Memoirs of Hunt Moore: Part I

How I Got To Be an Oil Miller

Hunt Moore with Frank Boling

Note: The following is a paraphrased version of a manuscript personally written by Hunt Moore. Much of the transcription was done the year prior to his 90th birthday (April, 2004). The details of his story dovetail into an extraordinary progression of events that seem to point to something very close to providential influence. Perhaps this could be the case with each person's career, but Hunt Moore's story is a very good example of the real "Great American Dream." That is: A life's work that has been exciting, fulfilling, and most of all, fun. Many words could be written about this man, but the following are basically *his* words, telling *his* story.

The Rubber Band

It was a lazy summer day in McKenzie, Tennessee in 1930. I had finished my chores for the day and was out in our side yard when a neighbor boy came by. He told me he had been playing with some friends who had rubber band guns and predictably, being defenseless, he became a primary target for their weapons. He wanted me to make him a rubber band gun so he could more equitably join in the fun.

I took up the challenge and cut out a nice pistol shape with a longer than usual barrel. Attaching the standard clothespin firing device and cutting a notch at the end of the barrel to receive the rubber band, I then proceeded to test-fire the weapon. Somehow, just as I sighted down the long barrel, the rubber band slipped off the notched end and before my eyelid could close, the powerful rubber band smacked me in the right eye. I spent the rest of the summer in a dark room with eye drops being administered every three hours.

When the healing was accomplished and my eye was tested, the doctor proclaimed I would never regain 20–20 vision. Since all I had dreamed of from a very early age was becoming an aeronautical engineer and flying airplanes, this development was a tremendous blow to my ego. As a result of this, I abandoned my plans of studying aviation.

When school started again that fall, I elected to take chemistry and immediately became very involved with this branch of science. Part of the attraction to this subject was a wonderful young teacher named Clare Dinkman. In addition to being a very good chemistry teacher, she allowed me the privilege of cleaning the glassware and refilling the reagent bottles after school. During this time, Miss Dinkman told me of the many exciting opportunities that were emerging in the chemical industry and before long, my disappointment of not being able to follow my dream of flying was replaced by an eager quest for knowledge of chemistry.

Frank Boling (left) of N. Hunt Moore & Associates, worked with Hunt Moore in putting together the "memoirs."

First Move to Memphis

My father, who was a Methodist minister, was assigned to a church in Memphis just before school started in my senior high school year. After graduation from Humes High School, I signed up and was admitted to what was then known as West Tennessee State Teachers College, now The University of Memphis. I continued my studies in chemistry as a major and took all the math and physics classes offered for the next three years.

During fall registration for my senior year of college, I discovered that to graduate from that school I would be required to complete courses in methods for teaching and participate in the student teaching program. Disappointed that the college did not offer a degree in my major of chemistry, I decided to not register that day and think the situation over.

On the way back home that day, I came across a friend waiting for a streetcar and offered him a ride. I discovered he was working for The Buckeye Cotton Oil Company. He told me that the company was hiring lab assistant trainees to run analysis on the seed from the bumper crop of cotton that year. I got the name of the man to see from my friend.

First Oilseed-Related Job

The next morning bright and early, I was sitting in the office of the lab director interviewing for a job. He was at first reluctant to take my application, learning that I had interrupted my college education after three years, but after some time, I was able to convince him that my motive for working was to get enough money to attend a school where I could get my chemical engineering degree. And I told him I was looking forward to working in a lab to get some on-the-job

training. After that, he hired me on the spot and I worked for him and later another lab for a total of two-and-a-half years.

By years end of 1935 I deemed my finances adequate to take up my college career again and applied and was accepted at Georgia Tech University in Atlanta, Georgia. Having resigned my position as a fairly well qualified lab technician, I packed my footlocker and suitcase and boarded a bus on New Year's Day, bound for my future.

