Barry K. Worthington
Executive Director
United States Energy Association

To the

Carbon Sequestration Leadership Forum
Roundtable Dialogue: How to Make CCS Work
Market Incentive Roundtable
Cape Town, South Africa

April 15, 2008

Remarks

Good morning ladies and gentlemen. Let me first congratulate our hosts for organizing an outstanding series of meetings this week in Cape Town. The Department of Minerals and Energy of the Republic of South Africa was present as a founding member of the Carbon Sequestration Leadership Forum (CSLF) five years ago at the Organizing Ministerial meeting in Washington, DC in 2003. Their active participation and support for CSLF is evident in their outstanding arrangements that have made our work more productive today.

This is only my second visit to the beautiful city of Cape Town. My first was in 1994 when South Africa hosted the Annual Executive Assembly of the World Energy Council. This became a historic meeting when Barbara McKee, whom you all know as the CSLF Secretariat Director, became the first black female to address the World Energy Council in its then 70 year history. As we think of how much this world will change over the next 15 to 25 years, let's remember how much the world has changed in the last 15 to 25 years.

On the flight from Washington, I finished a new book "Jacked Up" written by Bill Lane, who for twenty years or so wrote speeches for the legendary GE CEO, Jack Welch, as well as other GE officers. Lane strongly recommended that you never begin a presentation with a joke, hence, please note what I am about to say is simply an illustration, not a joke.

The story I heard on a church program this weekend is centered in the student cafeteria of a Catholic school – I suppose it could be any school, anywhere in the world. At the front of the cafeteria line is a basket of apples. A note from one of the nuns said "only take one – God is watching." At the end of the cafeteria line was a platter of cookies. One of the students wrote a note that said "Take as many as you want, God is busy watching the apples."

This story is more relevant to the issue at hand than immediately apparent. USEA has supported the Wall Street Green Trading Summit in New York City for the last seven years. Let me tell you, while you have focused on technology development, the apples if you will – the global financial community has been focusing on the money – the cookies.

Last month, the New York Mercantile Exchange (NYMEX), perhaps the world's leading commodity exchange, launched "The Green Exchange." The Green Exchange serves as a platform to trade a variety

of "green" instruments. Believe me, they are prepared to launch trading in CO_2 credits as soon as the U.S. government adopts a cap and trade regime. NYMEX support and backing will bring liquidity, credibility, accountability and certainly the ability to be audited to a new market currently under suspicion in some quarters.

This panel's topic "Market Incentives" must be recognized in the context that no "pure" market for carbon capture and storage exists because CO_2, on the scale required, does not represent a real market. Carbon dioxide is and will be an "artificial" commodity and commodity market as currently envisioned.

No market has ever existed like this before. Nothing at the scale envisioned is similar to the U.S. sulfur dioxide market or the use of CO_2 for enhanced oil recovery. And a fundamental question exists – who pays – is it the citizens/tax payers/ consumers? Or are these all the same people? I understand yesterday's session addressing this issue did not resolve this question because no one yet can prescribe the solution.

In looking at market incentives to encourage CCS – let me say we are talking about large scale commercial deployment by private sector investors – not government funded demonstration projects. At this point you have to assume that the legal/regulatory framework is clear; liability issues have been resolved and technical details in scaling up projects are settled.

We then need to understand how carbon value creation occurs. In looking at the options, please recognize that any carbon constraint regime must be practical, effective and politically viable.

Some options which have been identified include:

- Carbon taxes
- Cap and trade strategies
- Greenhouse gas reduction mandates
- Enhanced oil recovery
- Algae/biomass production
- New products: construction materials, etc.
- Deployment of no carbon/low carbon technologies

Observing what has been done with renewable energy incentives is instructive. Examples include:

- Production tax credits
- Investment tax credits
- Accelerated depreciation
- Feed in tariffs
- Loan and grants programs

Other non-market options relative to carbon capture and storage are:

- Mandates – portfolio standards similar to renewable portfolio standards where a certain amount of no-carbon/low carbon sources would be mandated;

- Classify CO_2 as a hazardous waste, which is a terrible idea. CO_2 is not similar to any hazardous waste and while this option is identified, it should be rejected as nonsense;

- An International Investment Fund to support deployment of clean energy technology. This has conceptionally been proposed by the Bush Administration although details will need to be defined;

- Modify the "Clean Development Mechanism," – no CDM projects have included CCS – a modification that should be easy to accomplish if CO_2 reductions are to be taken seriously;

- Customer choice programs – similar to how some consumers can select to have their electricity from renewable sources or how E-85 is available at some gasoline retailers (E-85 is a blend of 85% ethanol and 15% gasoline.);

- Government funded training programs – the world needs welders as well as engineers and pressure will be on the availability of skilled craft labor. Welders are critical at every stage of CCS projects as are other skilled craftsmen.

