

Financial Risk

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What is risk?

- The IPCC 4th Assessment Working Group III^[1] report discussed risks associated with developing and implementing climate mitigation strategies. Authors acknowledged that there are knowledge gaps to be addressed.

Risk is understood to require both uncertainty and exposure – possible consequences. Glyn Holton^[2] supplied a more general definition of risk that might apply to almost any action with the two essential components: exposure and uncertainty: “Risk...is exposure to a proposition of which one is uncertain.”

- **Risk is partly in the eye of the beholder particularly when dealing in situations where there is balance between subjective elements and objective elements. Development of long-term strategies for dealing climate change is just such a case.**

^[1] IPCC 4th Assessment, WG III TAR, Chapters 2 and 3

^[2] Knight, Frank H. 1921. “Risk, Uncertainty, and Profit”, Hart, Schaffner, and Marx (NY) as quoted in Holton, Glyn A. 2004. “Defining Risk”, Financial Analysis Journal, Vol. 60, No. 6 (Nov/Dec 2004)



Mitigation, Adaptation and Geoengineering – Managing risk?

- Assessing risk in the context of climate change requires one to be specific about who is facing the risk (exposure) and how that person (or institution) understands and assesses risk. Measures of the effectiveness of corrective actions are similarly cloaked by uncertainties.
- The dangers faced by human societies (and nature) include many unmeasurable uncertainties. At present, there is no objective standard for assessing impacts. Recommendations to “protect” may not address cost/benefit analysis. How much change can be tolerated through adaptation? What is the role of geo-engineering and how will the benefits of such actions be “credited”?
- As we move “down” the scale of complexity, scope (nation vs. a single site) and time, uncertainties and exposures may become more measurable or better understood even if still not quantifiable.
- Ultimately all the different types of uncertainty and the degrees of exposure create a cumulative sense of risk. Whether we address the problem globally, within a single country, at some smaller scale, these different “risks” impact which strategies we pursue.



Factors contributing to financial risk

- Regulations and assignment of liability
- Capital needs for fossil-fired CCS generation facilities
- Political climate and public acceptance
- Alternative energy choices available and energy use patterns by consumers
- Economic situation – capital intensive vs. non-capital intensive projects
- Availability of skilled workforce across the spectrum of project activities
- Distance to the sequestration site
- CCS technology readiness and availability
- Value of incentives for this and competing technologies
- Emerging carbon markets and price volatility
- Carbon offsets – governing rules and availability (or quotas)
- Amount of investment returns, if any, from sale/use of carbon dioxide
- Leakage of carbon dioxide (transportation and storage site)
- Competence of companies involved
- Approach to risk management
- Cost of bonding or liability insurance
- Corporate approach to financing

Battle for Public Opinion - Link between CCS and Climate Change negotiations still missing

Carbon capture is still not a very relevant topic within international negotiations regarding climate change policies. The last Climate Summit in Copenhagen hardly discussed CCS. Within the regular 'Kyoto mechanisms' like CDM, CCS is still not eligible. New mechanisms could create a new landscape but are still insecure.

The international politics were subject to the first discussion panel of the GHGT-10, yesterday morning.

The scene was more or less set by Michael Román (Stockholm Energy Institute) who said: "In climate

change negotiations, CCS is only one of the many options." Negotiations-watcher and chairwoman Heleen de Coninck of the Energy Research Centre of the Netherlands was well aware of the present deadlock. She inspired the discussion by applying John F. Kennedy's reversal trick "Don't

ask what your country can do for you, ask what you can do for your country" into: "Don't ask what climate change negotiations can do for CCS, but what CCS can do for the negotiations."

The focus of the debate was especially on the application of CCS in developing countries. De Coninck: "We should ask ourselves: Which countries have a particular interest in CCS? These countries could have some influence on the negotiation process." Looking around in the world, it seems that CCS is not exclusively developed in countries with large coal reserves. On the contrary: countries like Brazil and the states of the Middle East are very active.

For the Middle East, CCS is a way to hedge the risks in the fossil fuel markets they dominate. In this respect, CCS could pave the way for some input by the Middle East in the negotiation process. That could replace the usual opposition to any



new agreement, which represents their present attitude.

The panel and the audiences looked at the subject from many sides. One important observation of many attendants was that the international climate change politics have merely become a matter of economic development and cooperation. This led to a remark from the audience that climate change politics now lose focus. Discussing the climate within the general development issues makes it very difficult to come to an international climate change treaty. Which was definitely proven by the Copenhagen Climate Summit, last December.



"Which countries have a particular interest in CCS?"



GHGT Times 10

Big Differences in Public Opinion of Climate Change In Canada and the U.S.