Just before the bus pulled out of the station in downtown Memphis, a young man rushed on and took a seat next to me. His name was James Hayward. On the long trip, I learned that James was a graduate student at the University of Tennessee in Knoxville. He was doing post-graduate work on a pilot plant project on campus, with the goal of testing a new process for hydraulic press extraction of oil from cottonseed. Our conversation deepened to include my lab experience with Buckeye Cotton Oil and when I related my plans to attend Georgia Tech, he said that the he was sure the Engineering Experiment Station at UT-Knoxville would be interested in talking with me since they were searching for a lab technician to conduct oil and protein analysis in connection with the upcoming pilot plant project.

I got some telephone numbers from James and while changing buses in Chattanooga, I phoned Dean Farris, the head of the UT Engineering Department at his home that afternoon. He heard my story and my work history and he then convinced me to at least come to Knoxville and see what they were doing in the oilseed processing field where I had over two years of lab experience.

Forks in the Road of Life

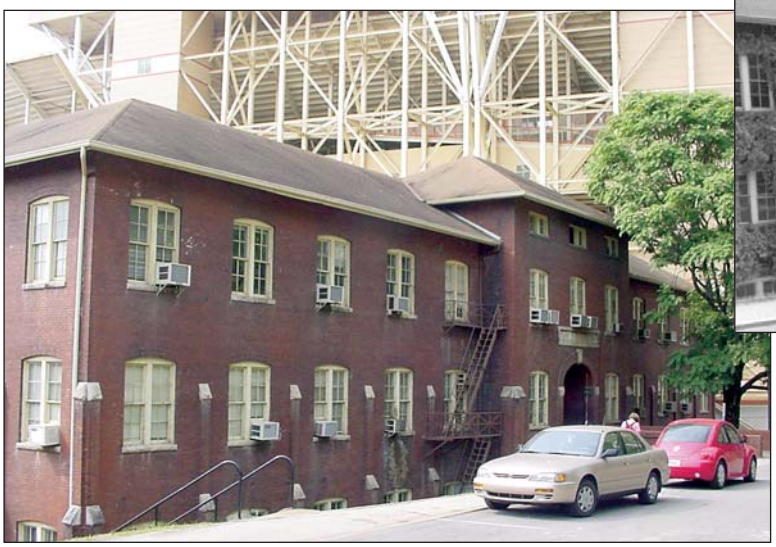
On the spur of the moment, I exchanged my Atlanta bus ticket for one to Knoxville. Since the last bus had already left, I got a room across the street at the YMCA for the night and caught the 6:00 a.m. In Knoxville, after checking my belongings, I walked to the Dean's office and within the hour, I was registered as a junior at the University of Tennessee. Before looking for a place to stay, I had to go to the president's office for his signature on my admission papers. He asked me if I was kin to Yates Moore, a classmate of his at Vanderbilt. Yates Moore was my father and because of the friendship between these two old friends, the president of the University took it upon himself to arrange my room and board with a nice family who lived near the campus.

When the first day of classes was over, I was sent downtown to the TVA [Tennessee Valley Authority] office in the Sunshine building to apply for the lab technician position. TVA was funding the research on this particular project. I needed to see a Mr. Taylor, but the receptionist told me he was very busy and she didn't think he would have time to see me. Since I had studying to do, I asked if I could do homework in the waiting room and maybe he would have time before the day was up.

After a while, as I poured over my books, I noticed a young man going in and out of Mr. Taylor's office. He finally stopped and said he didn't think the man would have time to see me that day. We conversed a few moments and he asked the nature of my business. I told him my story and of my experience in cottonseed and how I had come to be in Knoxville and before I knew what was happening, he had ushered me into Mr. Taylor's office proclaiming me to be "the answer to a maiden's prayer."

The man explained the dilemma he was in trying to work out bus schedules for getting lab samples all the way to Memphis and analysis back with results of the pilot plant's daily production. This current system effectively limited the pilot plant operation to only one or two days a week because of the long transportation link with the nearest lab in Memphis.

