



Climate Change From the Investor's Perspective

by Adam Seitchik, Ph.D., CFA



Growing the Economy Through Global Warming Solutions



Global warming is one of the most urgent problems of our time.

The good news is that many of the solutions to this extraordinary problem are within reach. Many of the solutions to global warming are not only feasible, they are economically and socially beneficial. While some claim that addressing global warming will have a negative impact on the economy, the most recent report by the Intergovernmental Panel on Climate Change (“IPCC”) asserts that there is substantial economic potential for the mitigation of greenhouse gas emissions over the coming decade. In fact, there is a growing global market to address global warming, and the United States must act now or risk being left behind.

Growing the Economy through Global Warming Solutions sets forth the steps we can take to curtail global warming, the governance models needed to encourage such a transition, and the economic benefits of doing so. By taking these steps as soon as possible, we not only will minimize the grave risks of global warming, we will position the United States as the leader in the clean industries and technologies that are emerging as the key growth engine of the Twenty-First Century.

It is now a given that global warming is happening. It is caused by the emissions of greenhouse gases – primarily carbon dioxide released during the combustion of fossil fuels -- and already has begun to inflict harms on climate, ecology and people. The most recent IPCC report confirms that global warming is here and will accelerate in the future with serious harms and risks if greenhouse gas emissions are not promptly limited. Dr. James Hansen, of NASA’s Goddard Institute for Space Studies, warns that a global average warming of 3.5 degrees Fahrenheit will produce a “different planet” by taking us over dangerous climate thresholds that greatly magnify the risks of disintegrating the great ice sheets on Greenland and West Antarctica, an event that would cause massive and rapid sea level rise. Dr. Hansen emphasizes that we can keep the planet within the known boundary conditions by limiting the future global temperature increase to no more than 3.5 degrees Fahrenheit.

To do so, we must stop the business as usual approach in which carbon dioxide and other greenhouse gas emissions increase every year. One of the primary obstacles to moving from this business as usual approach to a problem solving approach is the argument that mandates to limit emissions will cripple the U.S. economy and that the market will produce all necessary solutions on its own. But this argument focuses too narrowly on the economic impact to “big energy”, which for too long has dominated the political discussions in Washington. Growing the Economy through Global Warming Solutions asserts that we cannot afford to wait for voluntary market solutions. We must either invest now to implement solutions, or we will pay much more later as we have to adapt to the growing impacts of global warming. Many mitigation strategies, those that will help reduce emissions now, will not only be cheaper to implement, they will stimulate the economy.

Government has an essential role to play in developing a strong governance model – those procedures, rules and regulations that can work to bring greenhouse gas emissions under control. In fact, with the right set of government incentives to help focus their attention, the business community, which is already beginning to recognize challenges and opportunities - and looking to both adapt and innovate - will see even more possibilities for capitalizing on economic opportunities while achieving environmental gains. The good news is that, if we get started right away, we can rapidly move to this solutions-oriented approach in which emissions are limited and reduced in time to avert the worst risks of global warming.

Growing the Economy through Global Warming Solutions is a series of papers written by experts in the fields of economics, public policy, energy policy, architecture, insurance, investment, transportation, and agriculture. It details the solutions that can be taken off the shelf today. While there is no single silver bullet for addressing global warming, there are a wide variety of solutions that, taken together, will lead to a reduction of carbon dioxide emissions, the key to stopping global warming. These promising solutions must be phased in as we phase out our outmoded reliance on foreign oil and coal. Along with its companion reports, Climate Change From the Investor’s Perspective, by Adam Seitchik, Ph.D., CFA, sets out important next steps that can and should be taken in the near and medium term to ensure that we do everything possible to address the challenges of global warming.

We have the know-how and it is the American Way to innovate and problem solve. We have time.

We have to get started now.

“We have at most ten years—not ten years to decide upon action, but ten years to alter fundamentally the trajectory of global greenhouse emissions.” – Jim Hansen, Director of the NASA Goddard Institute for Space Studies, and Adjunct Professor of Earth and Environmental Sciences, Columbia University’s Earth Institute.

Executive Summary

Investments in clean technology, or “Cleantech” have exploded in recent years. The Cleantech Venture Network estimates that Cleantech is now the third largest venture investment category, poised to rival or even eclipse prior investments in information technology and biotech. Global investment in clean energy has grown from \$27 billion to \$71 billion in the space of two years. Other areas of substantial investment growth come in the area of “green” real estate, with emerging interest in “green” alternative investments such as hedge funds.

The Investor Network on Climate Risk (INCR), founded in 2003, now includes more than 50 institutional investors responsible for over \$3 trillion in assets. The dramatic growth in investment in climate solutions is being driven by a widespread recognition that climate change poses great financial risks and that the solutions present tremendous economic opportunity. Led by savvy institutional investors and venture capitalists, investors understand that the high costs of carbon emissions cannot be avoided, and that aggressive management of climate change will likely increase market returns in the coming century.

Investors are employing a number of strategies to manage risk and capture opportunities around climate change, prodding their investment advisers and corporations in which they invest to improve data, research and strategic management. Major institutional investors are emphasizing the need for mandatory disclosures on carbon emissions so that risks can be assessed properly, and are asking the SEC to better define what material issues related to climate change should be included in corporate filings. Investors have expanded the number of climate-related shareholder resolutions filed, and these resolutions are receiving increasing levels of support. Most recently, in March 2007, investors responsible for \$4 trillion called on U.S. lawmakers to enact strong federal legislation to curb pollution causing climate change.

All of these actions are driven by the understanding that greater disclosure and clear federal policy will help manage the risks and maximize the opportunities posed by climate change. Public policies that constrain carbon emissions and provide a stable planning environment will facilitate an economic conversion away from fossil fuels, towards greater energy efficiency and Cleantech solutions. For the millions of Americans with a stake in mutual funds and retirement plans, better management of climate change will translate into improved long-term investment returns and a more secure economic future.



Introduction

While public policy initiatives on climate change are just now kicking into gear, investor interest is already substantial and accelerating rapidly. The Investor Network on Climate Risk (INCR), founded in 2003, has grown into an alliance of more than 50 institutional investors responsible for over \$3 trillion in assets. The second Institutional Investor Summit on Climate Risk, held at the United Nations in May 2005, attracted more than 400 institutional investors, fund managers and financial professionals from 15 countries. INCR members have been active in encouraging the companies they invest in to address the business risks and opportunities associated with climate change and the global shift toward a less carbon-intensive economy. In conjunction with the Summit, 28 leading U.S. and European institutional investors pledged to invest \$1 billion in prudent emerging business opportunities in clean technologies.