A fresh public survey (2011) and a new report from [The Public Policy Forum and Sustainable Prosperity](#), confirms that a wide gap exists between Canadian and American perceptions of climate change...In the fall of 2008, nearly three-quarters of Americans accepted the reality of global warming and for a time, it seemed that American and Canadian views of climate change were quite similar.

~~What a difference two years makes. Four in five Canadians believe that climate change is occurring and this figure has been relatively stable over time. South of the border, as recently as several months ago, and after incessant attacks on the science of climate change, support fell to barely half and has only just been rising to around 60%.~~

Anthony Leiserowitz, Director of the Yale Project on Climate Change, describes the drop in American support for climate science: "Over the past year the United States has experienced rising unemployment, public frustration with Washington and a divisive health care debate, largely pushing climate change out of the news."

...Some 47% of Americans believe that scientists overstate the risks from global warming, compared with 36% of Canadians.

<http://www.desmogblog.com/big-differences-public-opinion-climate-change-canada-and-us>

For Public, Climate Change Not A Priority Issue

by [Richard Harris](#)

A recent Harris Poll(2009), among the latest of several over the past year, shows that barely half of the American public believes that the carbon dioxide that's building up in the atmosphere could warm up our planet.

There are multiple reasons for this growing skepticism, including psychological reactions and politics. Anthony Leiserowitz of the Yale University School of Forestry puts one reason above all the rest: "First of all, it's the economy, stupid." People can only worry about so many issues at one time, he says. So it's no surprise they worry about issues that hit closest to home. "And the economy is still by far the No. 1 concern of Americans, which just pushes all other issues off the table."

Climate A Low Priority

In a poll by the Pew Research Center for the People & the Press, climate comes in dead last, No. 20 of the 20 big issues of concern to America. But that doesn't completely explain why a number of recent polls show that people are less and less likely to accept the science of global warming. Here's where psychology comes in. Even as scientists become more confident that climate change is a serious hazard, public opinion is shifting the other way, says Kari Marie Norgaard at Whitman College in Walla Walla, Wash...

<http://www.npr.org/templates/story/story.php?storyId=121105095>

CLIMATE COMPARED: PUBLIC OPINION ON CLIMATE CHANGE IN THE UNITED STATES & CANADA

Key Findings Report for the
National Survey of American Public Opinion on Climate Change
and Public Policy Forum - Sustainable Prosperity Survey of
Canadian Public Opinion on Climate Change

Release Date: February 23, 2011

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Concerns that impact all energy projects

- Uncertainty in construction cost estimates
- Decline in number of skilled trade workers for construction and operation
 - Over half of 400,000 electric utility workers will be eligible for retirement in 5 – 10 years and will have to be replaced. (2)
 - Conservatively, approximately 185,000 industrial construction craftsmen needed for attrition and a growth rate of 1 – 2 % through 2015. (3)
 - Recent recession may have reduced this concern. Skilled trades are not retiring as rapidly as projected.
- Strategic sourcing issues – complex and diverse supply chain in the energy sector
 - Recession has reduced investments in new projects resulting in fewer shortages, reduced lead times, and lower prices.
- Regulatory processes with evolving rules for access to transmission and gaps in expertise at regulatory agencies
 - Access to transmission lines for power projects and access to transportation infrastructure for movement of CO₂ to storage sites

What might apply to Coal, Coal + CCS, Any CCS?

➤ Project financing

- Current market conditions make it hard to raise capital for coal-based projects
- Stockholder activism encourages “sustainable investments” but who defines sustainable?
- Carbon Principles, Carbon Disclosure Project and Equator Principles.

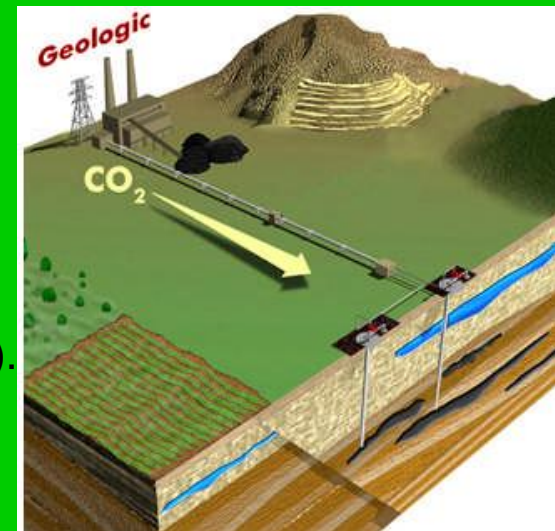
➤ Insurance

- Infrastructure repair, redesign & fortification; service provision & loss of revenues; liability (contributor to climate change/service provider).
- Ability of insurers (reinsurers) to assess risk depends on activities they will cover and limits on liability under national or state law.