Upon hearing my experience in commercial analytical procedures, Mr. Taylor straight away asked me to go over to Estabrook Hall, home of the lab, and make a list of equipment and supplies I would need to begin immediate work in analyzing cottonseed samples from the hydraulic pilot operation. After several days had passed, Mr. Taylor's assistant



COURTESY UNIVERSITY OF TENNESSEE

COURTESY UNIVERSITY ARCHIVES, UNIVERSITY OF TENNESSEE, KNOXVILLE

While attending the University of Tennessee in Knoxville, Hunt Moore worked at the pilot plant on the lower level of Estabrook Hall. His duties of analyzing cottonseed paid him 75 cents an hour. At one point Estabrook Hall was the largest building on campus, but the university's second-oldest building is now dwarfed by structures such as Neyland Stadium, which is seen behind Estabrook in the more recent photo, at left, taken at a similar angle.

came by and told me that in the rush to get me started to work, some of the required formalities had been bypassed, such as an official interview and a complete physical that the Tennessee Valley Authority required for it's employees. When these things were accomplished, I was told that I now had a job making $.75 per hour. It was also about this time I realized that my parents were still under the impression I was at Georgia Tech in Atlanta, so I communicated with them to tell the amazing chain of events that led me to Knoxville.

On the lower floor of Estabrook Hall the pilot plant had been installed and would soon be ready for testing. I was working all the time that I could spare from studying, getting the lab ready. I was able to put in 40 hours a week as I was taking only about a half load of subjects. When the pressure cooker and the hydraulic press were ready to operate, dehulled and rolled cottonseed meats were received by truck from Rome, Georgia, and the tests began. I would go to classes in the mornings and come to the lab in the afternoon and at about 4:30 p.m. the samples would be brought to the lab. These would be properly prepared and would be weighed and the analyses would start. The moisture, residual oil, and the protein would be run. By about 10:30 p.m. the results would be calculated and the reports would be put on the director's desk, so that the next morning he would be able to plan the pilot plant run for the day.

Helping the Oilseed Industry

The improved results from the pilot plant excited the industry enough to encourage manufactures of oil mill equipment to donate equipment to the project. Space was needed to house this new equipment and it was decided to build a new building dedicated to this new pilot plant and to have a larger lab. In 1939 Berry Hall was built and the equipment was installed during Christmas holidays. With this new equipment, whole, delinted cottonseed could be shipped to the pilot plant. This was an important step in the real-world process because, up until then our methods of using seed already dehulled and rolled seed several days or even weeks old, did not duplicate actual plant conditions. The larger facilities and new equipment allowed the seed to be dehulled and rolled on site before going to the pressure cooker. We could process freshly flaked cottonseed meats and test the effect of changes of the moisture, temperature, and pressure on the residual oil in the cake from the hydraulic press. These results were transmitted to the oil mills that were using pressure cookers. This new process was a great help to the cottonseed processing industry because of the significant increase in oil yielded from the process.

Next month, Memoirs of Hunt Moore: Part II, Solvent Extraction—a Piece of Cake. ■

Strategies to Manage Emerging Greenhouse Gas Legislation

Pat Delamater
Katherine Blue

Introduction

The accumulation of greenhouse gases (GHG) in the Earth's atmosphere, created primarily through fossil fuel combustion, has resulted in the scientifically recognized phenomenon known as global climate change, or global warming. GHG include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. In fact, some of the greenhouse gases are actually what make the earth inhabitable. Carbon dioxide is the fifth largest compound in the atmosphere following nitrogen (75%), oxygen (23%), argon (1%), and water vapor.

Greenhouse Gas	*Source(s)*
Carbon Dioxide	Combustion
Methane	Landfills, coal mines, oil and gas production, agriculture
Nitrous Oxide	Combustion, fertilizers, nitric / adipic acid plants
Hydrofluorocarbons	Semiconductor, refrigeration, fire protection
Perfluorocarbons	Semiconductor, refrigeration, fire protection
Sulfur Hexafluoride	Electric power–circuit breakers, gas-insulated substations, switchgear

Solar radiation passes through our clear atmosphere. Some solar radiation is reflected by the earth and the atmosphere, while most is absorbed by the earth's surface and warms it. Then, infrared radiation is emitted from the earth's surface. Some of the infrared radiation passes through the atmosphere and some is absorbed and re-emitted in all directions by GHG molecules. The effect of this is to further warm the earth's surface and the lower atmosphere, similar to a greenhouse. The concept of the greenhouse effect is not new. The idea was first introduced in 1827 by French physicist Jean Fourier who stated that the earth's atmosphere acted like the glass of a greenhouse.

