U.S. Carbon Offset Policy:
Risks, Uncertainties and What We Can Learn from Current Financial Markets

By

Alan Abramson

Dr. Brian Murray, Advisor

April 24, 2009

Masters project submitted in partial fulfillment of the
requirements for the Duke Environmental Leadership-Master of Environmental Management degree in
the Nicholas School of the Environment of
Duke University

2009

ABSTRACT

Climate change has become an increasingly important topic of political discussion and public concern. Although the United States has not signed the Kyoto Protocol, some individuals, companies, municipalities, states and regions have made either voluntary or regulatory efforts to reduce their greenhouse gas (GHG) emissions. Many observers believe the U.S. will institute a national carbon policy sometime during the current administration. Most public policy experts believe a cap-and-trade program will be part of any U.S. climate change policy. A trading program will presumably include both carbon allowances and carbon offsets.

This Masters Project investigates what lessons policymakers can learn about regulation, oversight and transparency from the recent credit and financial market crisis. The research and analysis will suggest how policymakers can apply these lessons to help build the nascent carbon offset market into a robust, trusted, viable and liquid financial market over the long term.

The research method included conducting twenty-nine interviews with specific questions for each group of participants. Ten financial market respondents, eleven carbon market respondents, five NGO respondents and three public policy experts were interviewed. A thorough literature review of current environmental commodity markets was conducted, too.

The results address three distinct areas. First, what went wrong in the financial markets is scrutinized. Specific findings suggest too much complexity, too much leverage, and an overall lack of transparency caused most problems. Second, how the carbon market, in general, can avoid these problems is revealed. A consensus advocates utilizing a central clearinghouse with margin requirements for market participants while limiting the number of derivative products to the simplest of futures and options. Finally, explicit guidance for the offset market is given. This market must reduce the number of standards and registries. Furthermore, the conflict of interest inherent in the current verification and validation model for offset approval needs to be eliminated.

TABLE OF CONTENTS 3

INTRODUCTION

Climate change is a global phenomenon. It does not matter for the atmosphere where emissions reductions occur; however, for the U.S. economy it does. The goal of a greenhouse gas (GHG) cap-and-trade program is not simply to reduce emissions but to do so in the most cost-effective manner possible. How and where these emission reductions occur are important factors in the creation of U.S. carbon policy.

An offset is distinct from an emissions allowance (or a permit), which represents a government-sanctioned right to emit, and is issued to sources covered under a GHG cap-and-trade program. Allowances are allocated from an overall cap on emissions, while offsets are created from projects and activities outside the GHG program's cap.

A well-designed offset program can provide many benefits in a GHG cap-and-trade system including:

- Cost control by allowing capped entities to access low cost reductions from many sectors across geographic locations
- Incentivizing investment and innovation in sectors not covered by the GHG program which could foster environmental benefits that might not happen otherwise
- Avoid expensive early retirement of economic assets
- Allow time to develop lower carbon-emitting technologies (by providing "covered sources" access to low-cost compliance options in the short term)

Experience and knowledge can be gained from current voluntary offset markets as well as compliance driven offsets such as the Clean Development Mechanism (CDM). The report will

include overviews of the following with a look toward what successes and failures can be drawn from each:

- CDM
- U.S. voluntary offset markets, particularly the Chicago Climate Exchange (CCX)
- EU ETS

The report will also analyze the qualities inherent in successful environmental market for SO_2 (acid rain).

The nascent carbon market, and its derivative component the offset market, is a commodity market created by government regulation. Any cap-and-trade program has the explicit goal of putting a cap on emissions. Allocated allowances and offsets are tradable financial instruments designed with that end in mind.

Within the context of today's financial markets one can compare an allocated allowance to a commodity that trades on an exchange. The government will issue a certain amount of allowances that are interchangeable and fungible. In that sense, an allocated ton of carbon is similar to a bushel of corn.

Offsets are much different. Each offset is a story unto itself with its own peculiar characteristics:

- Project developer
- Location
- Technology used (methodology)
- The offset itself (project type)
- Vintage

- Who validated the offset (validation)
- Third party verification (verification)
- Registry (credit issuance)

Risks regarding both quality and quantity abound in the offset market. How do market participants evaluate these risks and the uncertainties generated? We can learn a great deal from certain current financial markets, specifically the corporate bond market, the mortgage-backed securities market, commodity exchanges and the interest rate swap market. There are many parallels we can draw from these markets that will help establish healthy and strong offset markets.

Different types of offset projects have different kinds of risks. A variety of financial products and services can be employed to minimize these risks:

- A credit rating system such as that used in the corporate bond market
- Credit enhancement products
- Insurance products
- Derivative products such as options
- Pooling of assets similar to mortgage-backed securities
- A buffer system that sets aside a specified amount of carbon for particular kinds of projects

Given the recent problems in certain well-established, regulated and supposedly transparent markets, starting with Enron and culminating with the sub-prime mortgage fiasco, it is imperative that this ***new*** market, created via regulation, has unprecedented transparency and integrity. Measurement and monitoring must be standardized and difficult to manipulate. The

roles of verifiers and validators must be strongly scrutinized to eliminate the possibility of collusion. Methodologies and protocols for each different type of project must be uniform. Accounting tools and auditing procedures cannot be compromised. The goal of cost-effective emissions reduction is the preeminent concern. This will be difficult to achieve if the public and market participants cannot trust the marketplace.

The carbon market was valued at $64 billion in 2007. $50 billion was allowance trading, primarily EU ETS. $14 billion was project based transactions, mostly CDM. These values more than doubled from 2006.

Given the huge growth in the carbon market and the potential for further increases, as more nations commit to emissions reductions, managing risks and uncertainties are of particular concern.

METHODS

The following quantitative and qualitative research was conducted:

- Open-ended (i.e. qualitative) interviews were conducted with carbon project developers, insurance company risk underwriters and executives , current and former commodity exchange executives, current and former mortgage-backed securities traders, current and former interest rate swap traders, current and former financial services executives and carbon offset traders and investors. Specific questions were asked to the members of each particular group. The questions are listed in the Appendix with the approved research protocol;
- A thorough literature review of existing analysis regarding CDM, voluntary offset markets and EU ETS;

- A literature review of the cap-and-trade market for acid rain that was created by the Clean Air Act Amendments of 1990;
- Some open-ended interviews were also conducted with experts and stakeholders within research institutions and NGO's.

FRAMEWORK

Where possible the questions asked of the various market participants will be used as a framework for the paper. The answers will be quantified and analyzed with regard to:

- Themes of responses
- Consensus
- Disagreements
- Unanimity

Given the fact that the respondents were granted anonymity, references to specific individuals will use aliases, but their job descriptions will be informative. A list of respondents revealing their type of job and type of firm will be included in the Appendix.

SECTION I: Responses to questions from financial market participants

I interviewed 10 financial market participants ranging from the CEO of a major institution to the head interest rate swap trader at a large multi-national bank. None of the respondents currently work for the same firm. These people have a minimum of 15 years in the industry; the longest tenure is 30 years. Each respondent was asked 10 questions. Some questions could be answered yes or no. Certain respondents elaborated on their answers to these questions. Other questions involved asking people to discuss their opinion on certain topics. This report will systematically characterize the extent of agreement/disagreement for each question and will expand on the specific responses for clarity and depth.

Question #1: *Do you (did you) think that risk management at your firm(s) was thorough?*

YES	NO
3	7

Large discrepancies were noted in the answers to this question. Interestingly, the two highest level executives, Scott (a former CEO)[1] and James (a current Vice Chairman)[2], felt that there firms did a very good job of risk management. The only other person to agree that risk management was good was Dan (a hedge fund trader)[3].All others felt that risk management was lacking. Although no consensus was determined, each respondent acknowledged that risk management systems failed. James and Dan put some blame on flaws inherent in the Value at Risk (VaR) system, although they said that VaR was not the only method used for managing risk

[1] Interview January 24, 2009
[2] Interview January 29, 2009
[3] Interview February 4, 2009

at their institutions. Jeff (a former fixed-income department head trader and current hedge fund manager)[4] said that the loss of liquidity could not be anticipated; Gary (a former department head of sales and trading and current hedge fund executive)[5] agreed that the loss of liquidity was not foreseeable, yet the correlation of risk across Wall Street should have been more obvious. Sam (a Mortgage Backed Securities-MBS- trader at a hedge fund)[6] and Richard (a credit trader at a large money management firm)[7] noted that the compensation structure fueled a disregard for risk. Gary said that credit risk was not well understood; risk models were based on historical precedent, but the securities that blew up had no significant history to track. Richard said arrogance and blindness were fueled by the large paper profits these institutions were making. Sam noted that anybody who had been in the business for a long time should have known that no product could go from five percent of a firm's revenue to fifty percent of a firm's revenue without tremendous risk being taken.

Question #2: *Do you (did you) think that risk takers (traders) understood the actual risks?*

YES	NO
0	10

[4] Interview February 11, 2009
[5] Interview January 31, 2009
[6] Interview February 12, 2009
[7] Interview February 8, 2009

Question #3: Do *you think that executives understood the actual risks?*

YES	NO
3	7

The answers to this were mostly in line with the answer to question # 1. However, respondents were unanimous in their belief that there was no way things could get as bad as they did. Scott said he thought he understood risk as well as anyone but he missed the fact that the entire system was overloaded with the same positions.[8] The presumption of liquidity and being able to stop losses at a reasonable level was prevalent at the executive level.

