Chiara Trabucchi

Principal, Industrial Economics Incorporated

Testimony

Before the

Committee on Energy and Natural Resources

United States Senate

Hearing on

Senate Bill 699, Department of Energy Carbon Capture and Sequestration Program Amendments Act of 2011

May 12, 2011

Summary
Chiara Trabucchi (Principal, Industrial Economics Incorporated)
Testimony before Senate Committee on Energy and Natural Resources

May 12, 2011

Firms seeking investment capital to finance business ventures, including CCS, must demonstrate the ability to assume and manage risks inherent to the venture. By doing so, the firm is able to assure investors, whether private or public, that the value of their investment will not erode, and with time, will gain value. In the case of CCS, the very long time horizon and the use of taxpayer dollars demands a financial assurance structure that adequately protects the private and public investor.

To be effective, a financial assurance structure that implements private – public risk sharing should achieve four clear goals: (1) Ensure funds are adequate, when needed; (2) Ensure these funds are readily accessible, when needed; (3) Establish minimum standards for financial institutions providing funds or underwriting risk; and (4) Ensure continuity of financial assurances, when ownership of sites is transferred.

The long-term indemnity model proposed in Senate Bill 699 is a notable step forward in achieving these goals, and appropriately limits indemnification to certain types of damages. To the extent that Senate Bill 699 is designed to establish a financial management structure that ensures sufficient resources are available to pay for long-term stewardship at the time ownership of the demonstration projects is transferred, then, in my view, the following elements of the Bill would benefit from additional clarification:

1. In the section addressing Collection of Fees and the use of Net Present Value analysis, the amount of fees assessed and collected should be based on the Net Present Value of probable damages arising from each demonstration project. Damages associated with CCS projects are a function of site location and plant design; the analytic tools exist to estimate dollar values for potential damages and are routinely used by firms expert in financial and natural resource economics.

2. This section also should require the design of an adjustable fee structure, whereby the CCS developer pays a risk-adjusted, site-specific fee that is reassessed as actual site-specific monitoring, measuring and verification data become available.

3. Consistent with basing fees on a Net Present Value analysis, the fees collected should be invested in a dedicated, interest-bearing account that generates a rate of return at least equal to the risk-adjusted discount rate underpinning the Net Present Value calculation. In the absence of doing so, the fees collected may not yield sufficient revenue to avoid an inter-generational transfer of costs to future tax payers.

4. Given the experimental nature of CCS and its limited commercial application, insufficient information may exist about the risk profiles of the candidate demonstration projects to design a site-specific fee structure, today, that appropriately adjusts for risk and uncertainty over the long-term. Pending the availability of such information, establishing a dollar-denominated amount of indemnification for a discrete number of early-mover, demonstration projects may be appropriate.

   Over the long term, I caution against establishing an arbitrary limit of absolute dollar liability. Rather, the amount of indemnification should be correlated to the pooled value of probable loss

associated with the specific CCS demonstration projects subject to cooperative agreements under the Bill.

5. In the section addressing the amount of indemnification, the language should state clearly that indemnification is applicable only to CCS-related activities; a business entity (or 'person') underwriting a CCS project should not be allowed to package its operating activities in such a way as to yield an inappropriate risk transfer of pre-existing, non-CCS related liabilities to the public.

In my view, clarifying the language of Senate Bill 699 as I have suggested will help ensure continuity of financial assurances and provide a measure of certainty with respect to the long-term stewardship of CCS sites in a manner cognizant of, and consistent with, potential risks to the public. In so doing, Senate Bill 699 will send a positive signal to private capital markets seeking to invest in CCS technology.

Testimony of Chiara Trabucchi

Principal, Industrial Economics Incorporated

Thank you for the opportunity to testify in today's legislative hearing on Senate Bill 699, Department of Energy Carbon Capture and Sequestration Program Amendments Act of 2011. I am a Principal with, and the Chief Financial Officer of, Industrial Economics Incorporated in Cambridge, Massachusetts. My expertise is in finance and economics, with specific focus on financial assurance frameworks and financial indemnity models. Founded in 1981, Industrial Economics is a privately-owned professional services firm expert in the areas of financial and natural resource economics. The clients of the firm span the public and private sectors.