Research on climate-related investment risk and opportunity has grown from next-to-nothing five years ago to the continuous publication of substantive reports on a variety of themes and industries. One important spur to research has been the UK-based Enhanced Analytics Initiative (EAI), an institutional investment consortium backed by over \$2 trillion in assets. The EAI provides financial incentives for better and more detailed analysis of issues such as climate change within mainstream investment research. Leading global investment houses including Citigroup, UBS, Lehman Brothers, and Goldman Sachs are responding to this demand and publishing substantial reports on climate-related investment challenges and opportunities. Furthermore, a number of brokerage institutions now have dedicated research groups assessing the impact of environmental, social and governance (ESG) issues on investment portfolios.

Beyond research and analysis, early stage investors are making a major commitment to climate solutions. Venture capital has been pouring into this space under the banner of “clean technology,” or Cleantech. Again, the motivation is primarily financial, as investors emphasize doing well financially while doing good. Cleantech technologies add economic value by optimizing the use of natural resources to reduce environmental impact, lower costs, and boost profits. The potential opportunity inherent in these strategies could rival or even eclipse earlier investments in information technology and biotech. The Cleantech Venture Network estimates that Cleantech is now the 3rd largest venture investment category, with 13% market share in North America and 18% in Europe.¹ Global investment in clean energy has grown from an estimated \$27 billion in 2004 to \$71 billion in 2006, almost tripling in the space of 24 months.²

The exploding capital market interest in climate solutions has little to do with social investing. Instead, it has everything to do with the disruptive power of climate to create both financial risk and opportunity. There are three essential reasons why investors are taking a strong interest in climate change: portfolio strategy, security selection, and capital allocation.

1) *Portfolio strategy.* Most institutional investors, as well as many individuals, are broadly diversified: by country, sector and asset class. As long-term asset holders with exposure to both private assets like venture capital and real estate, and public securities such as stocks and bonds, these highly diversified “universal owners” essentially own shares in the global economy. As a result “their returns and consequently their ability to meet their fiduciary obligations depend to a critically large extent on the performance of the economy as a whole.”³ Therefore, investors have a strong vested interest in public policy and private activity that lowers the global risk of climate-related economic disruption.



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2) *Security selection.* Regardless of how climate change plays out, better research will result in improved investment decisions. Until very recently, investors interested in how climate change might impact the fair value of any individual asset holding or industry were working in a virtual information vacuum. Few corporations estimated climate-related risks and opportunities as part of strategic planning, little research was published on the subject, and securities analysts essentially ignored climate change when developing pricing models. This is all changing fundamentally.

3) *Capital allocation.* While most investing still occurs in publicly traded securities, the allocation of capital to less-liquid private investments has grown substantially since the stock market crash of 2000-2002. Green real estate, green hedge funds, and Cleantech venture capital are emerging as attractive choices for investment allocation. Also, institutional investors are pressing the fund management industry to develop targeted “green” funds that trade in public securities. For the most part, these newly emerging investments are driven by the long-term economic and financial opportunities defined by a carbon-constrained world.



The Importance of Climate Change to Portfolio Strategy

In the long run, investors are paid for taking risk. Much of the risk in a diversified portfolio comes from participation in the markets themselves. As popularized in books such as *Winning the Loser's Game* in the 1980s and *Stocks for the Long Run* in the 1990s, the most important choices investors make are not in active stock picking, but broad asset allocation: their relative exposures to classes of investments such as real estate, stocks, bonds and cash. Similarly, climate will have its greatest portfolio impact through overall asset class returns, not the performance of any individual securities holdings.

Most of the advice around asset allocation focuses on the long-term, wealth-generating potential of investing in the stock market. This bullish view of long-term investing is a product of the post-War experience in market economies in Western Europe, Japan and North America. During the second half of the 20th century, stock returns in these markets were exceptional. However, recent research on global financial returns in the last century indicates that investing in the markets as a passive exercise does not always lead to positive outcomes. Market returns do not occur in a vacuum, but are the product of political, social, technological and economic trends that investors themselves help influence.

For example, a passive, risk-averse investor in German bonds would have lost 100% of their value during the hyperinflation of 1923, and a German equity investor would have lost 87% of value in 1948.⁴ During the first half of the 20th century, Japanese equity investors essentially made nothing for fifty years, after accounting for inflation. So, long-term investing through broad market exposure is not an effective strategy at all times and in all places. Markets in the first half of the 20th century endured two World Wars, multiple financial panics, the Great Depression, the rise of communism and fascism, widespread labor discrimination, and the detonation of atomic bombs that killed several hundred thousand human beings. The result was U.S. and global investment returns less than half as good as those post-War.⁵

Our perception of long-term market outcomes is colored by the positive developments that emerged in the five decades following World War II: no global wars, a regulated and insured banking system, limited nuclear proliferation, the Marshall Plan, expansion of the middle class, improved social justice via the civil rights movement and related legislation, national environmental policies, the end of the Cold War, healthy, less-volatile economic growth, and Federal Reserve interest rate management. The result was fifty years of phenomenal returns in a variety of markets, with global stocks rising 9% annually in excess of inflation.

While efficient, broad market investment through vehicles such as index funds has gained widespread popularity, it has also led to a risky passivity among owners of capital. In fact, simple exposure to a market index (such as the S&P 500) has become known as “passive” investing. However, as climate change and energy constraints loom, market returns will not necessarily be attractive in the long run.

No doubt, clear linkages exist between the performance of portfolios and the health of the overall economic system. Recently, this understanding has crystallized into a more formal analysis of the position of the Universal Owner (UO). The UO hypothesis “states that a portfolio investor benefiting from a company externalizing costs might experience a reduction in overall returns

due to these externalities adversely affecting other investments in the portfolio, and hence overall market return.”⁶ Put simply, negative externalities are costs from economic activities that are borne by those "external" to the transaction. Carbon emissions are a classic example of a negative externality, to the extent that the full cost of the pollution is not factored into the price of a barrel of oil but borne by society at large. The key insight from UO analysis is that for a diversified investor, there is no place to hide from these costs: they come back into the portfolio as taxes, insurance premiums, inflated input prices and the physical cost of disasters.