Question #4: *Discuss the general level of internal oversight at your firm(s).*

Sam felt very strongly that the lack of internal oversight was more important than anything else.[9] He pointed out that if these institutions did not have management systems in place to oversee and understand the total risk of the firm then how could anyone expect the external overseers to understand them. After all, who else could or should be able to evaluate these risks. These executives were in the business of creating and trading these securities. Jeff pointed out there was always an assumption the system would not fail; therefore, internal oversight became lackadaisical.[10] Record profits in previous years (a lot of which were paper profits) took management's eye off the ball. Jeff said credit risk was not well understood and that "the tentacles were infinite.[11]" James felt internal oversight was thorough; meetings and position

[8] Interview January 24, 2009
[9] Interview February 12, 2009
[10] Interview February 11, 2009
[11] Ibid

analysis were conducted on a daily basis.[12] Systems were in place but the systems did not properly account for the risks. In other words, the risk management systems were flawed. VaR did not value the tail properly. Fred (an economist) noted the risk models had the wrong probability distribution.[13] Neil (a professor) said even if the probability distribution was correct the total disregard for the one percent probability of meltdown was reckless.[14] Richard was disgusted by the fact that internal oversight did not see the incorrect valuation of positions.[15]

Question #5: *Was external oversight lacking?*

YES	NO
10	0

Question #6: *What could be done better?*

Most respondents agreed the regulators and overseers were not smart enough, were undermanned and underfunded. James said the Fed had smart people but not nearly enough; he also said there were virtually no smart people in the Securities and Exchange Commission (SEC).[16] He acknowledged it would be very hard for the regulators to do a competent job given there were so many markets and products that were left out of the purview of the regulators. There was an ironic consensus among market participants of diverse political views (although each and every one of the respondents considers himself a free market capitalist) that there needs to be better

[12] Interview January 29, 2009
[13] Interview January 29, 2009
[14] Interview January 7, 2009
[15] Interview February 8, 2009
[16] Interview January 29, 2009

regulation of the financial markets. ***This cannot be allowed to happen again***. We need a twenty-first century regulatory system for our twenty-first century financial system. All agreed that regulation in and of itself is not a bad thing. Gary acknowledged that traffic lights are a regulation (and they seem to do a necessary and competent job).[17] Rules need to be rewritten and all products and market participants need to have proper oversight. However, any new regulatory system must have enough funding and manpower to do the job. Jeff, a lifelong Republican, suggested the ten largest banks need a regulatory system so stringent they would no longer be allowed to take the risks that almost brought down our financial system. The biggest banks, those that are "too big to fail" should be operated like a public utility.[18] Sam, a lifelong Democrat, said no institution should have positions large or complex enough to bring down anybody but themselves.[19]

Question #7: *How long has the problem existed?*

As long as I can remember	It's a recent problem
10	**0**

Question# 8: *Discuss your perception of what went wrong and how to remedy the problem.*

Similar answers to question # 6. All respondents felt that regulators need more manpower, expertise and funding. James, Scott, Jeff, Sam, Richard, Gary and William alluded to the problem with a system in which regulators want their next job to be at a firm they are

[17] Interview January 31, 2009
[18] Interview February 11, 2009
[19] Interview, February 12, 2009

overseeing.[20] Many people from the SEC want to work on Wall Street. The pay is better. This is a fatal flaw mentioned somewhat frequently throughout the interview process. An oversight system must be created with the proper incentive for the overseers and fear of enforcement and penalties for those being regulated. James said that penalties for cheating need to be consistent and dramatic. He also mentioned that the culture of bending the rules (if not breaking them) permeates Wall Street; as soon as new rules get written there are market participants finding a way around them.[21]

Question #9: *Is there an overall problem with transparency in the financial markets?*

YES	NO
10	0

The respondents had a unanimous answer of YES. However, all participants pointed out that there is more than one dimension of transparency. Jeff said the biggest problem with transparency was between large banks and their shareholders; he claimed that with all the public documentation available, it is still difficult for a shareholder to have a good idea of the balance sheet and risks of these large financial institutions. He noted that "off balance sheet" accounting games contributed to the lack of transparency.[22] James said the lack of reporting requirements around certain entities (such as hedge funds) has caused serious problems. He also mentioned

[20] Various interviews January 7, 2009-February 12, 2009
[21] Interview January 29, 2009
[22] Interview February 11, 2009

that the accounting system was antiquated considering the recent proliferation of exotic products.[23]

A consensus among the respondents was that Wall Street, in its market making capacity, does not want transparency. The less the customer knows about prices the better for the dealer. This gets to the issue of different types of transparency.

Question # 10: *Is transparency a problem in certain segments of these markets.*

YES	NO
10	0

ALL respondents said yes. They also unanimously acknowledged that Wall Street does not want transparency. Respondents pointed out that there are different types of transparency even within the market making capacity. James, Jeff, Sam, Richard, Gary and William noted that price transparency is different from clearing transparency.[24] Over-the-counter (OTC) markets do not have the same level of price transparency as futures exchanges; however, some OTC markets (the government bond market, for example) have tremendous transparency because of the trade clearing mechanism and the large number of market participants. Other products have varying levels of both price and clearing transparency. Exotic derivatives and certain MBS tranches were noted to be especially lacking in transparency.

[23] Interview January 29, 2009
[24] Various interviews January 7, 2009-February 12, 2009

Question # 11: *Discuss how you would solve transparency issues.*

Respondents were unanimous in their opinion that ***all*** financial instruments should be settled through the ***clearinghouse*** process. Sam and Richard acknowledged they were not in favor of too much price transparency (they make their living off the bid-offer spread; the less transparency, the larger the spread); yet they still favored the clearinghouse approach to all securities.[25] Jeff said that any financial instrument too exotic to be settled through a clearinghouse should not exist.[26] Sam was not willing to go that far; however, he did say that regulators need access to the balance sheets of financial firms so that systemic risk can be analyzed properly.[27] The clearinghouse method of trade settlement differs from that of bilateral trade settlement. A clearinghouse acts as the central counterparty for all transactions (usually on futures and options exchanges). A central counterparty acts as the buyer (or seller) on all transactions. (Further explanation of the clearinghouse process, and its possible benefits, will be in the recommendation section, below.)

Section II: Responses to questions from carbon and carbon offset market participants

I interviewed 11 carbon market and carbon offset participants. These people ranged from the CEO of a carbon offset developer to a high level executive of a futures exchange that lists and trades carbon and carbon derivatives. Only two people work at the same company. Most respondents have been in the carbon markets since inception. Each person was asked eight questions (ten, including follow-ups). Similar to Section I, some questions could be answered yes

[25] Interviews February 8,11 and 12, 2009
[26] Interview February 11, 2009
[27] Interview February 12, 2009

or no; however, most responses were a discussion of issues. Once again, this section will systematically characterize the extent of agreement/disagreement for each question and will expand on the specific responses for clarity and depth.

Question# 1: *Do you think these markets are properly regulated?*

YES	NO
11	0

Interestingly, there was a unanimous answer of YES. A consensus opinion was that the CDM market is ***over-regulated*** to the point that it is very difficult to get projects approved and is therefore holding back the market and its participants from being able to reduce emissions enough to impact climate change. Respondents were only unanimous that the CDM market is over-regulated. The voluntary aspects of the carbon offset markets, other than CCX, are not regulated at all.

Russ (a carbon market trader) felt an important regulation would be to have screening exams (like the financial markets do with the series 3 and series 7 exams) for eligibility to participate in these markets.[28] Michael (a carbon offset investor) felt the trading aspects of these markets were unregulated in the U.S;[29] He and Cam (a carbon market investor) also felt the market was too small to require regulation at this stage.[30] CCX is self-regulated and its participants have requested oversight from the National Association of Security Dealers (NASD) and the Commodity Futures Trading Commission (CFTC). The EU ETS was considered a properly

[28] Interview February 11, 2009
[29] Interview February 10, 2009
[30] Interview January 15, 2009

regulated market with regard to efficiency, but not with regard to effectiveness. Respondents had different views on this point.

Question # 2: *Do you think these markets are transparent?*

YES	NO
7	4

No consensus was established for this question. Most respondents felt the issue of transparency was a function of each different type of carbon market. CDM is perceived as transparent, but very inefficient. Bob (carbon offset investor) noted that although the CDM market appears transparent there is some opacity with regard to why some projects qualify and other similar projects do not.[31] Respondents were divided on the transparency of the voluntary markets. Many felt that CCX is transparent but that their standards are poor. Russ (a carbon market trader) said that not a single CCX offset will be a compliant offset when the U.S. goes to a compliance regime.[32] Others noted that the voluntary market, with its lack of regulation (other than CCX) is rife with transparency issues.

Question # 3: *What are the goals of the carbon and carbon offset markets?*

Respondents were unanimous in their opinion that the goal of these markets is to reduce carbon emissions in a cost-effective manner. Nevertheless, there were quite a few different forms of elaboration on the topic. Michael mentioned that the goal of the markets is to make money.[33] When prompted that the question was referring to the goal(s) of the policy that creates these

[31] Interview February 9, 2009
[32] Interview February 11, 2009
[33] Interview February 10, 2009

markets (with the understanding that these markets are established by government regulation) he said that the societal goal of the market is to reduce emissions of GHG by more than the business as usual (BAU) case. Bob pointed out the CDM had an additional goal of promoting sustainability; he mentioned that the market had essentially lost sight of this aspect. [34]

Question # 4: *Do you think U.S. carbon policy will be effective?*

Respondents were unanimous that U.S. carbon policy has the ***potential*** to be effective. Potential for effectiveness is far different from success. This leads to the next question.

Question # 5: *What recommendations would you make so that carbon policy can achieve its goals?*

All carbon market participants felt that for carbon policy to be successful the timeframe has to be long-term; this means a minimum of 10 years and as far out as 30 years. Russ mentioned that SO_2 credits can be used for up to 30 years.[35] Beyond the agreement on the need for the program to be long-term, there was tremendous diversity as to what policy should look like. Tim (an exchange executive) noted the SO_2 program is a wonderful model for GHG emission reductions.[36] Russ, Bob, Michael and Fred noted the number of facilities that emit SO_2, and the regional rather than global impact, make CO_2e emissions a ***much*** different problem which requires a different approach.[37] ***All*** respondents felt that there was ***no*** time left to waste; the problem gets worse as we wait to implement a policy. ***All*** respondents agreed the environmental integrity of the program is paramount; however, they acknowledged that no program will be perfect.

[34] Interview February 9, 2009
[35] Interview February 11, 2009
[36] Interview January 30, 2009
[37] Interviews January 29, February 9,10 and 11, 2009

Question # 6: *Are there different quality carbon offsets? How many?*

YES	NO
11	0

Respondents gave a unanimous answer of yes. With regard to how many different qualities the consensus opinion was there were quite a few. However, the carbon market participants did not feel this was a meaningful question. Russ said that carbon offsets are like wine: really good, good, bad and really bad![38] The fact that there are various offset types leads to the next question(s).