In 1988, the World Meteorological Organization and the United Nations Environment Programme established the Intergovernmental Panel on Climate Change (IPCC) to assess the available scientific, technical, and socioeconomic information in the field of climate change. In December 1997, representatives from more than 160 countries met in Kyoto, Japan, to negotiate binding limits on GHG emissions for developed nations. The resulting Kyoto Protocol established emissions targets for each of the participating developed countries relative to their 1990 baseline emissions levels. The Bush administration has rejected the Kyoto Protocol, arguing that participating in the program would cripple the American economy as the United States would be required to disproportionately reduce emissions when compared to developing countries, such as India, China, and Mexico.

Ratification of the Kyoto Protocol had been stalled, awaiting Russia's ratification to bridge the threshold of 55% of global GHG emissions required to fully ratify the protocol. However, the Duma, or the lower house of Russia's parliament, recently ratified the Protocol in a landslide vote. Final ratification by the upper house is imminently expected, and the Kyoto Protocol should be fully effective within 90 days of full Russian ratification. Ratification of the Kyoto Protocol is expected to increase pressure on the United States to address mandatory GHG reduction targets, since the majority of larger developed countries will be subject to the Kyoto Protocol, with the exception of Australia and the United States.

Irrespective of U.S. participation in the Kyoto Protocol, activity on national GHG legislation has increased with each new congressional session. In the absence of national regulations, states are increasingly enacting GHG legislation, particularly in the northeast states. The frequency with which this national and state legislation arises provides a strong signal for the possible future regulation of GHG, at a minimum from the electrical generating sector at a state level and perhaps nationally across all industry sectors. Lack of coherent national legislation contributes to business uncertainty, particularly for energy intensive sectors. Furthermore, the patchwork quilt of state legislation that is emerging may require companies to have to deal with numerous state regulations instead of one national reduction target. In the United States, many industries are taking the position that it is not a question of "if" GHG will be regulated, but "when."

This article discusses how progressive companies can improve operations, reap financial benefits, and mitigate business risk by managing their GHG emissions. Understanding these markets is key to crafting an effective strategy for GHG emissions management.

Overview of Greenhouse Gas Science

According to the National Academy of Sciences, the Earth's surface temperature has risen by about one degree Fahrenheit in the past century, with accelerated warming during the past two

decades. There is new and stronger evidence that most of the warming over the last 50 years is attributable to human activities, and the growing consensus among scientists and governments is that we can—and must—do something. Researchers under the auspices of the National Academy of Sciences and the Intergovernmental Panel on Climate Change (IPCC) have pondered the evidence and concluded that the earth is warming as a direct result of increased levels of GHG in the lower atmosphere, that humans are probably the cause, and that the threat is real enough to warrant an immediate response. Scientists do, however, disagree about how much the temperature will actually change. Based on research from the IPCC, the average temperature of the earth could increase between one and six degrees Celsius over the next 100 years.

Since the beginning of the industrial revolution, atmospheric concentrations of carbon dioxide have increased nearly 30%, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15%. These increases have enhanced the heat-trapping capability of the earth's atmosphere. Global mean surface temperatures have increased 0.5–1.0°F since the late 19th century. According to EPA, the 20th century's 10 warmest years all occurred in the last 15 years of the century. Of these, 1998 was the warmest year on record. The snow cover in the Northern Hemisphere and floating ice in the Arctic Ocean has decreased. Globally, sea level has risen 4–8 inches over the past century. Worldwide precipitation over land has increased by about one percent, and the frequency of extreme rainfall events has increased throughout much of the United States.