Being a passive investor abdicates fiduciary responsibility for the world that underpins economic and financial prosperity. The corporations that investors own exert tremendous global power relative to government and labor. Investors can and should demand that companies desist in externalizing environmental costs onto society that in the long run will harm portfolio-level returns.

From the perspective of a single company, it may be a profitable strategy, even in the long-term, to avoid paying the costs of CO₂ emissions. Yet, from a portfolio perspective, this could lead to lower overall returns. For example, take the profits that derive from the traditional energy sector. Investments in this sector account for about 10% of US stock market value. In 2006, fossil fuel companies occupied three of the top six spots in the Fortune 500 list of the largest US companies, and generated record profits of over \$60 billion.⁷ These profits drove up the stock prices of the companies and thus appeared to benefit diversified investors in the short run. However, over time, the disruptive portfolio influence of climate change, such as rising ocean levels and the damage from more intense storms, could easily overwhelm the short-term benefit of these corporate profits narrowly concentrated in the energy sector.



It is in investors' financial self-interest to take a leadership role in analyzing critical long-term risks and opportunities such as CO₂ emissions. Arguably, for trustees such as pension fund and foundation boards it is a key element of fiduciary duty. In recent years, the legal case for taking environmental, social and governance (ESG) issues into account when making fiduciary decisions has been strengthened. In 2005, the United Nations Environment Program's Finance Initiative commissioned a comprehensive global report by leading international law firm Freshfields Bruckhaus Deringer entitled: "A Legal Framework for the Integration of Environmental, Social and Governance Issues into Institutional Investment." The Freshfields' analysis concluded that "integrating ESG [environmental, social, governance] considerations into an investment analysis so as to more reliably predict financial performance is clearly permissible and is arguably required in all jurisdictions."

Paul Watchman, Partner at Freshfields Bruckhaus Deringer and senior author of the study, notes that "Institutional investors have more freedom to integrate ESG issues into their decision-making than they think. Whilst normally we find ourselves encouraging our clients to be more cautious, in this case we can instead say 'be more imaginative'."⁸ An improved investor understanding of the importance of these risks has led to the development of the Principles for Responsible Investment, now backed globally by over \$2.5 trillion in investor assets. The preamble to the Principles states that:

As institutional investors, we have a duty to act in the best long-term interests of our beneficiaries. In this fiduciary role, we believe that environmental, social, and corporate governance (ESG) issues can affect the performance of investment portfolios (to varying degrees across companies, sectors, regions, asset classes and through time). We also recognize that applying these Principles may better align investors with broader objectives of society.⁹

Securing attractive market returns in this century will likely require the aggressive management of climate change. It is all too easy to put seemingly environmental issues like this into the box of "politics," disconnected from investment policy-making. But, while investors can debate the appropriate course of action, there should be little disagreement that dire outcomes are possible and imminently material. When shareholder activism can reduce market risk and enhance long-term returns, passivity is not the winning investment strategy.

10 Key Steps for Investor Action on Climate Risk¹⁰

ASSESSMENT

Expert Advice – Find experts to raise awareness, assess climate risks, and convey fiduciary duties to plan beneficiaries, investment consultants, fund managers and portfolio companies.

Risk Assessment – Assess physical and policy risks of climate change in evaluations of companies, industry sectors, investment portfolios and property holdings.

Networking with Others – Join INCR and engage with others to promote climate risk assessments, greenhouse gas emissions disclosure and responsible public policy.

DISCLOSURE

Public Statement – Declare that climate change poses fiduciary and financial risks to be addressed through research, corporate engagement and long-term investment strategies.

Public Disclosure – State methods to assess and address climate risk in plan documents and require companies to identify material risks of climate change in securities filings.

Emissions Accounting – Ask companies to disclose emissions based on the Greenhouse Gas Protocol, and to account for GHG emissions from products and property holdings.

Stakeholder Dialogue – Adopt proxy voting guidelines to urge corporate action on climate change, and maintain an active dialogue with beneficiaries, fund managers and companies.

SOLUTIONS

Investment Strategy – Match long-term objectives with reduced climate risk exposure to optimize investment returns, and engage fund managers and companies to adopt best practices.

Clean Energy – Direct investment capital into emerging clean energy technologies and promote energy efficient products and building practices.

Government Action – Support government actions to promote investor certainty, including mandatory policies to achieve absolute reductions in greenhouse gas emissions.

The Investor Network on Climate Risk (INCR) has led in the development of institutional investment strategies to effectively manage risks and capture opportunities around climate change. In 2004, INCR published an Investor Guide to Climate Risk, identifying 10 key steps for investor action. They are shown in the box above and include assessment, disclosure, and solution-based activities.

At the INCR summit in May 2005, 28 major institutional investors with assets of over \$3 trillion endorsed an action plan intended to accelerate the pace of innovation around climate risk and opportunity. Signers of the plan included seven state treasurers, three state and city comptrollers, four public pension funds, seven labor pension funds, two foundations, and two religious institutional investors.

The action plan included a number of specific initiatives covering many of the above strategies. Commitments included:

- Deploying \$1 billion of capital in clean technologies
- The development of a model corporate climate risk policy
- The development of global standards for corporate disclosure
- Creation of a forum for international collaboration
- Requiring that investment managers disclose their analytical approach to climate risk
- Engaging with companies around their greenhouse gas emissions strategies and disclosures
- Encouraging the Securities and Exchange Commission (SEC) to require that companies disclose the risk associated with climate change as part of their securities filings

A growing number of investors have emphasized the need for mandatory climate disclosure, in addition to voluntary disclosure through the Global Reporting Initiative and other means. Members of the Investor Network on Climate Risk (INCR) have twice written to the SEC Chairman (in 2004 and 2006) to request the enforcement of disclosure requirements on material risks such as climate change, the strengthening of disclosure requirements related to these risks, and the inclusion of proposals related to climate change in shareholder proxy statements.¹¹ In March 2007, over 60 investors and companies asked the SEC to better define what material issues related to climate change companies should include in their filings.