Question # 7: *How does quality get measured? Is this a reasonable method?*

The interviewer noted a very interesting dichotomy of responses to this question. Russ, Bob and Michael felt the market would evaluate quality through the information and data provided in the offset approval process.[39] Peter mentioned his company likes to do methane projects because they are easy to measure.[40] Ben (a carbon consultant) said that forestry projects are obviously difficult to measure but, nevertheless are an important part of any policy framework going forward.[41] The additional public good (including biodiversity) achieved through reduced deforestation compels any program design to come up with acceptable measurement and monitoring techniques so that forestry projects are an accepted part of any GHG emission reduction regime.

[38] Interview February 11, 2009
[39] Interviews February 9, 10 and 11, 2009
[40] Interview January 16, 2009
[41] Interview December 17, 2008

Question # 8: *What recommendations would you make to improve measurement techniques?*

There were interesting responses to this question. Most participants are very comfortable with the current measurement techniques that are used for CDM projects. Market participants believe the science is understood and very good. The issue of standards is much more important. The interviewer was scolded, more than once, for his focus on measurement and quality as opposed to standards. General agreement exists that certain types of projects are easier to measure than others (methane v. forestry) but what matters are the protocols and standards used for each type of project. There was a consensus that there should not be too many standards; but there was also a consensus that CDM standards are inhibiting the market. ***All*** market participants agreed that there should be sector-based additionality measurement as opposed to project-based. A unanimous opinion was that the infrastructure for a large, viable market of offsets is not in place. One thing that is bogging down CDM is the lack of professionals with the ability to measure, monitor, verify and validate projects. Respondents noted that this is already a problem while the market is small. They questioned how big this dilemma might become when the U.S. develops a compliance framework.

SECTION III: Important issues regarding the creation of carbon and carbon offset markets resulting from interviews and literature reviews.

1. Risk Management

General risk management issues are not of primary concern for this report. Issues of internal oversight are important only for what they can tell us about the types of securities that were

difficult for managers and executives to appraise and value. If experienced financial market professionals struggled with certain types of instruments, it seems obvious that the nascent carbon markets should avoid the introduction of such securities.

2. Oversight and Regulation

Strict oversight and regulation are necessities for any market, especially a market that is created for the public good by government regulation. Any regulator must have the manpower, technology and the funding to do a complete and thorough job. Regulation cannot be an unfunded mandate. Free market capitalists from the financial markets are ***begging*** for better, thorough, competent regulation and oversight of their markets. The sense of despair and anger about what has happened to our financial system permeated every interview. Certain participants said that the financial industry is dead; and many think it is a good thing. Republicans and Democrats concurred that the issue is not one of regulation or no regulation. The issue is good regulation vs. bad regulation. The need for a twenty-first century regulatory regime is critical if we are going to get out of our financial malaise ***and*** if we are going to build carbon markets that achieve the goal of abetting climate change in a cost-effective manner.

3. Standardization and Liquidity

Standardization and liquidity are important aspects of all healthy markets; they are requirements for clearinghouse participation. It is easy to see how the allowance aspect of the carbon market can be standardized and liquid; it is far more difficult to do the same for carbon offsets. The CDM protocol considers each project unique; even if the next regime (post 2012) changes from project specific to sector specific measurement the various sectors will not necessarily be fungible, at least during the project development stage. Currently, different types of projects

command different prices before they become secondary Certified Emission Reductions (CERs). The process by which an offset is created in any sector can be standardized. Once the credit has been validated and stamped then an offset becomes fungible with an allowance.

4. Market Infrastructure

Market infrastructure becomes an important part of the regime. As we consider the offset market we need to look at what types of participants there will be. Many stages of project development exist before an offset credit is stamped:

- Project developer
- Location
- Methodology
- Project type (sector)
- Vintage
- Validation
- Verification (third-party)
- Registry (credit issuance)

The market requires validators and verifiers all over the world. The system is already short personnel with these skills. Then there is the question of who pays these people? Regulators need to keep in mind the failure of the credit rating agencies (Moody's, S&P, etc.) in the recent credit crisis. Markets require trust. Respondents said the only reason certain investors purchased some MBS assets was the Triple-A rating.[42] These same respondents say that a significant flaw in the system exists because the credit rating agencies are paid by the bond issuers. A disincentive

[42] Interviews January 31, 2009 and February 8,11 and 12, 2009

exists for doing a thorough job. Currently, validators and verifiers are paid by project developers. If we are to learn from the failings of the financial markets, this is an aspect of the carbon offset markets ripe for misconduct. Policymakers must address this issue.

5. Human Behavior

Policymakers need to keep in mind that a behavioral characteristic of market participants (individuals and firms) is to bend, if not break, the rules. Their incentive is to make money. ***PERIOD***. Capitalism is based on this incentive. Stringent rules need to be put in place so that the penalty of enforcement creates a significant disincentive to cheat. It must be kept to a minimum (if not eliminated completely). Theories abound as to what has happened to our financial services firms over the last 3 years. History reminds us that the problem is not new. We may not be able to solve the problem; after all greed and arrogance are part of some people's nature. However, if we construct our markets with the knowledge that a lack of forbearance is a ***natural*** human behavior in the marketplace, then we can honestly attempt to institute regulations that restrain the impulse to break rules. The threat and enforcement of penalties has to be commensurate with the misconduct.

6. Transparency

Transparency issues are somewhat misunderstood. People refer to transparency differently. With carbon offsets, investors see transparency as their ability to verify and validate that a project will produce the carbon credits contracted for. In financial markets, transparency usually refers to market participants being able to see the prices and volume of transactions. But there is more to transparency than these concepts. For instance, with regard to carbon offsets, it is the full disclosure of all aspects of the project, and the credit created, that is true transparency. Full

disclosure implies proof of additionality concerns, lack of double counting and registration. Nevertheless, once an offset is stamped the transparency issue is resolved, unless there is some kind of contingent claim put on the credit that says its value can be rescinded if it is later deemed to be non-additional or reversed.

In the financial markets, price is simply one dimension of transparency. Shareholders want full disclosure, in public reports, of the balance sheets of companies they invest in. Traders in the financial and commodity markets need to know that transactions have settled properly. Price is not the major concern; solvency of the system is more important. Exchange traded markets do a much better job of this than Over-the-Counter (OTC) markets. However, OTC markets can overcome this weakness by instituting a clearinghouse function for all transactions. It is also important to note that market makers (dealers who make prices on OTC traded securities) do not want transparency. Fred said that when he went to visit various Wall Street houses to discuss transparency issues in the carbon markets the only thing these market participants wanted to talk about was the allowance allocation.[43] Why? Because that is where financial firms see the money being made. There was consensus opinion among financial market respondents that Wall Street has a vested interest in a limiting the transparency of its transactional business.

7. Efficiency

Issues of efficiency are important for markets. One complaint from all carbon market respondents is that the CDM process is inefficient. High transaction costs impede the progress of the market and therefore slow the move toward emission reductions. David (a venture capitalist) noted that the CDM process was a method for the UN to regulate by administrative

[43] Interview January 29, 2009

delay.[44]Administrative costs are also of concern. More detail on this topic will follow in section IV.

8. Leverage and Capitalization

Leverage and capitalization are important issues for the markets. Warren Buffet said that the only thing that can allow a smart person to go broke is leverage.[45] Leverage ratios and the transparency of such ratios are an important piece of information. Brian (an attorney and former commodity exchange executive) noted that the problem was not leverage but that firms were insufficiently capitalized for the amount of leverage they had.[46] James and Scott said that certain exotic products did not require any capital because they were unregulated.[47]

9. Products and Market Participants

Sam (who has traded MBS for twenty-five years) stated that the MBS market was very "simple" in its infancy.[48] There was a standardization of underlying collateral and delivery. Over the years, standardization was reduced and the quality of the underlying collateral dwindled. Underwriting standards got looser. These factors led to the origination of various derivative products tied to MBS. Scott said that there has never been a crisis (other than outright fraud, such as Enron) that was the result of an underlying asset. All the crises have been a function of derivatives.[49]

Futures markets are the original derivative product. Futures exchanges started as a hedging vehicle for farmers. Some respondents took issue with the difference between a necessary or

[44] Interview January 9, 2009
[45] Interview with Charlie Rose, October 1, 2008
[46] Interview February 6, 2009
[47] Interviews January 24 and 29, 2009
[48] Interview February 12, 2009
[49] Interview January 24, 2009

legitimate hedge and an outright bet. This topic came up with reference to the Credit Default Swap (CDS) market. The question of market participation and whether or not certain markets should only allow participants with a "vested interest" saw a true disagreement among the respondents.

Linda (an insurance executive and former NGO executive) was adamant that the only participants should be hedgers; she insisted no speculators should be allowed. She felt that a market created for societal good should not allow participation by those who have no interest in that public good.[50] Russ and Michael felt exactly the opposite; they said there would be no liquidity without speculators. They asked "without speculation, who will be there to take the other side of a hedge?"[51] Properly regulated markets should be able to limit excess speculation by the rulemaking mechanism. Linda fears that Wall Street, with its focus on profits rather than the public good, will "get in the way" of successful environmental policy.[52]

Section IV: Analysis of existing environmental commodity markets

1. SO_2 (Acid Rain)

Any new market needs to learn from the success and failures of other markets. Respondents had differing opinions on how much the carbon markets can be modeled after the SO_2 market. Respondents were unanimous regarding the success of the SO_2 program. Targeted emissions reductions have been achieved and exceeded, and total abatement costs have been significantly less than what they would have been in the absence of the SO_2 trading provisions.[53] Trading

[50] Interview January 21, 2009
[51] Interviews February 10 and 11, 2009
[52] Interview January 21, 2009
[53] Stavins, R. (2005). Lessons Learned from SO2 Allowance Trading. *Choices, 20*(1), p.53

volume has increased over the life of the program, and the robust market has resulted in an estimated cost savings of up to $1 billion annually compared with the cost of command-and-control regulatory alternatives that were considered by Congress.[54] Tim felt that the SO_2 model should be built upon; he said that Congress lacks institutional memory because most Congressmen, and all staffers, do not remember back to 1990.[55]

The performance of the SO_2 allowance trading system provides evidence that market-based instruments can achieve major cost savings while accomplishing environmental objectives. The SO_2 trading system offers lessons about the importance of flexibility and simplicity, the role of monitoring and enforcement, and the ability of the private sector to make markets work. [56]

Flexibility was exhibited through the broad set of compliance alternatives available; these included both timing and technological options. Banking allowances for future use played an important role. Utilities could choose technological changes (scrubbing) or fuel switching to meet their reduction targets. Simplicity was displayed in the simple formulas for allocating permits based on historical data. Trading rules were clearly defined up front with no prior government approval of individual trades. Absolute baselines, rather than relative ones, contributed to simplicity and success.