The focus of my testimony is on the financial management and indemnification framework proposed by Senate Bill 699. Below, I offer my overall assessment of Senate Bill 699, I highlight areas of the Bill with which I agree, and offer suggestions for consideration by the Committee. These suggestions are based on the language proposed in Senate Bill 699, and the Bill's intended objective of fostering early-mover deployment of no more than 10 Carbon Capture and Sequestration (herinafter CCS) demonstration projects.

The sections that follow map to the provisions proposed by Senate Bill 699. Where appropriate, I highlight elements of the proposed language that are well designed; and I offer suggestions where the language of Senate Bill 699 might be clarified or improved.

Overview. The Importance of Financial Responsibility

Firms seeking investment capital to finance business ventures must demonstrate the ability to assume and manage risks inherent to the venture. By doing so, the firm is able to assure investors,

whether private or public, that the value of their investment will not erode, and with time, will gain value. Under traditional financing models, investors require that risks be bounded, quantified and accounted for either directly as an expense, or indirectly through third-party financial instruments (letters of credit, surety bonds, insurance, to name a few).

CCS processes create a suite of risks, including possible injury to private and public sector interests, e.g., possible injury to natural resources, bodily injury and/or property damage. Traditional financing models presume that the project developer is an active business entity capable of setting aside funds today to pay for future obligations related to these risks. However, the objective of CCS is to store CO_2 in perpetuity, i.e., a period of time that transcends the typical business life cycle of many corporate endeavors. To the degree risks arising from CCS ventures continue beyond the operational life of the project, and in the event the CCS developer is no longer a going concern, prudent risk management dictates consideration of who will finance the obligations arising from these risks.

The use of taxpayer dollars and the very long time horizon associated with CCS – one which may extend beyond the natural life of the corporate entity undertaking the demonstration project – demands a financial management solution that blends the strengths of private and public risk sharing. To be effective, a financial assurance structure that implements a private – public risk sharing should achieve four clear goals:

(1) Ensure funds are adequate, when needed;
(2) Ensure these funds are readily accessible, when needed;
(3) Establish minimum standards for financial institutions providing funds or underwriting risk; and
(4) Ensure continuity of financial assurances, when ownership of sites is transferred.

To the degree society wishes to reduce greenhouse gas emissions, and the portfolio of emission reduction technologies includes CCS, then an effective financial assurance and indemnification framework will balance the four above-listed goals with needed incentives to foster the safe deployment of a limited number of early mover, demonstration projects.

If modified as I suggest below, the design of the financial assurance framework and the implementation of private – public risk sharing as proposed in Senate Bill 699 should provide a measure of financial and legal certainty with respect to the long term stewardship of CCS sites in a manner cognizant of, and consistent with, potential risks to the public. In so doing, Senate Bill 699 sends a positive signal to private capital markets seeking to invest in CCS projects.

Project Selection Criteria

In my view, the science-based criteria and provisions for project selection as proposed by Senate Bill 699 are necessary but not sufficient to underpin the financial management structure defined in later sections of the Bill. Additional provisions requiring the explicit evaluation of potential human health and environmental impacts from a financial perspective – deriving expected and maximum loss values with a clear understanding of the statistical range of possible outcomes – are needed for each proposed demonstration project.

The outputs of these evaluations will achieve three objectives.

First, they will help the implementing agency assess competitive bids for demonstration projects, and make an informed decision as to the potential financial risk posed by each demonstration project.

Second, they will provide an appropriate basis to calculate the amount of financial assurance that should be set aside by the individual CCS developer during the operating lifecycle of the CCS project, and for a defined period post-injection.

Third, to the degree the Secretary agrees to indemnify recipients of cooperative agreements for CCS demonstration projects, they will inform the amount of indemnification that is warranted.

Terms and Conditions (Financial Assurance)

In my view, as proposed by Senate Bill 699, the CCS developer should remain financially responsible for events that occur during the operating lifecycle of the CCS project, and for a defined period post-injection. Specifically, financial assurances should be secured and maintained by the developer of the CCS demonstration project until such time as title to the site is transferred and accepted by the implementing Federal agency. In this way, the Bill provides incentives for CCS developers to properly operate and maintain their sites, limiting the potential for future damages. Firms are more likely to undertake design and operating decisions that minimize environmental (and remediation) costs, if they are held financially accountable.

