, Energy research Centre of the Netherlands, Bert Metz, European Climate Foundation, "Global Learning on Carbon Capture and Storage: A Call for Strong International Cooperation on CCS Demonstration," 2009, http://live.belfercenter.org/files/de\_Coninck%20Stephens%20%20Metz\_January%2030\_final.pdf]//SH

**A lack of funding** for the large scale demonstration of technologies **is a well-recognized problem in technology innovation. After a successful R&D phase, public funding is often reduced, while private funding for application of the technology is still seen as** uneconomical or **too risky. The cash flow for the new technology dries up, and the ensuing “valley of death” looms** (Murphy and Edwards, 2003). **This pattern of difficulty at the demonstration phase can be identified in many technologies, but is particularly pronounced in large-scale, capital intensive technologies such as CCS.**

#### Private investors are hesitant to invest in pipeline infrastructure absent federal support

Insight Economics 11 (“Development of Carbon Capture and Storage Infrastructure” 4.4 Role for Government, Global CCS Institute, March 21 2011, http://www.globalccsinstitute.com/publications/development-carbon-capture-and-storage-infrastructure/online/39031)//MR

**Understanding these risks and uncertainties is** particularly **important in** terms of **setting the policy environment for** building **the future pipeline network** that will be required **for the large scale deployment of CCS.** Financial analysis suggests that **the private sector would be** understandably **unwilling to invest in the currently oversized pipelines that would provide more efficient transport in the longer term.** A reasonable question then is why should taxpayers take on this risk if private investors will not? One answer is that **there may** well **be public benefits in reducing the costs of CCS transportation, in terms** perhaps **of electricity prices and** the **carbon price being lower** than otherwise, **together with** any social **benefits** that accrue **from** having **a wider portfolio of emissions reduction technologies** than may otherwise be the case.¶ The conclusion from this analysis is that**, at this stage** at least, **governments will** probably **need to play an important role in facilitating investment in CCS infrastructure** via the mixed funding model. **This may involve subsidising the construction of** efficiently sized **CO2 pipelines. Another option is for governments to construct CCS infrastructure itself and then sell it to the private sector** when the risks are better understood and the uncertainties have been substantially reduced.