A small group of scientists continues to argue that there is no immediate danger and that there is not enough substantive data to develop reasonable hypotheses regarding climate change.

Increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change. Some scientists expect that the average global surface temperature could rise 1-4.5°F (0.6–2.5°C) in the next 50 years, and 2.2–10°F (1.4–5.8°C) in the next century, with significant regional variation. Evaporation could increase as the climate warms, which could result in increased average global precipitation. Sea level could rise two feet along most of the U.S. coast.

A small group of scientists continues to argue that there is no immediate danger and that there is not enough substantive data to develop reasonable hypotheses regarding climate change. However, there is one undisputable fact: regardless of your position on the science or politics associated with global warming, this is an issue that is here to stay and must be dealt with if your enterprise desires to compete on a national and/or international stage.

Developing Greenhouse Gas Legislation

During the current congressional session, there are three bills proposed in the Senate that address GHG. Each bill varies by applicable sector, limits, and the specific GHG to be regulated. However, all of the bills are in agreement that regulation of GHG is best achieved with a market-based approach, using a cap-and-trade system. Two of the bills focus on carbon dioxide, in addition to mercury, nitrogen oxides, and sulfur dioxides for the electricity-generating sector while the third bill focuses on regulation of GHG across many sectors.

The Jeffords Bill—S366. Clean Power Act of 2003

The first bill that proposed regulation of carbon dioxide from electric-generating facilities was the Jeffords Bill, which was reintroduced on February 12, 2003, as the "Clean Power Act of 2003" (SB 366). This legislation, sponsored by Senator Jim Jeffords (I-VT) proposes regulation of sulfur dioxide, nitrogen oxide, carbon dioxide, and mercury (four pollutants) by January 1, 2009, for electrical-generation facilities with a capacity greater than 15 megawatts (MW) that use a combustion device to generate electricity for sale.

The Jeffords Bill would limit emissions of carbon dioxide from all entities to slightly more than two billion tons per year, or approximately 21 percent below 2000 levels. Under this bill, an emission allowance tracking system would be created for carbon dioxide (in addition to the other regulated pollutants). Nearly two thirds of the credits would go to households and consumers, since one premise of the bill is that the air is a public resource. The remaining allowances would be allocated to renewable energy and energy-efficiency projects, in addition to credits for transitioning industries and existing power plants. The construct of the allowance system is to reward clean power producers.

On or before April 1, 2010, and on April 1 of each year thereafter, facilities would have to "true-up" their actual emissions by submitting allowances equal to the actual tons of carbon dioxide emitted. Emitters of excess carbon dioxide emissions would be penalized at a rate of three times the excess emissions multiplied by the average annual market price of emission allowances.

The Carper Bill—S843. Clean Air Planning Act of 2003

In April 2003, Senators Tom Carper (D-DE), Lincoln Chafee (R-RI), and Judd Gregg (R-NH) introduced Senate Bill 843, the "Clean Air Planning Act of 2003." This bill, also known as the Carper Bill, proposes to amend the Clean Air Act to establish a four-pollutant regulatory program for the electricity-generating sector. The four-pollutant bill would set emission caps for carbon dioxide, nitrogen oxides, sulfur dioxide, and mercury, which are the regulated pollutants under the proposed Clear Skies Act, and establish a cap-and-trade program for these pollutants. The Carper Bill has been characterized as a "centrist" approach between the Clear Skies Initiative, which currently is proposed as a three-pollutant bill, and the Jeffords and McCain-Lieberman Bills.

The objective of the Carper Bill in amending the Clean Air Act would be to establish a national uniform multiple air pol-

lutant regulatory program for the electricity-generating sector. The Carper Bill would generally apply to electricity-generating units with a capacity greater than 25 MW that generate electricity for sale. The bill proposes to cap carbon dioxide emissions from the electricity-generating sector at 2006 emission levels for the 2009 to 2012 period and at 2001 emission levels for 2013 onward.