Further, maximum flexibility should be afforded to developers of the early mover demonstration projects in selecting the financial instruments that may be used, including but not limited to trust funds, letters of credit, surety bonds, insurance, and self-insurance through a corporate financial test or corporate guarantee, or any combination thereof. The array of acceptable financial instruments must ensure that funds are adequate if and when needed, and readily accessible to pay for delineated activities. For this reason, minimum standards are necessary for financial institutions securing funds or underwriting CCS risks.

Indemnification Agreements

Exception for Gross Negligence and Intentional Misconduct

In my opinion, Senate Bill 699 appropriately limits indemnification to certain types of damages. The exception provided in Senate Bill 699 for gross negligence and intentional misconduct is important, particularly as it relates to fraud and misrepresentation of site (monitoring, measuring and verification) data. The importance of this exception can not be overemphasized, because these data likely will be used to underpin financial assurances, fee calculations and indemnification amounts.

Collection of Fees

I believe it is appropriate to assess and collect fees from the CCS developer to finance the cost of long-term stewardship. In my view, the language proposed by Senate Bill 699 should be clarified to ensure that the amount of fees collected is not arbitrary or based on a fixed rate for all sites. Establishing a blanket fixed fee to be paid by all CCS developers regardless of their individual site characteristics, operational methods and potential for consequences results in an inefficient use of available resources which otherwise could be invested for productive economic purposes. From a financial perspective, establishing a fixed rate of financial assurance that is paid by all CCS developers results in some developers paying more, and others less, than their fair share, because of differences in site attributes. Further, without strong oversight regarding site selection and fund management, and a clear process by which the amount of fees collected are periodically evaluated against the risk profiles of pooled sites, there is no reason to believe that the amount of funds collected will map to the actual financial resources needed to address long-term care expenses and delimited compensatory damages.

If the intent of Senate Bill 699 is to ensure a fee structure whereby the CCS developer pays a risk-adjusted, site-specific fee, then additional clarifying language in the section of the Bill that addresses the criteria for determining the amount of the fee to be collected is prudent. In my opinion, this fee should be based on the Net Present Value of the future expected losses for each individual demonstration project. Specifically, damages associated with CCS projects are a function of location and plant design (including fuel source and technology), and therefore probable loss scenarios can be derived from each project's site characterization and risk assessment plans. These analyses provide an indication of 'how bad it could get' if an adverse event related to a CCS project were to occur, as well as a measure of the expected amount of funds required for remediation and to compensate for harm or injury, taking into account the probability of an event arising.

The amount of money collected from each CCS developer should directly correlate to the funds needed for long-term stewardship once ownership of their specific site is transferred. A 'one-size-fits-all' approach will result in perverse financial incentives, whereby poorly designed, sited and operated sites may be allowed to proceed without 'paying' for their share of prospective risk; allowing exclusions for a subset of sites will exacerbate these incentives, contributing to market distortions and the potential for moral hazard.

The use of Net Present Value analysis is accepted practice for funds management within the financial community; in addition, the analytic tools exist to estimate the expected range of dollar values for potential damages on a site-specific basis. Similar tools are used by: (1) firms, such as insurers, in the risk management industry; (2) firms in the financial sector; and (3) firms with expertise in human health and natural resource economics.

Additional clarifying language is warranted with respect to the timing of when such fees will be paid by the CCS developer. To ensure continuity of financial assurance during active site injection, post-

injection, and through long-term stewardship, the amount of fees collected from the CCS developer should be established either as an up-front payment or as a payment over time during the operating lifecycle – the period of active injection – of the demonstration project. If the intent of Senate Bill 699 is not to delay the collection of fees until the end of the project, when there is the danger that the CCS developer may not have the resources available to pay the fees, or until an event or claim arises, then the language of the Bill should clearly state this. Provisions should be made at the outset of the demonstration project for the possibility of future bankruptcy or financial distress of the developer of the CCS demonstration project.

As the provisions proposed by Senate Bill 699 relate to a limited number of demonstration projects, and the public is assuming a measure of financial risk, the fees should be reassessed as information about the risk profiles become available. Practical reality should inform the application of financial theory. For example, if actual site monitoring, measuring and verification data demonstrate a declining risk profile and a reduced dollar value of future expected loss, the Net Present Value calculation underpinning the fee collection should be adjusted to reflect this situation, and the CCS developer should pay less in fees. Overfunding a long-term financial structure benefits neither the private sector nor the public sector. However, the inverse is also true – if monitoring, measuring and verification data suggest an increasing risk profile – the fees assessed should reflect the incremental increase in potential harm that may arise from the occurrence of an adverse event.