Both companies and members of Congress are responding to these requests. In key industries affected by climate change, disclosure rates in SEC filings rose from 26 percent of companies in 2000 to 49 percent in 2005. Two of the six climate change bills before the Senate in April 2007 would require corporate disclosure of climate risk in SEC filings. Both the Sanders-Boxer and the Kerry-Snowe bills require an interim SEC statement acknowledging trends in global warming. The bills also require new regulations, issued within a two-year period, directing companies to disclose their financial exposure due to their emissions, and the potential economic impacts of climate change on the company.

Investor action is now moving to the public sphere, as the linkages between long-term investment returns and effective public policy on climate become clear. In March 2007, dozens of institutional investors responsible for \$4 trillion in assets called on U.S. lawmakers to enact strong federal legislation to curb the pollution causing global climate change. Joined by some leading U.S. companies, the investor group outlined the business and economic rationale for climate action. They also called for a national policy to reduce greenhouse gas emissions consistent with the scientific targets needed to avoid dangerous global warming impacts. The 65 signatories included institutional investors and asset managers such as Merrill Lynch, Allianz, and the California Public Employees Retirement System (CalPERS), as well as leading corporations such as BP America, PG&E, DuPont, Alcoa, Sun Microsystems and National Grid.



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Climate Change and Security Selection

The fair value of any security is a function of its future profit stream, and the certainty (or lack thereof) of those expected cash flows. Climate change has the ability to influence virtually every investment on every important dimension that determines its price: projected costs, revenues, and the level of uncertainty about the future.

Good data are central to the investment management of carbon risk and opportunity. Cross-sectional information is needed to make judgments between companies, along with longitudinal data to monitor trends over time. The Carbon Disclosure Project (CDP) has spearheaded efforts to improve corporate transparency on climate for investors. Launched in 2000, the CDP began by requesting information from the 500 largest global companies (the FT 500). The fourth annual survey, in 2006, was sent to an expanded list of 2000 companies globally, of which 900 responded. This questionnaire (CDP4) had significant investor weight behind it, including 225 institutional investor and asset management signatories.

Given the high level of material climate change risk, investors would benefit from required reporting in this area under a consistent set of disclosure guidelines. Despite the lack of a mandated framework in most countries, it is striking how much the data have improved in just the last few years -- particularly from corporations in Europe. In the US disclosure is improving, but is uneven among large corporations, and minimal for smaller firms.



Ceres, the non-profit organization, recently teamed up with the investment group Calvert to analyze responses to CDP4. While 72% of the 500 largest global companies (the FT 500) responded to the survey, only 47% of the primarily US-based S&P 500 companies filled out the questionnaire. In addition, one-third of S&P 500 responders only allowed their data to be available to the signatories of the CDP, limiting the investment analysis impact for research firms and asset managers. Furthermore, only one quarter of S&P 500 respondents disclosed measurable emissions targets. While many companies acknowledged physical risks from weather, few tied weather-related risk to climate change.

The analysis of S&P 500 CDP4 responses indicates that companies with the largest direct carbon emissions, such as those in the electric power and oil sectors, have the highest-quality disclosure. Most companies in sectors where carbon emission risks are indirect but very real, such as health care, retailing and banking, have not begun to analyze their strategic exposure to climate change.

When companies lag in their response to climate change, concerned investors increasingly are responding by filing shareholder resolutions. Shareholders have raised the issue of climate change with companies for years: Exxon received the first climate-related shareholder proposal in 1990. However, shareholder advocacy related to climate change has increased exponentially in recent years and shows no signs of peaking yet. Shareholders filed 150 climate-related proposals in the last five years. The number of climate proposals in the 2007 proxy-voting season broke all previous records, with a broad set of public pension funds, religious institutional investors and other asset holders filing a total of 45 climate resolutions at companies in diverse sectors including oil, gas, and coal companies; utilities; automakers; home builders; retailers; and insurers and other financial institutions.¹²

Not only has the number of climate proposals climbed, so have levels of support for these shareholder votes. The high-water mark for climate-related resolutions is 37 percent, very significant in a voting system favoring corporate management. While the proposals vary in how they ask corporations to address climate change, most request improved data disclosure and the development of a coherent climate strategy, including: (1) public reporting of greenhouse gas emissions, along with an assessment of risks and opportunities from climate change, (2) establishing goals and targets to reduce emissions of greenhouse gases, and/or (3) support for public policies that restrict greenhouse gas emissions.

As a result of their activism as corporate owners, shareholders have negotiated significant agreements with companies over the past several years. For example, shareholders helped convince major utility companies to call for new federal legislation to limit greenhouse gas emissions and give them greater certainty about future regulations, and to boost investments in integrated gasification combined cycle plants that could allow carbon capture and storage. Proponents have also convinced a number of oil companies to measure and disclose their greenhouse gas emissions, set reduction targets, and boost investment in renewable energy alternatives. A number of retailers and homebuilders agreed to implement new energy efficiency measures. Other companies, from automakers to banks and insurers, boosted their disclosures and in some cases adopted new policies to address climate-related impacts.

In order to improve the quality and consistency of corporate data in this area, a group of institutional investors released the *Global Framework for Climate Risk Disclosure* in October 2006. The Framework consists of four elements of disclosure:

- Total historical, current, and projected greenhouse gas emissions
- Strategic analysis of climate risk and emissions management
- Assessment of physical risks of climate change
- Analysis of risk related to the regulation of greenhouse gas emissions



There are a number of existing reporting mechanisms through which the Framework's disclosure can be accomplished. These include mandatory financial reports such as those required by the Securities and Exchange Commission (SEC), where material risks must be disclosed; the Carbon Disclosure Project itself (CDP); the Global Reporting Initiative (GRI), which is a set of guidelines for the comprehensive reporting on the economic, environmental and social dimensions of corporate activity; and forward-looking statements made in analyst briefings and other corporate reports.

Engaged shareholders understand that there is a strong business case for pro-active corporate approaches to climate change. As discussed in recent business strategy research, corporations have a clear self-interest in using environmental strategies to "innovate, create value and build competitive advantage."¹³ Analysts are identifying key linkages between climate change and business profitability. For example, in a recent Harvard Business Review article, Lash and Wellington offer prototype questions that companies (and the investment analysts that follow them) should be asking about potential climate-related revenue and cost drivers:

Examples of Cost and Revenue Drivers from Climate Change¹⁴ that influence Fair Value

Potential Cost Drivers

- How will regulatory policy affect costs?
- Will emissions be taxed?
- What capital expenditures will be required for emission reduction?
- How much will raw materials prices escalate for the company and its suppliers?
- How much will energy costs rise?
- How will the company's risk profile affect its insurance premiums?