Compared to the Jeffords Bill, this bill contains more specifics on the constructs of a carbon dioxide trading system. If passed, the Carper Bill would require EPA to promulgate regulations to establish a carbon dioxide allowance trading program. This program would allow for the generation, allocation, issuance, tracking, transfer, and use of carbon dioxide allowances and would also make that information publicly available. Standards, guidelines, and procedures concerning the generation and certification of allowances would also be developed.

During the annual "true-up" periods, entities would be required to surrender allowances in the amount equal to the total tons of carbon dioxide emitted from an affected entity. Excess emissions would be penalized at a rate of $100 per ton emitted in excess of the allocated allowances. Entities would be required to provide quarterly reports of their carbon dioxide emissions, and this information would be made public at least once per year.

The McCain-Lieberman Bill–S139. Climate Stewardship Act of 2003

The McCain-Lieberman Bill (SB 139), sponsored by Senators John McCain (R-AZ) and Joseph Lieberman (D-CT), was introduced on January 9, 2003. Similar to the other proposals, its objective is to accelerate the reduction of GHG emissions in the United States by establishing a market-driven system of tradeable allowances. However, this bill would be much more far-reaching in scope since it would regulate the transportation (via petroleum refiners), industrial, and commercial economic sectors in addition to the electricity-generating sector. The regulated sectors would comprise approximately 85 percent of the overall U.S. GHG emissions from the year 2000. The bill would apply to entities that emit greater than 10,000 metric tons of GHG per year and would not apply to the agricultural sector, or individual car or homeowners.

In contrast to the Jeffords and Carper Bills, the McCain-Lieberman Bill provides more aggressive targets for GHG reduction. The bill would require a reduction to 2000 GHG emission levels by the year 2010 and a reduction to 1990 GHG levels by 2016. Furthermore, the McCain-Lieberman Bill addresses all six GHG, rather than just carbon dioxide.

Under this bill, the Secretary of Commerce would develop allowance trading and auction systems. For allowance trading, companies could satisfy up to 15 percent of carbon dioxide emission reduction requirements by submitting allowances from another nation's trading market. Companies could also meet requirements by undertaking sequestration projects or submitting reductions registered by a non-affected entity. Penalties would be assessed for excess emissions at the rate of three times the market value of a ton of GHG, as determined by the market trading system. Companies that plan to deploy technologies within five years that will reduce carbon dioxide emissions could borrow against expected future reductions to meet current requirements.

The McCain-Lieberman Bill would require EPA to establish a system for GHG reporting, inventorying, and registration of emission reductions. Measurement and verification standards would be developed by the Secretary of Commerce to ensure that the system is accurate and transparent. In addition, the standards would ensure that reductions are not counted in both this program and other international programs. In October 2003, McCain-Lieberman was defeated by a 55 to 43 vote, which was a closer margin than expected.

State and Regional Legislation

The most significant state/regional legislation is the Regional Greenhouse Gas Initiative (RGGI). RGGI is a regional initiative of eight Northeast states (Connecticut, Delaware, Massachusetts, Maine, New Hampshire, New York, New Jersey, Vermont) to develop a mandatory cap and trade program that will regulate carbon dioxide from utilities in these states. Pennsylvania and Maryland are participating as observers to the process. The program will apply to all fossil fuel-fired electric-generating units with a nameplate capacity greater than 25 MW in the participating states. Currently, the "cap" and the mechanics of the "cap and trade" program are being evaluated through a stakeholder process. Long-term, there is the option that the RGGI program could expand to surrounding states and additional industry sectors. In order to support the RGGI program, states in the northeast are beginning to implement state legislation to support classification of carbon dioxide as a regulated pollutant. For example, the state of New Jersey issued a proposed rule in October 2004 to regulate carbon dioxide as an air contaminant, setting the stage for the regional regulation of carbon dioxide.