Establishing an adjustable fee structure that is based on the results of actual monitoring, measuring and verification data ensures that the CCS developer is rewarded for design and operating decisions that minimize future risk, and by extension future loss. Further, underpinning the financial management structure proposed by Senate Bill 699 with an adjustable fee structure that reflects the evolution of site risks over time ensures that the financial instruments used for purposes of financial assurance can be scaled up or down in response to site-specific differences.

Analyses underpinning the Net Present Value calculation proposed by Senate Bill 699, and the determination of how much to collect in fees, should be developed prior to entering into an indemnification agreement. These analyses should be transparent, identifying key assumptions regarding the timing of probable payments and an appropriate risk-adjusted discount rate. The public should know what it is financing, especially if there is the expectation that these fees will be passed through to end consumers in the form of increased energy rates. Further, to the degree other projects (beyond the early mover demonstration projects) come on-line, the data generated as part of these early mover efforts should inform the financial assurances and design of financial management strategies for long-term stewardship of subsequent projects.

Use of Fees (Net Present Value and the Importance of Funds Management)

In my view, the use of Net Present Value analysis as proposed in Senate Bill 699 is effective only if the money that is collected is set aside in a dedicated, interest-bearing account that generates a rate of return at least equal to the risk-adjusted discount rate underpinning the Net Present Value calculation. In the absence of doing so, the fees collected may not yield sufficient revenue to avoid an inter-generational transfer of costs to future tax payers.

The portion of funds collected that is not required to meet annual withdrawals should be invested in interest-bearing obligations of the United States.[1] Other long-term liability and federal indemnity models, including the Hazardous Substances Superfund,[2] the Oil Spill Liability Trust Fund,[3] and the

[1] 26 U.S.C. 9602
[2] See Comprehensive Environmental Response, Compensation, and Liability Act § 221, 42 U.S.C. 9631 (2007), Superfund Amendments and Reauthorization Act § 517, 42 U.S.C. 9601(11) (2006), 26 U.S.C. 9507 (Hazardous Substance Superfund).
[3] See Oil Pollution Act § 1001(11), 33 U.S.C. 2701(11) (2007). 26 U.S.C. 9509 (Oil Spill Liability Trust Fund).

Harbor Maintenance Trust Fund,[4] to name a few, adopt a similar investment strategy. Further, the Secretary of the Treasury should rely on the implementing agency, as established by Senate Bill 699, to provide information on the annual funding needs of the program, either as it may relate to the payment of claims following acceptance of title to the CCS demonstration project, or for purposes of long-term monitoring activities.

Ensuring that the language of Senate Bill 699 clearly articulates the intent of Congress in assessing, collecting and using fees from the developers of CCS demonstration projects will help to avoid future litigation over how much should have been collected in fees, how much was collected in fees, and what happened to the fees that were collected.

Contracts in Advance of Appropriations – Limitation.

I am persuaded that investing in a limited number of CCS demonstration projects through a public financial assistance program is prudent. In my view, the financial management and indemnification framework as set forth in Senate Bill 699 provide a measure of financial and legal certainty with respect to long term stewardship of CCS sites in a manner cognizant of, and consistent with, potential risks to the public. In so doing, Senate Bill 699 sends a positive signal to private capital markets seeking to invest in CCS projects.

All else being equal, site-specific, risk-based pricing is predicated on the premise that the amount of funds collected over the life of the CCS project equals the amount of funds necessary to hedge financial obligations arising from project risks in the long-term. This is particularly true if the fees are regularly adjusted to reflect evolutions in the project's risk profile over time. However, given the

[4] See Act of May 13, 1954 (commonly referred to as the "St. Lawrence Seaway Act") § 13(a), 33 U.S.C. 988(a). Water Resources Development Act § 210(a), 33 U.S.C. 2238(a) (2007). 26 U.S.C. 9505 (Harbor Maintenance Trust Fund).

experimental nature of CCS and its limited commercial application, insufficient information may exist about the risk profiles of the individual demonstration projects to design a site-specific fee structure, today, that appropriately adjusts for risk and uncertainty over the long-term. Therefore, pending the availability of such information, establishing a dollar-delimited limitation of liability for a discrete number of early mover, demonstration projects may be appropriate.