Potential Revenue Drivers

- How will changes in customer demand patterns affect pricing?
- What percentage of climate-related costs can be passed through to customers?
- What revenue streams can come from new low-carbon products?
- What new forms of income (for example, carbon credits) will become available?
- What threats are faced from low-carbon substitute products?
- What will be the impact of weather patterns on revenue?

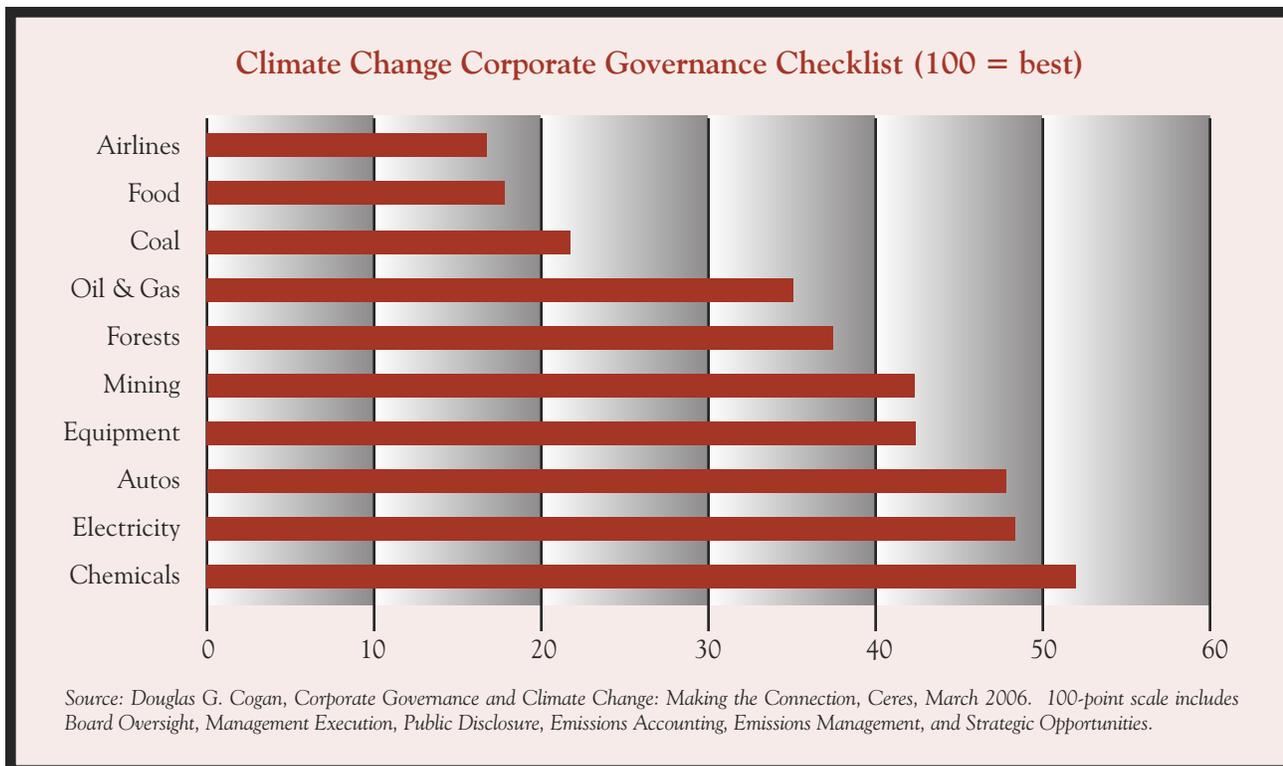
Ceres works with companies to address sustainability challenges such as climate change, and teamed up with the Investor Responsibility Research Center (IRRC) to comprehensively analyze how 100 global companies in the 10 most carbon-intensive industries in the US are managing climate risk and opportunity.¹⁵ As part of their analysis, the authors developed a Climate Change Governance Checklist, a 100 point system covering five key areas: Board Oversight, Management Execution, Public Disclosure, Emissions Accounting, and Strategic Planning. The study covered 76 U.S. and 24 non-US companies.

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The Ceres/IRRC analysis revealed large differences in the estimated climate risk governance performance within the various sectors studied. Climate risk leadership was evident in companies like DuPont, AEP, Toyota, and Alcan, with scores upwards of 60 (100 would represent comprehensive management of climate risk). Laggards scored in the 20s. In general, companies in the Chemicals, Electric Power, and Auto sectors are paying more attention to climate than the Oil & Gas, Coal, Food and Airlines industries. Investors should take note of companies that, despite obvious exposure to climate risk, are slow-footed in the strategic management of climate change.

The average industry scores are shown in the chart below:



The Ceres report identified some common themes among leadership companies with best-in-class climate risk strategies. First, the Board and senior executives are working collaboratively to address climate issues. Second, the CEOs have identified climate as a near-term priority. Third, management is taking action, and establishing practical policies for dealing with climate risk and opportunity.

For the most part, investment analysis of carbon risk is a long-term proposition, as risks may be latent for many years and then emerge suddenly through, for example, weather-related events or new regulations. However, a higher “risk premium” for a company should lead to lower current levels of fair value, and as investors sort through the data on carbon risk it could trigger a re-evaluation of corporate worth.

Taking investment research on climate to the practical level requires comprehensive, ongoing data and analysis. Toward this end, the research firm Innovest Strategic Value Advisors has developed industry and company-specific carbon risk metrics for over 1500 global companies. Innovest identifies three industry-level risk measures:

- Climate Change Direct Intensity, i.e. the industry’s emissions of carbon from its own operations
- Climate Change Indirect Intensity, which estimates the industry’s demand for electricity and other carbon-intensive inputs
- Climate Change Demand Sensitivity, with high sensitivity sectors either producing goods that create significant greenhouse emissions, or having other kinds of exposure (such as through investing or insurance provision)

At the company level, Innovest provides sector-relative ratings based on the company's current risk profile, the quality of its carbon management and conservation programs, and its strategic profit opportunities in areas such as energy efficiency and the transition to renewable energy sources.