Regarding market design, the devil is in the details; however, certain aspects of the SO_2 program could be transferred to carbon emissions. The importance of monitoring and enforcement cannot be overstated. Continuous emissions monitoring (CEM) helps build market confidence, and although the costs are significant, the success of CEM in SO_2 leads one to believe it is a necessity for CO_2 emissions, too. Enforcement was successful because of the stiff penalties—

[54] Stavins, R. (2005). Lessons Learned from SO2 Allowance Trading. *Choices, 20*(1), p.55
[55] Interview January 30, 2009
[56] Stavins, R. (2005). Lessons Learned from SO2 Allowance Trading. *Choices, 20*(1), p.56.

$2,000 per ton of excess emissions, a value more than 10 times marginal abatement costs—that provided sufficient incentive to comply.

The SO_2 program demonstrated that the private sector can step in and make it work. Entrepreneurs provided brokerage needs, developed price information, matched trading partners, and established other important and necessary market related services.

Some respondents (and literature) noted that SO_2 is a regional problem with a limited number of emitters. They wondered whether this program is transferable to CO_2, which is a global problem with an almost unlimited number of emitters. However, Fred pointed out that 80% of CO_2 emissions are generated by fossil fuels (85% from large point sources) and that it would be relatively easy to install CEM systems and cap the major fossil fuel generators upstream.[57] Importantly, the SO_2 market does not include an offset mechanism; offsets appear to be a trade-off between flexibility and simplicity.

One final and interesting point raised by Fred is that the ratcheting down of the SO_2 cap (via the Clean Air Interstate Rule-CAIR) is the payoff that society receives for implementing a cost-effective solution. He pointed out that a well conceived cap-and-trade program led to both cost and societal benefits.[58]

2. Chicago Climate Exchange

The Chicago Climate Exchange (CCX) is a voluntary market where members agree to reduce their carbon emissions by a certain percentage each year. Allowances (Carbon Financial Instruments or CFI) are issued to members to meet their allocated emissions cap. Offsets can be

[57] Interview January 29, 2009
[58] Ibid

generated and used in place of an allowance to meet a member firm's allocation. Offsets must meet the standards of the CCX. An approved offset is then issued a CFI and can be used in place of an allowance (a CCX offset becomes fungible with a CFI). CCX has generated a lot of controversy in the environmental and carbon trading community.

Many say their standards for offsets are of poor environmental integrity; Russ said not a single CCX offset will be considered compliant when the U.S. implements a regulatory framework.[59] However, Bob said CCX is an invaluable tool that has gotten the ball rolling with regard to carbon trading, including offsets. He noted that the volume of trading on the CCX, especially offset volume, is so small that the CCX standards (environmental integrity) are insignificant. What is important is the introduction of the platform. After all, standards for offsets will be set by policymakers, not exchange executives.[60] Tom said that his firm clears trades through CCX but does not purchase any offsets from the exchange. He mentioned that his company pays 3-4 times the market price of a CFI for their offsets. Tom said the goal of his firm is to own high quality pre-compliance offsets that will be fungible into a compliance regime.[61]

3. European Union Emissions Trading Scheme

European Union Emissions Trading Scheme (EU ETS) is the world's largest carbon market. Phase I had the problem of too many allowances allocated. Phase II has been an improvement. CDM and Joint Implementation (JI) projects can be used to offset allowance needs. Michael noted that nobody ever said the Kyoto Protocol was going to solve climate change. EU ETS is the most aggressive attempt to implement a regulatory framework for GHG emission reduction. Michael said the EU ETS is important for the lessons learned as we look beyond 2012 and

[59] Interview February 11, 2009
[60] Interview February 9, 2009
[61] Interview January 16, 2009

toward the next international agreement.[62] A common criticism of EU ETS, among respondents, is that the timeframe is too short. Although probably valid, with regard to the potential effectiveness of carbon policy, the fact that the timeframe is too short cannot be blamed on the EU; the time frames were negotiated by the international community under Kyoto. Bob felt that for any real progress to occur, twenty to thirty year infrastructure investments are needed; he said this cannot be done with a five year cap in place.[63] Uncertainty has to be reduced to attract the necessary capital to solve the problem.

One important role the EU ETS plays is that it gives a price signal that encourages project developers to invest in climate friendly CDM projects. Unfortunately, the use of Certified Emission Reductions (CERs) in Phase III was made contingent upon the emergence of a successor to the Kyoto Protocol. The intention of this restriction on CERs is to encourage other countries to make more meaningful commitments. Sadly, the result is more uncertainty and could have the unintended consequence of losing valuable momentum to reduce global GHG emissions through CDM.

4. Clean Development Mechanism

CDM projects are the primary method of creating compliance offsets. Respondents had very strong and different opinions about CDM and how the program is working. Michael said CDM is an important building block for future carbon offset programs.[64] David said the United Nations is regulating the project development market by administrative delay.[65] Russ, Bob and Michael said that methodologies, standards and protocols for issues such as additionality need to be sectoral

[62] Interview February 10, 2009
[63] Interview February 9, 2009
[64] Interview February 10, 2009
[65] Interview January 9, 2009

based as opposed to the current method of project based.[66] Cam noted this contributes to high transaction costs.[67]

Russ said the UN slows things down needlessly; he also said that the system needs to get rid of the financial additionality requirement; he feels very strongly there should only be environmental additionality.[68] The focus needs to be on the quality of the projects and offsets. Each respondent felt we are wasting time as we try to create a perfect system.

The trade-off between the environmental integrity of an offset project and the need to get more projects approved is somewhat of a paradox. Each respondent said the environmental performance of projects is of the utmost importance; nevertheless, each respondent felt that the UN Executive Board and CDM rules are too stringent to allow for any significant reduction of CO_2 emissions.

Michael does not understand the backlash against industrial gas projects. As an investor, he says that his company is looking for the projects with the greatest return on investment.[69] Initially, for CDM project development, these were industrial gas projects. Michael is adamant that, as long as approved methodologies are used and the projects are validated and verified, they should be enthusiastically accepted by the environmental community. Michael does acknowledge that perverse incentives have led to the creation of HFC-22 facilities for the purpose of increasing revenue from offsets; however, he reasons that CDM is an educational and iterative process.[70] Michael says that a well-informed, mature market will take care of these problems. One of the

[66] Interviews February 9, 10 and 11, 2009
[67] Interview January 15, 2009
[68] Interview February 11, 2009
[69] Interview February 10, 2009
[70] Ibid

lessons is that the cheapest emission reductions will occur first. Industrial gases represent cheap emission reductions. Most of these projects have now been exhausted.

Industrial gas projects highlight what implementing a cap-and-trade system is about. Large scale emitters are prompted to reduce emissions using the least expensive methods available. Once these projects are depleted, and further reductions are required, firms will look to the next cheapest method of emission reduction. One problem Bob mentioned is that the uproar caused by industrial gases has caused the Executive Board to implement more complex methodologies and monitoring systems which act as a deterrent for certain types of projects going forward.[71]

Respondents noted that CDM lacks the necessary infrastructure to fulfill the current global demand for compliance offsets. Problems include:

- Staff shortages
- Too few Designated Operational Entities (DOE)
- Procedural inefficiencies
- Regulatory bottlenecks

Demand has constrained the capacity of CDM infrastructure to deliver CER's on schedule. 2022 out of 3188 projects were at the validation stage at the end of 2007.[72] Project developers noted that it takes six months to engage a DOE; it takes 80 days from registration request to actual registration; newly revised methodologies complicate approvals; 1-2 years pass before CER's are issued from the time a project enters the pipeline.[73]

[71] Interview February 9, 2009
[72] Capoor, K., & Ambrosi, P. (2008). State and trends of the carbon market 2008. *The World Bank, Washington, DC*.
[73] Ibid

Russ, Bob and Michael agreed that CDM is an educational phenomenon.[74] As we build a compliance system in the United States, we need to learn from the strengths and weaknesses of current programs. The Kyoto Protocol is a steppingstone on the road to global emission reductions.

Complex rules and capacity constraint need to be modified. DOE's cannot keep up with the backlog; they need more people. However, they find it difficult to recruit, train and retain qualified staff. Excessively high transaction costs are the result. There is an urgent need for regulatory efforts to reform and streamline the process. Delays impact project financing, construction, and implementation. They dampen enthusiasm for further necessary innovation. [75]

"CDM must move up the learning curve and evolve toward approaches and methodologies that conservatively estimate emission reduction trends on the aggregate level and away from the current focus on trying to account for every last ton reduced or removed from the atmosphere. The next generation CDM should focus on catalyzing step changes in emission trends, and on creating incentives for large-scale, transformative investment programs."[76] This will require more standardization and less project specificity.