Furthermore, the attorneys general of the northeast states have been active participants in legislation against EPA on the issue of whether carbon dioxide is a regulated pollutant and are currently engaged in a lawsuit against the five largest carbon dioxide emitters in the United States, which are all electric utilities. Finally, the northeast states are simultaneously developing a voluntary Regional Greenhouse Gas Registry (RGGR), which will allow companies in the region to voluntarily register their baseline GHG emissions, with assurance from the region that early reductions would count if there were a future mandatory program. Outside the northeast states, several states are proposing similar voluntary registries, the most notable being the California Climate Action Registry (CCAR).

Measuring Risk and Developing an Appropriate and Proactive Response

International climate change developments such as the Kyoto Protocol, potential federal legislation, as well as a variety of state

	Jeffords Bill (SB 366)	**Carper Bill (SB 843)**	**McCain Lieberman Bill (SB 139)**
Target Sector(s)	Electricity generating	Electricity generating	Electricity generating, transportation, industrial, commercial
Applicability	Electricity or thermal electricity generating unit a combin ation of such units, or a combination of one or more of such units and one or more combustion devices that have a nameplate capacity of 15 MW or greater, generate electric energy for sale, emit a covered pollutant into the air.	Fossil fuel-fired electricity generating facility (including cogeneration) that has a capacity greater than 25 MW and generates electricity for sale.	Sources with emissions of greater than 10,000 metric tons of GHG per year (CO_2e) in the following sectors: • Electric power, industrial, or commercial sectors • Refiners or importers of petroleum products for use in transportation • Producers or importers of hydrofluorocarbons, perfluorocarbons, or sulfur hexafluoride
GHG	CO_2 only	CO_2 only	6 GHG
Emission Caps	21% below 2000 levels or 2.05 billion tons	•2006 levels (2009-2012) •2001 levels (2013 onward)	•2000 levels (2010-2015) •1990 levels (2016 onward)
Method	Cap and Trade	Cap and Trade	Cap and Trade
Other Credits	Carbon dioxide is excluded from the stipulation that allowances cannot be traded outside the system.	CO_2 allowances can be purchased from other internationally recognized carbon dioxide reduction programs. Provisions for forest/agricultural and sequestration credits, DOE 1605(b) or other GHG emission reduction projects carried out in U.S. or foreign country, not to exceed 10% of total.	Up to 15% of emission reduction requirements can be satisfied by submitting allowances from another nation's market, submitting a registered net increase in sequestration, or submitting reductions registered by a non-covered entity.
Penalties		$100 per ton of excess CO_2 emissions, adjusted for CPI.	Yes—three times the market value of a ton of greenhouse gas per ton of excess GHG emissions.

and local initiatives may require companies to strategically address GHG emissions and other climate change-related issues. Many organizations are recognizing that climate change-related issues affect the way they do business, and they are taking action to mitigate the associated risks. These risks include the following:

- Regulatory risks related to prescribed controls, fuel costs, and energy security
- Reputation management risks, such as competitive advantage, fiduciary and governance developments, shareholder activism, and access to capital/credit rating

Interestingly, financial entities are beginning to more closely scrutinize corporate action on climate change. Swiss Re, a major international insurer and re-insurer, announced on May 7, 2003, that it will consider withdrawing Directors and Officers (D&O) liability insurance for companies that do not adequately address climate risks. Swiss Re sent surveys to a number of companies to determine their climate change activities, and the insurer will use the survey results to assess each company's climate change policies relative to financial risk.

Also, socially responsible investment companies such as Innovest are exerting influence on climate change issues. As part of the Carbon Disclosure Project, Innovest and 35 institutional investors wrote to the 500 largest companies in the world (by market capitalization), asking for information about their climate change actions.