In order to evaluate the influence of carbon risk on stock prices, Innovest used its carbon risk framework to identify the 21 best-in-class responses from the first year of the Carbon Disclosure Project in 2002. These firms came from 12 carbon-sensitive sectors. When benchmarked against their sector peers, a portfolio of these carbon leaders outperformed by 2.3% annually over the subsequent three years.¹⁶ Effective management of carbon may in itself create improved stock price valuations, and also could be a proxy for a company's broader risk-reducing approach to complex strategic issues.

Conservation and efficiency measures go straight to the bottom line and can directly boost investment returns. Investors play an important role in improving economic efficiency by allocating capital to those corporations with the most effective resource and risk management systems. Given uncertainty about future risk, it is difficult to place a price on the management of climate change. That said, new research is emerging to quantify the potential investor benefit of sound resource deployment. One careful peer-reviewed study evaluated the investment returns of companies based on their "eco-efficiency," defined as the ratio of the value a company adds with their products and services to the waste they generate. While industries with heavy environmental impact such as oil, gas, chemicals and utilities scored badly in general, the authors identified the best-of-sector performers in each part of the economy. The "eco-efficient" portfolio created substantially better investment returns than the companies with less eco-efficiency.¹⁷

Capital Allocation to Climate Change Solutions

Beyond developing climate-related portfolio strategies and security selection techniques, investors are making substantial capital commitments to early-stage climate solutions. The Cleantech Venture Network differentiates between the current market environment and prior efforts to finance environmental solutions in the 1970s through early 1990s. While earlier efforts were driven by regulatory changes and focused on "end-of-pipe" technology (such as scrubbers on smoke stacks), today's Cleantech sector is profit-driven and responding to what appear to be enduring market trends.¹⁸ Specifically, the Network views the move from "Enviro to Green to Clean" creating a new emphasis on:

- First-mover activity driven by market forces, not regulatory change
- "Front-of-pipe" technology, such as zero emission plants
- Biological and materials science, transitioning away from a reliance purely on chemical science
- Systems design and engineering
- Rapid growth markets, moving from areas like waste management into solar, wind and energy efficiency
- An entrepreneurial mentality, replacing a save-the-world idealism
- Intensive use of information technology



There is no question that capital allocation to Cleantech is growing by leaps and bounds. The research firm New Energy Finance estimates that in 2006 at least \$7 billion was deployed globally in clean energy venture capital and private equity. Public market fundraising accounted for an additional \$10 billion, up from \$4 billion in 2005. The sum total of all global investment, mergers, acquisitions and refinancing in clean energy during 2006 is estimated at \$100 billion.¹⁹

SJF Ventures is an example of the new venture capital emphasis on Cleantech opportunities. Their funds identify companies whose competitive advantages include environmental or workforce innovation. SJF favors companies with innovative strategies in the Cleantech, business services, and consumer products industries.

Climate Change from the Investor's Perspective

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Unlike some of their competitors, SJF seeks out and supports unique ventures, often in locations and sectors overlooked by venture capitalists. Their efforts focus on finding entrepreneurial companies and providing the management assistance and equity capital to help accelerate their growth. SJF Ventures provides equity financing from \$500 thousand to \$5 million solo or in syndicates, to companies with annual sales of \$1 million to \$20 million. SJF Advisory Services, an allied non-profit organization, provides entrepreneurial, workforce and sustainability assistance services to SJF prospect and portfolio companies. SJF seeks to rapidly diffuse those entrepreneurial strategies to help build a more sustainable economy.

Green hedge funds are not as pervasive as Cleantech venture capital, but investor interest is likely to surface once additional attractive products are brought to market. While the unregulated nature of hedge funds means that the strategies employed are virtually limitless, a popular approach is “long-short,” limiting overall market exposure by going “long” attractive securities and “short” those that are judged to have lower financial return prospects.²⁰ Hedge fund providers such as Green Cay and Civic Capital Group already incorporate environmental risk and opportunity into their strategies. Access to an expanding body of research assessing carbon risk at the company and industry level allows investment managers to identify best practices and worst-in-class firms. Emerging hedge fund strategies will likely incorporate these data into their evaluation of risk on both the long and the short side of the market.



Another area very likely to benefit from increased capital allocations is “green” real estate, i.e. buildings and other properties that incorporate sustainable design and construction elements, ranging from the selection of renewable or recycled building materials to energy efficiency, green roofs, and alternative power sources. In 2005, McGraw-Hill estimated that the market for environmentally friendly real estate could grow to \$20 billion by 2010. However, even those projections may be too modest. A more recent survey by McGraw-Hill Construction and the National Association of Homebuilders estimated that by 2010 green builders may account for 10% of new home construction, or \$38 billion.²¹

While investment demand for green commercial real estate currently outstrips supply, the market is evolving rapidly as cities implement green building legislation. Boston and Washington, D.C. are now requiring all new large-scale projects to meet designated green building standards. Real Estate Investment Trusts are forming with “green” mandates, and some banks and institutional investors have committed capital to building projects that meet specific environmental standards.

Risk in alternative energy investing and conservation technologies is driven in large part by the uncertain price of fossil fuels. This was clearly evident in the mid-1980s, when the collapse of oil prices decimated the fledgling solar power industry. From 1986 to 1998 the price of a barrel of oil was relatively stable between \$15 and \$25, even as general consumer prices rose steadily.

Despite continuing subsidies for oil and gas exploration and production, since 2003 supply and demand conditions have led to a breakout in fossil fuel prices out of their historic trading range. This has no doubt been a primary driver of booming Cleantech activity. The average price of a barrel of West Texas crude was \$41 in 2004, \$56 in 2005, and \$66 in 2006. Although there has been some volatility, the price has stayed above \$50 since the middle of 2005. Some alternative energy and conservation technologies would not be competitive if fossil fuel prices surprise investors and plummet back down to their former levels.