5. **Voluntary Carbon Offset Markets**

The voluntary market existed in some fashion before the Kyoto Protocol was negotiated and adopted in 1997. The trading mechanisms of Kyoto became operational on February 16, 2005. The voluntary markets have grown and matured each year, particularly since Kyoto has been in effect. The OTC voluntary markets differ from the CCX in that they are not driven by an

[74] Interviews February 9, 10 and 11, 2009
[75] Capoor, K., & Ambrosi, P. (2008). State and trends of the carbon market 2008. *The World Bank, Washington, DC*.
[76] Ibid

emissions cap (although the CCX cap is voluntary). Voluntary offsets are highly fragmented and are driven on a deal-by-deal basis.[77] In the financial markets, participants refer to these types of instruments as each "having a different story."[78] The offsets are unique and there are many different standards in the voluntary market. These include:

- CDM
- Gold Standard
- Voluntary Carbon Standard (VCS)
- VER+
- Climate Action Reserve (formerly CCAR)
- Voluntary Offset Standard (VOS)
- Plan Vivo
- CCX
- Climate Community and Biodiversity Standards (CCBS)
- GHG Protocol for Project Accounting
- ISO 14064

Some of these are ***full-fledged carbon offset standards*** that offer all three major components[79]:

1. Accounting Standards
2. Monitoring, Verification and Certification Standards
3. Registration and Enforcement Systems

[77] Interview February 11, 2009
[78] Kollmuss, A., Zink, H., & Polycarp, C. (2008). Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards: by: WWF Germany
[79] Ibid

Others are ***Project Design Standards*** (PDS) which include accounting standards and some monitoring standards[80]. ***Offset Standard Screens*** are not full-fledged standards but accept projects that were implemented under other standards and that adhere to their screening standards.[81] ***Offset Accounting Protocols*** provide definitions and procedures to account for GHG reductions from offset projects but have no associated or regulatory bodies. Many of the full-fledged standards are based on such protocols.[82] ***Other Standard Types*** do not quite fit any of these other categories and have usually been developed for a specific project type.[83]

The voluntary market has undergone significant scrutiny by the press; in recent years, certain projects and offsets received negative publicity. The concept of additionality was introduced to the public; whether particular offsets met the additionality requirement was questioned. Closer examination of whether or not emission reductions were real took place. Some referred to the voluntary offset market as the "Wild West."[84] The term "ripoffsets" has become a term used to refer to some questionable offsets. However, like other evolving markets, the voluntary offset market is building an infrastructure that changes as stakeholders educate themselves.

Recently, offset purchasers have become more concerned about the quality of the offsets they buy, leading to a proliferation of standards. Each standard has a slightly different focus and none has managed to establish itself as ***the*** industry standard. Some closely mirror compliance market standards, while others take a more lenient approach in order to lessen the administrative burden and enable as many credits as possible to enter the market.[85] Certain standards are limited to

[80] Kollmuss, A., Zink, H., & Polycarp, C. (2008). Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards: by: WWF Germany
[81] Ibid
[82] Ibid
[83] Ibid
[84] Ibid
[85] Kollmuss, A., Zink, H., & Polycarp, C. (2008). Making Sense of the Voluntary Carbon Market: A Comparison

particular project types (e.g. forestry) while others exclude some project types in order to focus on the social benefits of carbon projects. [86]

The different standards differentiate themselves in some of these categories[87]:

- Additionality Tests
- Main Supporters
- Market Share
- Baseline measurement
- Third-party verification requirement
- Separation of verification and approval process
- Registry
- Project Types
- Environmental and Social Co-benefits
- Price

An interesting aspect of the voluntary market is the motivation of the offset buyer. Given the fact that there is no regulatory reason to purchase a carbon offset, why do different entities choose to do so? In 2007, the reasons for purchase most often cited were corporate responsibility and public relations/branding.[88] Price and convenience were noted as the least important factors.[89] Considerations such as additionality, certification, reputation and environmental and social

---

of Carbon Offset Standards: by: WWF Germany

[86] Hamilton, K., Sjardin, M., Marcello, T., & Xu, G. (2008). Forging a Frontier: State of the Voluntary Carbon Markets 2008. *Washington, DC, and New York: Ecosystem Marketplace and New Carbon Finance*

[87] Ibid

[88] Ibid

[89] Ibid

benefits matter the most.[90] As the market has evolved and consumers have become educated, voluntary carbon offset buyers want to purchase emission reductions that they think are real and make a difference.

Compliance buyers have a far different motivation. In the compliance market, offset buyers simply want to meet their regulatory need. Quality (or perceived quality) is of little or no concern.[91] This interesting phenomenon provokes the question of what will happen to the voluntary markets when the U.S. institutes a regulatory regime. Most observers believe there will always be a voluntary market for those entities that are not capped, or for those that want to go beyond the cap. The question is whether the demand for the types of projects (high-quality and charismatic) that voluntary buyers purchase now will be reduced under a regulatory framework.

Climate science argues that the "quality" of the offset does not matter as long as the emission reduction is real. Although environmentalists beg to differ because they think that environmental and social co-benefits are a critical part of any offset market, the most important element of quality has to be real reduction. CDM, which was created with sustainable co-benefits in mind, has not fulfilled this goal. One could argue that the UN Executive Board realizes that the most important aspect of a carbon offset is real emission reduction. If certain types of buyers want to pay more for co-benefits that is their noble decision. However, the goal of the offset market has to be real, verifiable emission reductions.

[90]Hamilton, K., Sjardin, M., Marcello, T., & Xu, G. (2008). Forging a Frontier: State of the Voluntary Carbon Markets 2008. *Washington, DC, and New York: Ecosystem Marketplace and New Carbon Finance*

[91] Sandor, R. (1992). IMPLEMENTATION ISSUES: MARKET ARCHITECTURE AND THE TRADEABLE INSTRUMENT. *Combating Global Warming: Study on a Global System of Tradeable Carbon Emission Entitlements*, 151

SECTION V: Market creation

Step one in a new commodity market is to define the commodity itself. In the SO_2 market that commodity is the EPA SO_2 allowance. One can assume that the CO_2 market will also define the commodity as a carbon allowance issued by whatever administrator is chosen by policymakers. New markets have an evolutionary process. Invention, innovation and market architecture are important. Good rules lead to the financial integrity of a market, including recordkeeping, disclosure and reporting.

Organized markets serve as a unified vehicle for the allocation of capital and the transfer of price risk at the lowest cost to the users.[92] Futures markets are often the most liquid and efficient market for an underlying commodity; however, futures exchanges traditionally evolve from cash forward markets. The most efficient market is often not the first market to be invented. Markets evolve.[93]

The goal of the CO_2 markets is to lower the cost of emissions; costs are lowered because the market encourages more emission reductions to be produced by the most efficient sources.[94] Barriers to the market, such as high transaction costs or regulatory impediments, hurt the prospects of cutting the cost of lowering emissions. An organized exchange aids the process by lowering the costs of finding a willing buyer or seller, by reducing the administrative costs of

[92] Sandor, R. (1992). IMPLEMENTATION ISSUES: MARKET ARCHITECTURE AND THE TRADEABLE INSTRUMENT. *Combating Global Warming: Study on a Global System of Tradeable Carbon Emission Entitlements*, 151
[93] Ibid
[94] Ibid

trading and by making prices known to all.[95] Users of futures markets include both the hedger and the speculator.

The development of market architecture is an art as much as a science. It is an iterative process that begins with specific proposals and evolves into a final structure. The evolution has begun for the world carbon markets. An interesting feature has been the creation of a futures market before the spot market has been well defined.

Section VI: Nascent financial markets

Experienced mortgage traders, who go back to the infancy of MBS, pointed out there were very few problems with that new market. A learning curve existed and there were some growing pains. However, the market functioned very well and became more and more liquid over time. The underlying asset was standardized, as was delivery. Futures and options markets developed with no risk to the system because the underlying asset was simple. That seems like a very long time ago. Unfortunately, the quality of the underlying asset deteriorated at the same time that financial engineering, based on the cash-flows of different kinds of mortgages, increased. The products were no longer simple and easily understood. Arthur (a low carbon economy consultant) noted that the negative externalities of these new products were not priced properly (if at all).[96] Policymakers need to look at the long history of the MBS market and take note of the fact that when it was simple it worked very well and posed no risk to the financial system.

The history of interest rate swaps tells a similar story. "Plain-vanilla" interest rate swaps were a financial innovation. Interest rate swaps allowed companies to hedge their floating or fixed-rate

[95] Sandor, R. (1992). IMPLEMENTATION ISSUES: MARKET ARCHITECTURE AND THE TRADEABLE INSTRUMENT. *Combating Global Warming: Study on a Global System of Tradeable Carbon Emission Entitlements*, 151

[96] Interview January 29, 2009

interest rate exposure. Interest rate swaps trade over-the counter (OTC) and have both credit risk and interest rate risk. Each transaction is bilateral and unique. At inception, interest rate swap market participants took credit risk very seriously. Credit risk is a function of the counterparty in a bilateral trade. Individual firms only wanted a certain amount of exposure to other firms.

Financial firms created a trade association, the International Swap and Derivatives Association (ISDA) in 1985. ISDA created standardization of swap contracts; the ISDA master agreement allows for positions to be netted out on transactions between members. The agreement also allows for similar transactions to be moved amongst counterparties, although a new contract must be written when the exchange takes place. The ISDA master agreement led to the evolution of a very liquid market.

Unfortunately, the liquidity of this new market led to two problems which have only recently come to light. First, there was a proliferation of more exotic derivative products, some of which had similarities to interest rate swaps. Second, financial firms lost sight of the credit risk. The combination of these two issues has been a major factor in the credit and financial market crisis. When interest rate swaps were simple, and financial firms were diligent about credit exposure, there were no blow-ups.

Section VII: The role of compliance offsets

The SO_2 market does not have offsets. Where carbon offsets fit into overall U.S. policy, and the carbon markets, is an important question. Many issues need to be resolved regarding offsets and how they are implemented into overall U.S. carbon policy. Some of these issues are:

- Types of offsets allowed: domestic and international

- Restrictions on quantity allowed to satisfy emission reduction requirements
- The need to maintain the integrity of the cap (environmental objective) as well as the integrity of the market (economic objective)

There are many dimensions of the integrity issue. These include:

- Measurement and monitoring
- Baseline calculations
- Additionality
- Leakage
- Permanence
- Transparency

The value of an offset is inherent in it being a verifiable reduction in emissions. Investors will need assurance that each allowance generated by these activities is indeed a true emissions "offset." This assurance will create investor confidence and help sustain the market. So what characteristics are necessary in the structuring of the offset market to create the assurance investors need?