➤ Surety bonds for sequestration sites?

➤ Carbon markets, buying and earning credits, ensuring quality of credits

➤ Incentives and their impact differ between established energy resources and new technologies; capital intensive technologies require long-term certainty



Risk and liability

A discussion paper^[1] issued by the Kennedy School of Government at Harvard argued that without a comprehensive or consistent legal framework at either the federal or state level, CCS faces legal uncertainty in virtually every aspect of activity, including^[2]:

- CO₂ capture (e.g., performance requirements under future regulation)
- CO₂ transportation (e.g., pipeline ownership, safety, regulation and access)
- State property law governing reservoirs, pore space, and injected CO₂
- Liability for leakage of CO₂ (regulatory liability for emissions control, and contractual liability for carbon trading)
- Liability for damage to property (induced seismicity, commingled resources)
- Liability for trespass (multiple users of reservoirs, boundary disputes, including transnational and international waters)
- Liability for CCS activities after transfer of ownership of property
- Liability under RCRA, CERCLA and other environmental statutes
- Health, safety and environmental liability (worker safety, groundwater contamination, flora, fauna) under federal and state regulations
- CCS site selection, permitting, operation and closure
- Long-term monitoring, remediation, and financial responsibility for CCS sites
- Treatment and accounting of CCS as a mitigation measure under voluntary and mandatory climate change regimes

[1] Hart, discussion paper 2009 -1, Advancing Carbon Sequestration Research in an Uncertain Legal and Regulatory Environment: A Study of Phase II of the DOE Regional Carbon Sequestration Partnerships Program (January 2009)

[2] See IEA (2007), Legal Aspects of Storing CO₂ Update and Recommendations for Future Work; Kipp Coddington, Robert Mowrey, Geir Vollaeter, and Kristin Holloway Jones, CCS Issues under the Safe Drinking Water Act, dated May 10, 2008 (on file with the author)

Insurance – Addresses unlikely events (ULEs)

The ability of insurers and reinsurers to assess risk will depend on which activities they are asked to cover and the limits on liability (if any) provided under national, state, or provincial law.

Considerations for Utilities([insurance, self-insurance, reinsurance]

- **Infrastructure repair, redesign, fortification** [property]
- **Service provision & lost revenues**
 - Changes in demand for energy and water
 - Failure to deliver [contingent business interruption]
 - Eroded water quality [product liability]
- **Liability**
 - As providers of services [general liability]
 - As emitters [various liability]
 - As impacted businesses [directors and officers liability]
- **Reputation**
 - Part of problem or solution?
 - Preparedness in the eyes of public, customers, shareholders, regulators
- **Risk profiles of climate responses**
- **Insurance availability & affordability**

The insurance sector has a key role to play in helping to mitigate the effects of climate change ... and by developing new products and solutions that can support emerging greenhouse-gas and renewable energy markets.

- Marsh & McLennan

Regulatory uncertainty

- Carbon storage regulations are incomplete and evolving. Some states have taken action but even the most comprehensive set (Wyoming?) recognize the need for Federal actions.
- Carbon storage overlaps other issues including oil and gas production, produced waters, drinking water, ownership and control over pore space, alternative uses for the subsurface, etc.
- Carbon capture and storage is opposed by many groups, some who favor other forms of energy production and some who are concerned about CO₂ leakage and damage to drinking water resources. Many of these groups demand “carbon disclosure”.
- Lawsuits have been filed based on the global risk (and one decided by an out-of-court settlement) that may establish precedents restricting fossil fuel use.
- International agreements , including ability to use off-shore offsets, international carbon trading, assignments of liability for prior emissions could impact the investment climate – Low carbon footprint requirement put on imported goods...

Things to consider when developing projects, providing services, or acting as a regulator

- Risk assessment, risk management and good communications are essential
 - Collect lessons learned: factors contributing to risk; impact of perceived risk on carbon markets; frameworks for assigning liability; success of existing incentives; and suggested actions to reduce risk or craft better incentives.
- Different issues motivate participants in the life cycle of a project. Will one of the least be rate controlling step?
- Uncertainties in policy or regulatory frameworks make effective actions difficult. Key attributes of frameworks:
 - Certainty over meaningful time frames from an investment perspective.
 - Clear policies whose effects on the subject problem can be measured.
 - Opportunity to “learn by doing” before making changes in policy.
- Processes have traits that can be analyzed. For example, supply chain for technology-based projects is complex, international, and is subject to upheaval.



Thank you!

LTI