The dynamism of the Cleantech and green real estate sectors is particularly striking given the absence of a coherent national public policy around climate change. The more investors are convinced that high fossil fuel prices are here to stay, the more capital we will see committed to Cleantech, conservation, and other environmental strategies. While the general consensus presumes that strong global demand and limited supply will keep energy costs elevated for the foreseeable future, the biggest risk to Cleantech and other green investments is a sustained drop in traditional energy prices in the absence of regulatory policies constraining carbon emissions.

The March 2007 investor Call to Action for the U.S. Congress to address climate change, backed by \$4 trillion in assets, noted that government policy “would remove unnecessary risk in asset management and corporate governance and help to harmonize an increasingly complex regulatory landscape. With greater certainty, American businesses and investors

could make capital investments and seize global leadership on clean technologies. American businesses could do what they do best – innovate.” The business and investment leaders emphasized that they “are willing to play their part in bringing about a low-carbon future. But in the absence of strong federal leadership, there is a risk that U.S. businesses may get left behind, losing ground against competitors in the rapidly growing global market for low-carbon solutions.”²²

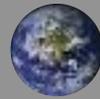
Given the large economic threat from climate change, it is in the interest of investors to advocate for public policies that constrain carbon emissions and thus provide a stable planning environment. Fossil fuel price subsidies and cost-free carbon emissions are not in the interests of long-term investors, when fully incorporating the portfolio risks that accrue from business-as-usual emissions patterns. Thus it is not surprising that climate change is one of the very few areas where both corporations and investors are calling for more government regulation, not less.

Summary and Conclusions

Most institutions and individuals have a long-term financial horizon that is placing climate change firmly on the investment agenda. Investors have been intensely active around climate in the last five years, with leadership coming from both the institutional investor and venture capital communities. The Investor Network on Climate Risk (INCR), an alliance backed by over \$3 trillion in assets, has used the power of shareholder ownership to push for substantial changes in the approach to climate by the financial services industry and the corporations that it invests in. This has led to improved strategic planning and data disclosure by companies about climate risks and opportunities, as well as more and better investment research.

Investment managers and research providers are active in developing programs for assessing which companies are best-in-class in managing climate change, and where business-as-usual behavior is leading to investment risk. Recent research has identified a financial return premium for those companies that are leaders in the efficient management of environmental resources in general, and of carbon emissions in particular.

Investors increasingly understand that short-term benefits created by carbon emissions in one portion of their portfolios will show up as costs elsewhere, particularly in the long run. Diversified investors are exposed to the health of the overall global economy, and thus the effective systemic management of climate change has become a central investment issue. This explains why the INCR and other large institutional investors are active not just in pushing for improved financial research and disclosure on climate, but also in calling for better public policy to ensure a rational financial planning environment for a carbon-constrained future.



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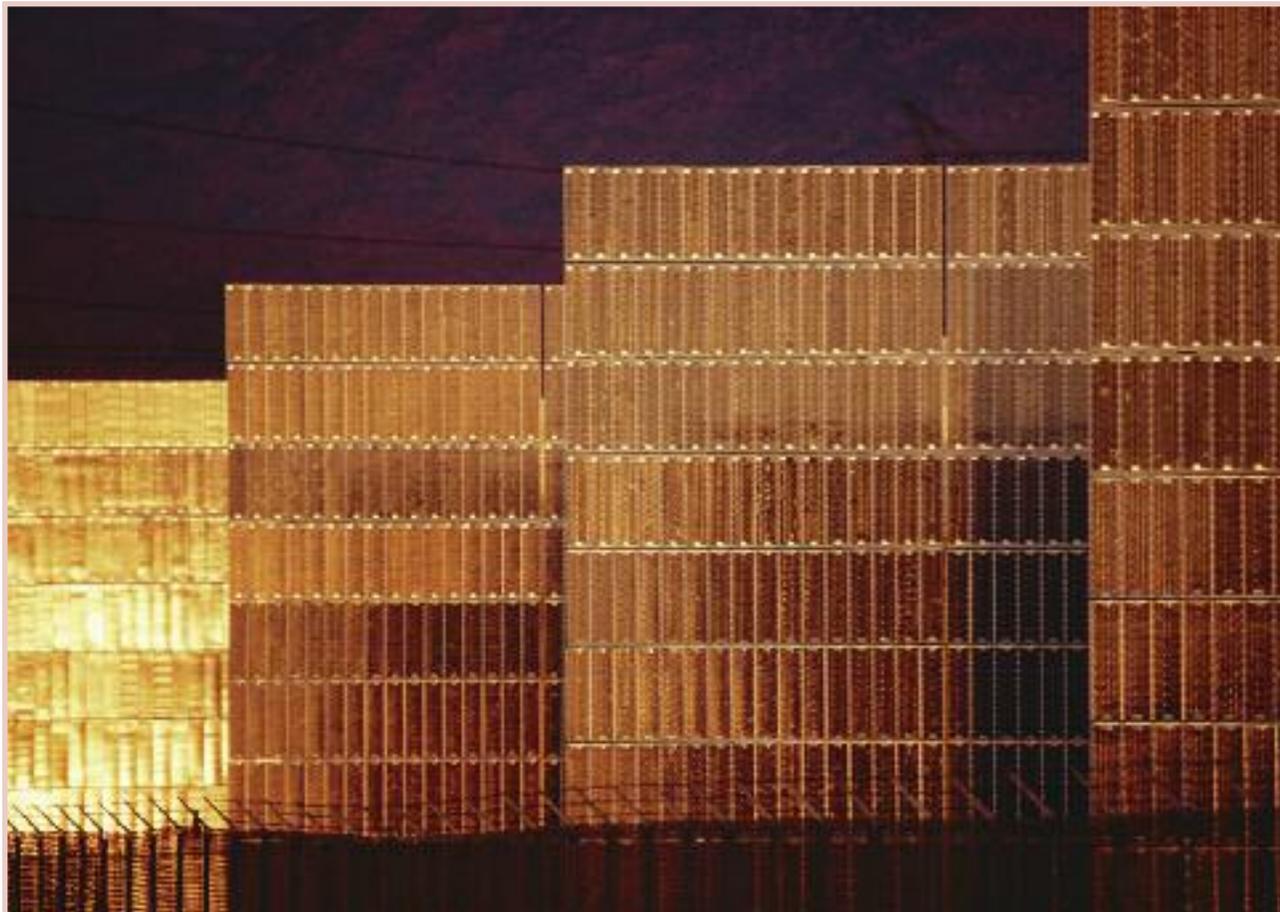
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American dynamism in venture capital investing has now turned to the clean energy sector, or “Cleantech.” This is now estimated to be the third-largest venture area, eclipsing telecom. With venture capital deployments of at least \$7 billion in 2006 and overall global capital allocation to clean energy of around \$100 billion, investors are responding to high fossil fuel prices by reallocating capital to technologies in areas such as conservation, alternative energy, water purification, and materials-efficient production. Green investing is also moving into alternative asset classes such as hedge funds, and the greening of commercial and residential real estate is the mega-trend in property development. The number of green real estate investment trusts and mortgage pools is expanding at a rapid pace, and recent estimates suggest that green homebuilding could represent 10% of the market by 2010, creating \$38 billion in investment activity.