In looking at how to encourage and apply these policies to the power sector, it is critical to consider the differences between competitive and regulated generation markets. CCS projects in competitive power markets will be primarily (perhaps exclusively) capitalized using project finance strategies. Key questions will include the quality and stability of cash flow; the stability of credit markets; tax treatment and the predictability of future tax treatment and, of course, price competitiveness.

A coal plant equipped with CCS that cannot meet the price break will not get dispatched and will be idled. This market reality in competitive markets is illustrative of the need for incentives to lower wholesale prices to a competitive level with other sources of generation competing within that same market.

Carbon capture and storage projects will face all the risks of other projects. Developers will be driven to reduce these risks, which include:

- Technology Risk
- Construction Risk
- Operational Risk
- Security/Safety Risk
- Finance/Cash Flow Risk
- Regulatory Risk
- Currency Risk (for international transactions)
- Market Risk

And most importantly • Political risk

Political risk cannot be overly stressed. The need for CCS is only driven by the political mandate to reduce greenhouse gas emissions. It is an artificial market, created by government policies. Other than the relatively small usefulness for enhanced oil recovery, no natural reason exists to store carbon dioxide. Long-term investors and credit rating agencies will ask themselves if government policies could change over decades. "What-ifs" will be pondered – What if the cost of CCS is dramatically higher than now expected? What if public acceptance of CCS does not materialize and in fact, existing support diminishes, perhaps due to an unpredictable, unexpected release of $C0_2$?. What if power prices increase dramatically and/or what if we have 5 to 10 very cold winters in a row? – And, what if several of these occur simultaneously? Will speculators ask these questions? Maybe not. Will long-term investors, the

rating agencies and the bond markets? Of course! When have these entities not asked hard questions about any investment?

Long-term investments such as in CCS – 50 to 100 year time horizons, are relatively unknown in conventional industrial applications. Some dams and bridges last 100 years, but most were not designed with this expectation. Carbon storage projects may have to last multiple hundreds of years.

Changing political pressures can render these projects unnecessary or under-utilized before capital investments are recovered. Hence, project developers will weigh the stability of political risk more heavily than for projects with shorter life spans.

Regulated power markets must meet certain regulatory principles, such as being "used and useful," "least-cost," particularly relative to efficiency, conservation and renewables in some jurisdictions; and able to demonstrate clear consumer benefits. A related issue in jurisdictions that utilize "rate-based" treatment of investments in establishing returns on investments is where along the CCS process does the regulated generators' role (and investment) end and the service providers' begin. In other words, will the regulatory commission require certain functions to be outsourced with corresponding responsibility and liability for these investments?

One other significant aspect in regulated markets will be determining whether shareholders or consumers gain or lose from either profits or losses from carbon trading; hedging and participating in carbon futures markets.

Rising energy prices risk provoking a consumer backlash that can often lead to politicizing issues. Prices of energy in all forms have been increasing and CCS is certain to add to future price increases. Expectations of widespread deployment and acquisition of technological experience from those demonstration projects and early deployment may reduce some risk and lead to lower borrowing costs.

However, increasing demand for iron, steel, aluminum, cement, chemicals and skilled labor through widespread CCS deployment may contribute to increased commodity prices. Predictions of cost reductions from widespread CCS deployment should be made only with caution.

The last issue I wish to raise is risk assignment with CCS projects, which will either serve as a positive or negative market incentive. Who will and who should take on CCS risks and liabilities? Questions to discuss include:

- Should it be consumers or shareholders?
- Operating utilities?
- Equipment manufacturers?
- Service Companies?
- Pipeline operators
- Injection field operators?
- And/or engineering companies?

Or should governments at all levels – local, state and provincial, or national governments assume long-term liability? Or will the global insurance industry see this as a new, profitable business line and develop insurance products to meet the demand for risk reduction?

For this, I have questions but not answers. I look forward to our dialogue on the entire array of issues regarding incentives for carbon capture and storage.

Thank you.