Offsets need some semblance of standardization; at the present time it is possible that we have too many standards, protocols and methodologies and too few experts that understand these processes. CDM currently authorizes only twenty DOEs to validate projects in fifteen different sectoral scopes. A maximum of eight DOEs, and a minimum of one (afforestation/reforestation), have been approved to provide verification per different sectoral scopes. The approved methodologies per sectoral scope range from twenty-nine for energy industries to none for both

solvent use and construction.[97] In the voluntary markets, there are many different standards and protocols for carbon offsets. Respondents said that CCX has the lowest standards for quality (environmental integrity).[98] Of the many voluntary standards mentioned earlier VCS, Gold Standard, VER+, and CCAR all have different characteristics, but were considered high quality by the respondents.[99]

Investors need access to information and they need to trust this information in order to make good decisions. Grades and ratings of commodities and financial instruments have existed for as long as markets have been in place. For example, corporate bonds are rated by credit ratings agencies; different grades of oil and orange juice trade on commodities exchanges. Different standards are similar to different grades and ratings.

Carbon offsets vary at the project level; however, once they have gone through the process of validation, verification and registration they become a stamped carbon credit. A stamped methane offset is equivalent to a stamped renewable energy offset. It is basically the difference between a primary CER and a secondary CER. If pre-stamped offset projects trade on an exchange or OTC, market participants, given proper information and disclosure about the standards, protocols and methodologies being used in a project's development, will differentiate quality by price.

The respondents that invest in the carbon markets and project development were all comfortable with the methodologies and standards that currently exist. They do not want too many different standards but accept the fact that there cannot be just one. Michael noted that there are various

[97] Capoor, K., & Ambrosi, P. (2008). State and trends of the carbon market 2008. *The World Bank, Washington, DC*
[98] Interviews February 9, 10 and 11, 2009
[99] Ibid

currencies so why shouldn't there be different standards for carbon offsets.[100] Russ said there will eventually be one registry when the United States goes to a compliance market.[101] This registry will approve certain standards; completed projects that meet approved standards will be registered and stamped.

Investors that purchase offsets in the primary CER ***and*** voluntary carbon offset markets face various risks. An insurance underwriter, Mary, mentioned that there are five risks that need to be observed and priced in a carbon offset project:[102]

1. Non-delivery risk
2. Credit risk
3. Political risk
4. Pricing risk
5. Systemic risk

She said that her company is comfortable with the first four risks. However, the risk that the entire system falls apart is very difficult to price properly. It bears no similarity to the other risks. The idea that the government can shut the game down at any time makes this risk more of an uncertainty that will affect the value of all assets in the carbon market.[103]

Various methods for hedging delivery risk are available to market participants. Insurance can be purchased; options can be used; or the risk can be taken outright. The price of these different hedging instruments will determine their usefulness. Some standards might implement a buffer

[100] Interview February 10, 2009
[101] Interview February 9, 2009
[102] Interview December 16, 2009
[103] Ibid

system for certain types of projects, such as the Voluntary Carbon Standard has discussed for forestry.

RECOMMENDATIONS

Recommendations are offered in three areas.

1. Financial Market Regulation and Oversight
2. The Carbon Market (in general)
3. The Carbon Offset Market

Some suggestions encompass all three; others pertain specifically to one category.

Keep it simple. The overwhelming consensus of the respondents was that fewer products (and types of products) allow all market participants to understand and price financial instruments properly. Derivative products are an important feature of many healthy markets. Futures exchanges are the most obvious example of this. Capped entities might choose to hedge their carbon risk; a futures market allows emitters to price their risks on a longer term basis and therefore make important decisions about capital investments. Options markets allow the same opportunity for hedging. The key is that these products need to be of the "plain-vanilla" variety.

Infrastructure development is very important for markets. Uncertainty is the enemy of a well functioning and efficient market. With the understanding that market innovation is an iterative process and that adjustments may need to be made, the rules and regulations of the market have to be simple and easily understood. Competing standards and registries make the offset market more complex than need be. Different standards could be used for different project types, but simplicity is the friend of a new market. Carbon offsets are somewhat complex in the first place. Too many methods and protocols for measurement, monitoring, verification, validation and

registration will only hinder the success of the market. Offsets need to be part of a regulatory regime; most experts agree that carbon offsets provide some of the most cost-effective emission reductions available. Offsets present capped entities with flexibility; this allows time for future improvements, innovations and new technologies. If we impose a well-conceived regulatory system there is no need to limit the amount of offsets allowed in the scheme. After all, carbon emissions are a global problem. However, until we are certain that measurement and auditing protocols are robust, it makes sense to limit the amount of offsets allowed in a domestic cap-and-trade scheme.

The financial market regulatory system needs a complete overhaul. Many respondents said there are not enough competent people within the regulatory community. The major challenges are to put the technology in place that allows regulators to view all transactions, and to have enough competent personnel in place for enforcement to be a legitimate deterrence to wrongdoing. Continuous emissions monitoring (CEM) should be a metaphor for all market regulation. The success of the SO_2 program is really the success of quality monitoring and enforcement. Transactions in the financial markets can be equated to SO_2 emissions at utilities. Regulators can easily enforce rules if they know all the emissions (transactions). Financial firms must be forced to let go of their notion that transparency is bad. Full disclosure might reduce their profits, but the trade-off of eliminating systemic risk is far better for society as a whole.

So how do we build a system that includes offsets and maintains a high degree of environmental integrity? Who decides that an offset is real? The CDM backlog is partially a function of too few approved validators and verifiers. Where do these validators and verifiers fit into the regulatory regime? Experience tells us the private market method of credit ratings agencies has been a dismal failure. The issuer cannot pay for the rating; the conflict of interest is too great. Fees need

to be paid on transactions that will bankroll rating agencies within the regulator. A similar system should be used for verifiers and validators. The carbon markets have a goal of cost-effective CO_2 emission reductions; government regulation creates these markets for the societal good. We cannot afford to ignore past mistakes and let potential conflicts of interest and collusion go unnoticed. Some unit of the government has to validate and verify offsets. There must be the necessary funding allocated to a carbon market regulator so that enforcement becomes a foregone conclusion.

A great deal of debate went on within the respondent group about who should be allowed to participate in the carbon markets. Linda (an insurance executive and former NGO executive) insisted that those without a vested interest in carbon should not be allowed to play in the markets.[104] Michael asserted that markets are most efficient when there are as many actors as possible. He was adamant that the carbon markets do not need any different regulation than other regulated markets. Michael acknowledged that better, more thorough, regulation and oversight is a necessity in the financial markets. He claimed that whatever regulation is implemented in the financial markets will be good enough for the carbon markets.[105]

Futures markets were created with the idea that hedgers and speculators would both play. If only hedgers existed then the markets would have insufficient liquidity; after all, natural hedgers are usually going the same way in the market. If the proper regulations are in place, there is no reason why there should not be unlimited participation in the carbon and carbon offset markets. The CDS market has received a tremendous amount of negative publicity over the last six months. Many people blame the growth of the CDS market for the financial devastation that has

[104] Interview January 21, 2009
[105] Interview February 10, 2009

taken place. Sam begs to differ; he said that it is not the CDS market itself, but the lack of regulation, capital requirements and transparency in that market.[106]

Most leverage, transparency and capital problems can be resolved by implementing a trading platform that requires a clearinghouse to act as the middleman on all transactions. Margin requirements, collateral requirements and daily mark to market have kept all exchanges, and clearinghouse maintained markets, from having any of the hiccups that have occurred in certain OTC and bespoke markets. Leverage ratios of carbon offset developers need to be transparent.

A clearinghouse is not a silver bullet; policy makers must realize that there are two kinds of default risk: "position risk" and "balance sheet risk". A clearinghouse has access to a firm's positions in a particular market, but not to that firm's overall balance sheet of risks. This is where the metaphor of continuous emissions monitoring equals continuous transactions monitoring comes into play. The twenty-first century financial market regulator has to know ***everything*** that is on a firm's balance sheet.

The recommendation is that the carbon markets and carbon offset markets use a central clearinghouse mechanism that facilitates all trades and settlements. One implication of this is that there cannot be any exotic derivatives; they cannot be cleared because a clearinghouse needs to be able to liquidate positions quickly. A clearinghouse works only when standardization and liquidity abound. A clearinghouse system is a necessity for all markets, including the carbon and carbon offset markets.

[106] Interview February 12, 2009

SUMMARY

More than 40 hours of interviews were conducted with 29 different stakeholders in the financial markets, carbon markets, NGO and public policy communities. Although there were diverse opinions on individual questions, the interviewer was surprised by the consensus and unanimity on certain important issues.

Internal oversight needs to be increased at financial services firms. Executives need to acknowledge that market participants are motivated by financial incentives; some would go so far as to call it greed. Many capitalists say this is a good thing. Unfortunately, the compensation system rewards profits with no penalty for losses. No fear exists to counteract the greed. Reckless behavior is encouraged because there are no consequences for losing. The credit crisis has exposed this flaw. It will be interesting to see what financial services firms do to change their cultures.

Not a single respondent felt that our financial regulatory system is adequate. Respondents at every level, from trader to CEO, said that stronger, enforceable regulation is a necessity for the financial markets. One high level bank executive noted that "penalties for cheating need to be consistent and dramatic."[107] Financial regulators need to be feared by the greedy. Making this happen is another story. Many respondents said there were too few competent employees working for the regulators. They also noted that the regulatory agencies were underfunded. We need to find a way to make enforcement a well funded mandate.

Technologies should allow regulators to monitor every transaction. All products need to come under the purview of the regulatory system. Respondents were deeply saddened by the collapse

[107] Interview January 29, 2009

of our financial system. They want to do whatever it takes to make sure it does not happen again. We can learn from what works and what has not. A clearinghouse system of trade settlement needs to be implemented for all the different types of tradable financial products. Exotics should be severely limited, and possibly eliminated.

Keep it simple should be the motto of the carbon and carbon offset markets. Most problems in the financial markets have been a function of too much leverage on complex derivatives with little transparency. These new markets need to be modeled after markets that have worked; they should reject what has not worked. Standardization and liquidity are important qualities of successful markets. The infrastructure and human capital that develops in the carbon offset market needs to put the environmental integrity of the program first. Although respondents complained about the inefficiency of CDM, they acknowledged that the integrity of the offset must take precedence. Conflicts of interest must be avoided while a system of robust standards and protocols is built. Most respondents believe the methodologies exist; the issue is the availability of qualified personnel to validate and verify projects on a large scale.