Diversified investors accept that future market returns are perhaps the most important determinant of their long-term financial health. Furthermore, attractive long-term financial returns are contingent on the vibrancy of our economic and ecological systems. Short-termism is not only inconsistent with most investors’ planning horizon, but is also in conflict with the kind of investment activity that will underwrite better risk-adjusted returns in the long run.

The investor push for better corporate management of climate risk and more effective public policy is consistent with fiduciary duty and in the long-term interest of all Americans. With an intermediated financial system as complex as ours, it is vital to remember that the citizenry are the underlying beneficiaries of mutual funds and retirement plans. This makes the effective management of climate an investment issue for virtually everyone. Asset owners both large and small must ensure that their interest in climate change risk reduction is firmly reflected in the behavior of their fiduciary boards, of investment managers who work on their behalf, and of the corporations that they own.



ENDNOTES

¹ Cleantech Venture Network LLC, Presentation by Nicholas Parker to the INCR Clean Energy Working Group, January 2007.

² New Energy Finance, presentation by Michael Liebreich to the INCR Clean Energy Working Group, January 2007.

³ Jim Hawley and Andy Williams, "Universal Owners: Challenges and Opportunities," Introductory remarks at the Universal Ownership Conference, Saint Mary's College, Moraga, CA, April 2006.

⁴ All market return data from Dimson, Marsh and Staunton. Their book, *Triumph of the Optimists* (Princeton University Press, 2002), reviews 101 years of global investment returns.

⁵ I first developed these ideas in "Taking responsibility for market returns," *Investing for a Better World*, Trillium Asset Management Corporation, Fall 2006.

⁶ Raj Thamotheram and Helen Wildsmith, "Putting the Universal Owner Hypothesis into Action," paper presented at the Universal Ownership Conference, Saint Mary's College, Moraga, CA, April 2006

⁷ Exxon Mobil (#1), \$36.1 billion; Chevron (#4), \$14.1 billion; ConocoPhillips (#6), \$13.5 billion.

⁸ See *Mission-Related Investing for Foundations and Non-Profit Organizations*, Trillium Asset Management Corporation, 2007.

⁹ www.unpri.org/principles/

¹⁰ Excerpted from the *Investor Guide to Climate Risk: Action Plan and Resource for Plan Sponsors, Fund Managers, and Corporations* (INCR, July 2004). Available online at www.incr.com.

¹¹ See www.ceres.org/pub/docs/Ceres_INCR_SEC_letter_061406.pdf

¹² Data on climate-related shareholder resolutions provided by Ceres and from Doug Cougan, "Environment: Global Climate Change," 2007 Background Report – J2, Institutional Shareholder Services, Washington, D.C., February 28, 2007.

¹³ Daniel C. Esty and Andrew S. Winston, *Green to Gold*, New Haven: Yale University Press, 2006. Also, see Michael E. Porter and Mark R. Kramer, "Strategy & Society: the link between competitive advantage and corporate social responsibility," *Harvard Business Review*, December 2006.

¹⁴ Jonathan Lash and Fred Wellington, "Competitive Advantage on a Warming Planet," *Harvard Business Review*, March 2007.

¹⁵ Douglas G. Cogan, *Corporate Governance and Climate Change: Making the Connection*, Ceres, March 2006.

¹⁶ Matthew J. Kiernan, "Climate Change and Global Investment Strategy," Background Paper for a presentation at the *Institutional Investor Socially Responsible Investment Forum*, New York, January 2007.

¹⁷ Jeroen Derwall, et al., "The Eco-Efficiency Premium Puzzle," *Financial Analysts Journal*, March/April 2005, pp. 51-63.

¹⁸ Parker, January 2007, Op. Cit.

¹⁹ Liebreich, New Energy Finance, January 2007, Op. Cit.

²⁰ Going "long" is investing in securities in the traditional manner, making a profit as prices rise. An investor who sells stock "short" borrows shares from a brokerage house and sells them to another buyer. Short sellers are betting that they will be able to buy the stock back at a lower amount than the price at which they sold short. As the stock falls in value they are making a profit, as it rises they are incurring a loss.

²¹ Suzanne McGee, "Green Real Estate," www.financial-planning.com, March 2007.

²² www.ceres.org/Call_to_Action/index.php

Author Biography

Adam Seitchik, Ph.D., CFA, is Executive Vice President and Chief Investment Officer of Trillium Asset Management Corporation in Boston, the nation's oldest and largest independent investment firm dedicated solely to socially and environmentally responsible investing. He is a member of Trillium's Executive Committee and chairs the Asset Allocation Committee. He is the lead portfolio manager for the Green Century Balanced Fund, an environmentally focused mutual fund owned by a consortium of non-profit environmental organizations.

Prior to joining Trillium, Adam was Chief Global Strategist for Deutsche Asset Management in London, where he led a team setting investment policy for over £40 billion in client assets, and created and managed three global macro hedge funds. He also has experience as an analyst and portfolio manager at Wellington Management Company in Boston. Adam holds a Ph.D. in economics from Boston University and early in his career was an assistant professor of Economics at Wellesley College. He received the Chartered Financial Analyst designation in 1993.

Adam has published a variety of books and articles on economics, finance and public policy, and has spoken widely on these issues. He is the co-author of "Why Lower Drug Prices Benefit Institutional Investors: An Application of Universal Ownership Theory," in the May 2007 issue of Corporate Governance. Other recent articles include "The Transformational Power of Sustainability," "Taking Responsibility for Market Returns," and "Wall Street Goes Green."

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