The recent release of shareholder resolutions for the 2004 proxy season provides evidence that shareholders are becoming increasingly concerned about environmental issues, as many of the resolutions focused on climate change. According to many institutional investors, companies can be financially affected by climate change in four ways:

- Increased costs of compliance due to regulatory changes
- Physical effects of actual global climate change on company assets and operations
- Damage to a company's reputation for its real or perceived contribution to climate change and its response to the issue
- Loss of business opportunities for failing to capitalize on new markets that will be created in a carbon-constrained world

The Interfaith Center on Corporate Responsibility (ICCR) is one of the more active organizations with respect to climate change shareholder resolutions. The ICCR is an association of faith-based institutional investors that represent a combined portfolio value of approximately $110 billion, much of which is invested in pension funds. The ICCR's goal is to increase shareholder value for their investments by encouraging companies to proactively address the climate change issue, with the position that companies that do not proactively address the issue are risking future shareholder value. In the 2004 proxy season, the ICCR filed 21 shareholder resolutions related to climate change—including five in the electric power industry, eight in the energy industry, two in the automotive industry, and one in manufacturing. Many of the recent climate change-related shareholder resolutions, such as the ICCR resolutions, include mid-sized companies in addition to larger, multi-national companies, particularly in the oil and gas industry. A similar trend may occur in other sectors, with resolution activity moving to mid-sized companies that previously have operated under the radar screen of most environmental groups.

Many organizations are recognizing that climate change-related issues affect the way they do business, and they are taking action to mitigate the associated risks.

In addition to the climate change shareholder resolutions, numerous shareholder resolutions were filed at companies requesting them to increase environmental disclosure through sustainability reporting according to Global Reporting Initiative (GRI) guidelines. The premise of this request is that shareholders believe sustainability reporting provides advanced warning of "trouble spots" within a company and can identify cost-saving opportunities and improve environmental performance. With reporting, risk is more transparent and can be evaluated by investment companies and individual shareholders.

A June 7, 2002, report by The Conference Board ("Global climate Change: Fact or Fiction? It Doesn't Matter–The Issue is Here to Stay") identifies seven actions that all organizations should take to effectively manage risk associated with global climate change.

Educate yourself. Decision makers must understand the issues, the risk, and the opportunities. Global climate change can present business opportunities for those with the vision to see them and the will to invest in them.

Measure your performance. If you aren't measuring your performance, you cannot manage it. Measuring and managing absolute emissions and emissions efficiency data allows environmental staff to present stakeholders with concrete information demonstrating the significance of climate change management programs.

Identify productivity improvement opportunities. Numerous companies have found opportunities to reduce emissions of GHG while saving money and/or improving their market position. In a well-publicized example, BP reduced its emissions to 1990 levels at a net savings of U.S. $650 million.

Monitor the leaders. BP, Royal Dutch/Shell, and DuPont, among others, have openly communicated their GHG emission performance objectives, the measures taken to achieve those objectives, the results, and the costs. A report by the Pew Center on Global Climate Change titled "Corporate Greenhouse Gas Reduction Targets" highlights activities by some of the 37 members of the Pew Center's Business Environmental Leadership Council.

Think holistically. Consider the collective values associated with reducing emissions of GHG. These values include lower energy costs, reduced vulnerability to energy supply and price fluctuations, and the ability to capitalize on competitive opportunities created by GHG emissions reduction programs. Two of the methods available to capture the value/cost of GHG emissions are assigning internal costs to emissions and establishing internal emissions trading programs.

Extend your time horizons. Companies should be concerned about the impact of future events on their business. However, thinking about the next fiscal quarter or the next calendar

year will not adequately capture those events. Companies should be thinking about their business and the regulatory and competitive operating environment in five years, in 10 years, in 20 years, maybe even in 50 years.

Think globally. Climate change is a global issue that eventually must be addressed on that scale.

When evaluating business risk, organizations must examine environmental issues with the same scrutiny that other risks require. Global climate change presents significant risk potential for companies that fail to address the issue. However, executive staff that identify and manage the risk can ensure the viability of their organization and demonstrate a proactive position on this emerging issue.

Conclusion

While it remains uncertain if any of the currently proposed federal GHG bills will become law, companies should monitor federal and state GHG legislation in order to effectively manage and minimize business risk associated with climate change issues. In addition, companies should monitor pending lawsuits against EPA and against companies regarding climate change. Considering the increasing frequency of federal, state, and regional legislation and lawsuits regarding climate change, managing carbon dioxide emissions may soon comprise an important part of an organization's environmental management strategy.

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