CONCLUSION

Building the carbon and carbon offset markets will not be easy. The economic downturn in the United States will not help our leadership focus on climate change. However, the problem gets worse every day we wait. This report puts forth some ideas and recommendations on how the carbon and carbon offset markets should be structured. More questions exist than were answered. More research on what a twenty-first century regulator for all financial markets, including carbon and carbon offsets, needs to be done.

Policymakers need to take a careful look at the impact a compliance offset market will have, if any, on the voluntary market. This should include careful consideration of the types of projects allowed in a compliance regime, especially if environmental and social co-benefits are important to these policymakers.

Interviews

1. Sam MBS trader, Hedge Fund, February 12, 2009
2. Jeff Fixed Income trader, Hedge Fund, February 11, 2009
3. Richard MBS money manager, Investment Company, February 8, 2009
4. Gary Managing Director, Private Equity firm, January 31, 2009
5. Brian Partner, Law Firm, February 6, 2009
6. Randy Partner, Law Firm, February 6, 2009
7. Todd Chief Operating Officer, Exchange, February 4, 2009
8. Scott Chief Executive Officer, Mortgage Finance Company, January 24, 2009
9. Peter Chief Executive Officer, Carbon Offset Developer, January 16, 2009
10. William Head Interest Rate Swap Trader, Multinational Bank, January 7, 2009
11. Ben Partner, Consulting Firm, December 17, 2008
12. Arthur Partner, Consulting Firm, January 29, 2009
13. Tom Chief Operating Officer, Carbon Offset Developer, January 16, 2009
14. Linda Senior Vice President, Insurance Company, January 21, 2009
15. Mary Senior Vice President, Insurance Company, December 16, 2009
16. Gerry Partner, Private Equity Firm, January 14, 2009
17. Tim Senior Vice President, Futures Exchange, January 30, 2009
18. James Executive Vice President, Multinational Bank, January 29, 2009
19. Cam Executive Vice President, Private Equity Firm, January 15, 2009
20. Bob CEO, Carbon Investment Company, February 9, 2009
21. Michael CEO, Carbon Offset Investment Firm, February 10, 2009
22. Russ CEO, Environmental Commodity Trading Firm, February 11, 2009
23. Fred Economist, NGO, January 29, 2009
24. Norm Professor, University, January 6, 2009

25. Neil Professor, University, January 7, 2009

26. Zack Private Investor, Self-employed, January 9, 2009

27. David Investor, Venture Capital Firm, January 9, 2009

28. Dan Energy Trader, Hedge Fund, February 4, 2009

29. Chris Carbon Trader, Insurance Company, January 13, 2009

Other References

Allocating Allowances in a Greenhouse Gas Trading System (2006). National Commission on Energy Policy.

Vountary Carbon Standard (2007).

Bales, C., Albert Cho, Jamie Russell (2008). *Financing the Transition to a Low-Carbon U.S. Economy*. Paper presented at the American Response to Climate Change Conference.

Bales, C., & Duke, R. (2008). Containing Climate Change. *Foreign Affairs*.

Benkovic, S. a. J. K. (2001). U.S. Sulfur Dioxide Emissions Trading Program: Results and Further Applications. *Water, Air & Soil Pollution, 130*(1-4).

Burtraw, D. (1998). *Cost Savings, Market Performance, and Economic Benefits of the U.S. Acid Rain Program*. Washington, D.C.: Resources for the Future.

Capoor, K., & Ambrosi, P. (2008). State and trends of the carbon market 2008. *The World Bank, Washington, DC*.

Creyts, J., Board, C., McKinsey, & Company (2007). *Reducing US Greenhouse Gas Emissions how Much at what Cost?*

Ebeling, J., & Yasué, M. (2008). Generating carbon finance through avoided deforestation and its potential to create climatic, conservation and human development benefits. *Philosophical Transactions of the Royal Society B: Biological Sciences, 363*(1498), 1917-1924.

Ellerman, A. (2006). Are cap-and-trade programs more environmentally effective than conventional regulation? *Moving to markets in environmental regulation: Lessons from twenty years of experience*, 48–62.

Enkvist, P., Nauclér, T., & Rosander, J. (2007). A cost curve for greenhouse gas reduction. *McKinsey Quarterly, 1*, 34.

Galik, C., Mobley, M., Olander, L., & Murray, B. climate change policy partnership.

Hall, D. S. (2007). *Offsets: Incentivizing Reductions While Managing Uncertainty and Ensuring Integrity*. Washington D.C.: Resources for the Future.

Hamilton, K., Sjardin, M., Marcello, T., & Xu, G. (2008). Forging a Frontier: State of the Voluntary Carbon Markets 2008. *Washington, DC, and New York: Ecosystem Marketplace and New Carbon Finance*.

Initiative, O. (2008). Ensuring Offset Quality: integrating high quality greenhouse gas offsets into North American cap-and-trade policy: Washington, DC 24p.

Kapoor, A. (2008). *State and Trends of the Carbon Market 2008*. New York: World Bank Institute.

Kaul, I., & Conceição, P. (2006). *The new public finance: responding to global challenges*: Oxford University Press, USA.

Keohane, N. (2009). Cap and Trade, Rehabilitated: Using Tradable Permits to Control US Greenhouse Gases. *Review of Environmental Economics and Policy*.

Keohane, R., & Raustiala, K. (2008). Toward a Post-Kyoto Climate Change Architecture: a Political Analysis. *UCLA School of Law & Economics Research Paper Series Research Paper*.

Kim, M., McCarl, B., & Murray, B. (2008). Permanence discounting for land-based carbon sequestration. *Ecological Economics, 64*(4), 763-769.

Kollmuss, A., Zink, H., & Polycarp, C. (2008). Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards: by: WWF Germany.

Mooraj, S., Oyon, D., & Hostettler, D. (1999). The balanced scorecard: a necessary good or an unnecessary evil? *European Management Journal, 17*(5), 481-491.
Murray, B., Newell, R., & Pizer, W. (2008). Balancing Cost and Emissions Certainty. *Resources for the Future Discussion Paper*, 08-24.
Murray, B., Newell, R., & Pizer, W. (2009). Balancing cost and emissions certainty: An allowance reserve for cap-and-trade. *Review of Environmental Economics and Policy*.
Natsource (2007). *Realizing the Benefits of Greenhouse Gas Offsets: Design Options to Stimulate Project Development and Ensure Environmental Integrity*: National Commission on Energy Policy.
Newell, R., Pizer, W., & Zhang, J. (2005). Managing permit markets to stabilize prices. *Environmental and Resource Economics, 31*(2), 133-157.
Olander, L. (2008). *Designing Offsets Policy for the U.S.* Durham, NC: Nicholas Institute for Environmental Policy Solutions.
Pagiola, S., & Bosquet, B. (2009). Estimating the costs of REDD at the country level. *Washington, DC: World Bank.*
Parry, I. W. H. a. W. A. P. (2007). *Emissions Trading versus CO2 Taxes versus Standards*. Washington D.C.: Resources for the Future.
Richards, K. a. K. A. (2001). The leaky sink: Persistent obstacles to a forest carbon sequestration program based on individual projects. *Climate Policy, 1*, 41-54.
Russell, J. (2008). *Options for avoiding deforestation in tropical countries*. New York: William J. Clinton Foundation.
Russell, J. (2008). *Unlocking climate change mitigation potential of sustainable commercial plantations*. New York: William J. Clinton Foundation.
Sandor, R. (1992). IMPLEMENTATlON lSSUES: MARKET ARCHlTECTURE AND THE TRADEABLE lNSTRUMENT. *Combating Global Warming: Study on a Global System of Tradeable Carbon Emission Entitlements*, 151.
Sandor, R. (2002). An overview of a free-market approach to climate change and conservation. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 360*(1797), 1607-1620.
Solutions, E., Olander, L., & Murray, B. Mitigation Beyond the Cap.
Standard, V. (2007). Guidance for Agriculture, Forestry and Other Land Use Projects. *Voluntary Carbon Standard*.
Stavins, R. (2005). Lessons Learned from SO2 Allowance Trading. *Choices, 20*(1), 53–58.
Stavins, R. N. (2007). *A U.S. Cap-and-Trade System to Address Global Climate Change*. Washington D.C.: The Brookings Institution.
Trexler, M., Derik Broekhoff, Laura Kosloff (2006). A statistically-driven approach to offset-based GHG additionality determinations. *Sustainable Development Law & Policy, 6*(2), 30-40.

GLOSSARY

Derivative: Derivatives are financial contracts, or financial instruments, whose values are derived from the value of something else (known as the underlying). The underlying on which a derivative is based can be an asset, an index, or other items. The main types of derivatives are forwards, futures, options, and swaps.

Transparency: Something transparent is easily seen, recognized or detected. In the financial markets transparency refers to the ability of market participants (including regulators) to access ALL relevant market information so that fully informed decisions can be made. Various types of transparency exist; prices, market risk and credit risk are the most important for this report.

Efficiency: For the purpose of this report, efficiency is the use of resources in the production of goods and services at the lowest possible cost.

Full Disclosure: Full disclosure is an extension of transparency. Full disclosure refers to the idea that all information about a company or market is available to regulators and investors.

Value at Risk (VaR): In financial mathematics and financial risk management, Value at Risk (VaR) is a widely used measure of the risk of loss on a specific portfolio of financial assets. For a given portfolio, probability and time horizon, VaR is defined as a threshold value such that the probability that the mark-to-market loss on the portfolio over the given time horizon exceeds this value (assuming normal markets and no trading) is the given probability level.

Regulation: For the purpose of this report regulation refers to government rules and restrictions imposed on market participants to achieve a desired outcome.

Credit Risk: Credit risk is the risk of loss due to a debtor's non-payment of a loan or other line of credit. Counterparty risk, otherwise known as default risk, is the risk that an organization does not pay out on a trade or transaction when it is supposed to.

Clearinghouse: A clearinghouse is a financial services company that provides clearing and settlement services for financial transactions, usually on a futures exchange and often acts as central counterparty. As central counterparty, a clearinghouse acts as the buyer to every seller and the seller to every buyer. Members of an exchange trade with each other, but for the purposes of trade settlement, the counterparty is the clearinghouse.