However, over the long term, any limitation of liability (i.e., dollar-denominated amount of indemnification) should not be arbitrary in design. Establishing an arbitrary limitation of liability contributes to unreasonable expectations and fosters misunderstanding with respect to the amount and timing of funds necessary for the responsible deployment of CCS. Perhaps more importantly, arbitrary limits of absolute dollar liability can result in moral hazard arising, because the CCS developer believes itself insulated from risk, and therefore may act less prudently with respect to how it sites and operates its project. Rather, the amount of indemnification should be correlated to the pooled value of probable loss associated with the specific CCS demonstration projects subject to cooperative agreements under the Bill.

As the provisions proposed by Senate Bill 699 relate to a limited number of demonstration projects, and the public is assuming a measure of financial risk, the amount of indemnification should be reassessed as information about the risk profiles of the CCS demonstration projects becomes available. Finally, if the intent of Senate Bill 699 is to provide financial certainty with respect to long term stewardship, then additional clarifying language in the section of the Bill that addresses limitations of liability is warranted.

First, with respect to the amount of indemnification proposed by the Bill, the language in this subsection should apply only to CCS-related activities underpinning each demonstration project subject to cooperative agreement. Blanket indemnification should not be provided to 'all persons indemnified in connection with an agreement' irrespective of activity. In the absence of

clearly delineating that the amount of indemnification is applicable only to CCS-related activities, a business entity (or 'person') underwriting a CCS project could package its operating activities in such a way as to yield an inappropriate risk transfer of pre-existing, non-CCS related liabilities to the public.

Second, as written, the Bill leaves open to interpretation whether the $10 billion amount of indemnification applies to the collective pool of CCS demonstration projects, or whether each CCS demonstration project is subject to an individual amount of indemnification equal to $1 billion per project. In my view, of the two options, the more effective means of protecting the public against financial risks associated with the early-mover CCS demonstration projects over the long-term would be to apply the amount of indemnification to the collective pool. Notwithstanding, if the intent of Senate Bill 699 is to establish per project indemnification, then additional clarifying language is warranted to address what happens if a single CCS demonstration project exceeds its per project limit of liability.

Federal Land

The same financial and legal provisions, with respect to financial assurances and indemnification, should exist regardless of whether the CCS demonstration project is sited on private lands, public lands or tribal lands. The failure to establish the same financial provisions for demonstration projects sited on public or tribal lands as for those sited on private lands may result in: (1) poor operating decisions and lack of appropriate site selection, because the project developer is not held financially accountable for its business decisions; and/or (2) provide an unintended subsidy or competitive market advantage to developers of demonstration projects on public or tribal lands.

Conclusion

The use of tax payer dollars and the very long time horizon associated with CCS – one which may extend beyond the natural life of the corporate entity undertaking the demonstration project – demands a financial assurance structure that blends the strengths of private and public financing and risk management tools. In my view, a financial assurance structure that successfully implements private – public risk sharing should achieve four clear goals:

(1) Ensure funds are adequate, when needed;
(2) Ensure these funds are readily accessible, when needed;
(3) Establish minimum standards for financial institutions providing funds or underwriting risk; and
(4) Ensure continuity of financial assurances, when ownership of sites is transferred.

To the degree society wishes to reduce greenhouse gas emissions, and the portfolio of emission reduction technologies includes CCS, then an effective financial assurance and indemnification framework will balance the above-listed goals with needed incentives to foster the safe deployment of a limited number of early mover, demonstration projects. The long-term indemnity model proposed in Senate Bill 699 is a step forward in accomplishing this objective.

However, if the intent of Senate Bill 699 is also to establish a financial assurance structure that ensures sufficient funds are available to pay for long-term stewardship at the time ownership of the demonstration projects is transferred, then the Bill would benefit from the modifications that I outline above. Finally, ensuring that the language of Senate Bill 699 clearly articulates the intent of Congress in assessing, collecting and using fees from the developers of CCS demonstration projects will help to avoid future litigation.