Speculator: A speculator is a market participant that assumes the risk of loss, in return for the uncertain possibility of a reward. Speculators are assumed to have no commercial activity in the underlying asset.

Hedger: A hedger is a market participant who takes a position in one market in an attempt to offset exposure to the price risk of an equal but opposite position in another market — usually, but not always, in the context of one's commercial activity. Hedging is a strategy designed to minimize exposure to such business risks as a sharp contraction in demand for one's inventory, while still allowing the business to profit from producing and maintaining that inventory

Plain-vanilla: Plain-vanilla is a term used in the financial markets to represent something simple, not exotic. Plain-vanilla derivatives are basic futures and options; market participants can easily understand and calculate the value of plain-vanilla financial instruments. The simplicity (and ease of valuation) of plain-vanilla products allows them to be settled through a clearinghouse.

APPENDIX # 1: Respondent's jobs, former jobs and firms

Name	*Job*	*Company*	*Former Job*	*Company*
Sam	MBS Trader	Hedge Fund	MBS Trader	Hedge Fund
Jeff	Fixed Income Trader	Hedge Fund	High Level Executive	Multi-National Bank
Richard	MBS Money Manager	Investment Company	MBS Money Manager	Investment Company
Gary	High-Level Executive	Private Equity firm	High-Level Executive	Multi-National Bank
Brian	Attorney	Law firm	Attorney	Commodity Exchange
Randy	Attorney	Law firm	Professor	Law School
Todd	High-Level Executive	Futures Exchange	High-Level Executive	Financial Services Firm
Scott	High-Level Executive	Finance Company	High-Level Executive	Multi-National Bank
Peter	High-Level Executive	Carbon Project Developer	High-Level Executive	Internet Company
William	Interest Rate Swap Trader	Multi-National Bank	Interest Rate Swap Trader	Financial Services Firm
Ben	High-Level Executive	Consulting Firm	High-Level Executive	Consulting Firm
Arthur	High-Level Executive	Consulting Firm	High-Level Executive	Consulting Firm
Tom	High-Level Executive	Carbon Project Developer	Executive	NGO

Linda	High-Level Executive	Insurance Company	Executive	NGO
Mary	High-Level Executive	Insurance Company	High-Level Executive	Insurance Company
Gerry	High-Level Executive	Private Equity Firm	High-Level Executive	Internet Company
Tim	High-Level Executive	Futures Exchange	N/A	N/A
James	High-Level Executive	Multi-National Bank	High-Level Executive	Financial Services Firm
Cam	High-Level Executive	Private equity Firm	High-Level Executive	Insurance Company
Bob	High-Level Executive	Environmental Trading Firm	High-Level Executive	Financial Services Firm
Michael	High-Level Executive	Environmental Investment Firm	High-Level Executive	Multi-National Bank
Russ	High-Level Executive	Environmental Consulting Firm	High-Level Executive	Financial Services Firm
Fred	Economist	NGO	Professor	University
Norm	Professor	University	Executive	NGO
David	Investor	Venture Capital Firm	High-Level Executive	Financial Services Firm
Chris	High-Level Executive	Insurance Company	High-Level Executive	Multi-National Bank
Dan	Energy Trader	Hedge Fund	Trader	Financial Services Firm
Neil	Professor	University	N/A	N/A
Zack	Private Investor	Self-employed	Head of Mortgage Trading	Financial Services Firm

APPENDIX # 2: Interview Protocol

U.S. Carbon Offset Policy:
Risks, Uncertainties and What We Can Learn from Current Financial Markets

1. **Research Design**

The purpose of the study is to gather information about the current financial market crisis with regard to oversight, transparency and integrity lapses. The idea is to learn from the mistakes and bring that knowledge to the building and creation of the nascent carbon and carbon offset markets through U.S. public policy.

Semi-structured, open-ended interviews will be conducted of representatives of the following perspectives on the financial market crisis, U. S. carbon policy and carbon offset development:

- Financial service companies
- Carbon offset developers
- Public policy experts

Financial service representatives will be asked to give their perspective on the particulars of their area of expertise with general impressions of what has happened and what could be improved with regard to oversight, transparency and integrity in the financial markets. These representatives will include:

- Executives
- Traders
- Credit-ratings agencies
- Investors
- Risk managers

Project developers of carbon offsets will be asked to give their perspective on what is needed in the areas of oversight, transparency and integrity for the U.S. carbon offset market to be successful in achieving its goals.

Public policy experts will be asked to give their perspective on what is needed in the areas of oversight, transparency and integrity for U.S. carbon policy to move forward and fulfill its goals.

Respondents will be asked to give their perspectives on their particular areas of expertise. They will be asked to contrast their perceptions versus public perceptions.

The following sections are intended to guide the interviews. Each section describes a subset of information that must be obtained. A suggested list of questions is provided in each section. However, it is not necessary to follow the guide exactly. The order may be rearranged to suit the flow of the interview. Questions may be added to obtain pertinent information and facilitate discussion.

Introduction
The researcher will introduce himself, describe the research study and explain why the interviewee was chosen. The interviewer will conduct an informed consent process, providing the potential interviewee with two copies of the form and asking if s/he has any questions before the interviewee consents and the interview begins. Note that the interview will be audio-taped.

Part I: Respondent's Role and Background
What is your current job function? What are your specific responsibilities? Have you had different jobs in your industry in the last ten years? Discuss your role(s) and how you interact with your peers.

Part II: Respondent's Perception of Risk and Management (internal oversight)
Did you think risk management at your firm was thorough? Do you think that risk takers understood the actual risks? Do you think executives understood the actual risks? Do you think managers were in denial? Do you think people were dishonest? Discuss the general level of internal oversight at your firm.

Part III: Respondent's Perception of External Oversight
Was external oversight lacking? Why? What could be done better? How long has the problem existed? Discuss your perception of what went wrong and how to remedy the problem.

Part IV: Respondent's Perception of Transparency
Is there an overall problem with transparency in the financial markets? Is transparency a problem in certain segments of these markets? Discuss how you would resolve transparency issues.

Part V: Carbon and Carbon Offset Markets: Investments, Policy and Goals
Describe a carbon offset? Do you invest in carbon offsets? Do you invest and/or trade in the carbon markets? What types of investments do you make? How long have you been doing this? Do you think these markets are properly regulated? Do you think these markets are transparent? What are the goals of the carbon and carbon offset markets? Do you think U.S. carbon policy will be effective? What recommendations would you make so that carbon policy can achieve its goals? Discuss your thoughts on these issues.

Part VI: Offset Quality and Valuation
Are there different quality carbon offsets? How many? How does quality get measured? Is this a reasonable method? What recommendations would make to improve measurement techniques? Discuss your thoughts on carbon offset quality, in general.

The duration of the interview is expected to be one to two hours. I expect that many of the research participants will agree to an interview of this length, given that many will be acquainted with me as a long-time colleague in the financial markets field. Those that wish to allot a shorter time for the interview will of course be accommodated.

APPENDIX # 3: Interview Consent Form

U.S. Carbon Offset Policy:
Risks, Uncertainties and What We Can Learn from Current Financial Markets

INTERVIEWEE CONSENT FORM

What is the aim of the study?

This study aims to learn more about the current financial crisis and its causes. The study will look at the issues of transparency, integrity, and oversight. The idea is to learn from recent mistakes and bring that knowledge to the formulation of U.S. policy with regard to the nascent carbon and carbon offset markets.

Why am I being asked to participate?

I am interviewing representatives of financial services firms, carbon offset developers, and public policy experts. I am asking to interview you because you have been identified as a person with insight into the recent financial market decline, or carbon offset development, or carbon market policy. I have 27 years of experience in the financial markets field, and am now in the Duke University Environmental Leadership program. This research is for my master's degree.

What will be involved in participating?

I would like to interview you for one to two hours. To ensure that I obtain accurate notes, I will audio-tape the interview and make a transcript of the recording.

Who will know what I say?

Only my advisor, Dr. Deborah Gallagher, a public policy scholar and faculty member at Duke University's Nicholas School of the Environment, and I will have access to the tapes and transcripts. My notes, the transcripts, and everything I produce (e.g. final report, presentations) will not contain the names of you or any other interviewee. Nor will I include the name of your firm or other information that would allow others to determine your identity.

What risks and benefits are associated with participation?

I do not anticipate any risks involved in participating in our study. I anticipate that most or all of the information we discuss will not be sensitive in nature. I expect each interviewee will decide what is reasonable to share. You are welcome to decline to answer any question; no reason is needed, and we will simply go on to other questions. If you do share opinions that include sensitive information about yourself or others, I will safeguard that information by destroying all information that links you to those comments as soon as I have transcribed the tapes and my notes. As I noted above, only Dr. Gallagher and I will have access to my tapes and transcripts, my transcripts and notes will contain no names, and my report will contain no names of people or firms, or clues to the identities of people or firms. Benefits of participation are that your knowledge and insights may be used to recommend improvements in public policies and business practices.

What are my rights as an interviewee?

You may ask any questions regarding the research and they will be answered fully. You may withdraw from the study at any time. The choice to participate or not is yours. You can answer questions as briefly or at length as you wish—it is completely up to you. You can decide if there is something you said that you want to be excluded.

What will be published?

I will make my findings known through a PowerPoint presentation and final paper due in May of 2009 to satisfy my Masters Project requirement toward obtaining a Duke Environmental Leadership-Masters in Environmental Management (DEL-MEM) from Duke's Nicholas School of the Environment.

If I want more information, whom can I contact about the study?

You may contact me, Alan Abramson, at **aia4@duke.edu**. You may also contact Dr. Gallagher at (919) 613-8138 or **deb.Gallagher@duke.edu**. If you have questions or concerns about participating, please contact the Duke University Institutional Review Board through the Office of Research Support at Duke University, Durham, North Carolina at (919) 684-3030 or **ORS-info@duke.edu**.

If you would like to participate, please fill in the lines below. Please give one copy to the interviewer and keep the second copy so that you have this information.

_____ _____

Print Name date

_____

Signature