Corporate Governance and Climate Change: *Making the Connection*

Summary Report

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Ceres is a national coalition of investors, environmental groups and other public interest organizations working with companies to address sustainability challenges such as global climate change. Ceres directs the Investor Network on Climate Risk, a group of more than 50 institutional investors from the U.S. and Europe managing nearly $3 trillion in assets. IRRC is a research firm that has been a leading source of high quality, impartial information on corporate governance and social responsibility issues affecting investors and corporations since 1972. IRRC was acquired by Institutional Shareholder Services in August 2005.

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Foreword

Companies and investors can no longer afford to ignore global warming. A preponderance of evidence shows that worldwide temperatures are rising, glaciers are melting and hurricanes are becoming more fierce. This confluence of events is forcing governments worldwide to enact limits on the pollutants that are trapping heat in the atmosphere.

These trends present enormous risks and opportunities for companies and investors. With the launch of the Kyoto Protocol and expanding greenhouse gas limits, power companies and other energy-intensive businesses face growing risks from the energy they use and how efficiently they use it. Companies also face risks from direct physical impacts, including stronger and more frequent storms, droughts, floods and sea level rise. In turn, forward-thinking companies that fine-tune their operations and develop new climate-friendly products can prosper from climate change.

This report is the first comprehensive measurement of how 100 leading global companies are preparing and positioning themselves to face these challenges. It pays particular attention to the job that corporate executives and board members are doing to enact well-functioning governance systems to face the climate challenge.

The report employs a "Climate Change Governance Checklist" to evaluate how 76 U.S. and 24 non-U.S. companies are addressing climate change through board oversight, management performance, public disclosure, emissions accounting and strategic planning.

The results are encouraging. In 2003, Ceres released a report on 20 companies showing that major U.S. businesses were largely ignoring these issues. By contrast, this report shows that corporate leaders in many key industries are now facing the challenge head-on—companies such as DuPont, Cinergy, American Electric Power and General Electric, which earned the highest scores in their respective industries.

Yet for all of the positive momentum in elevating climate as a governance priority, most American companies lag behind their international peers—a trend that is already resulting in competitive advantages for overseas companies developing low-carbon technologies in the auto and power sectors. No less worrisome, dozens of U.S. businesses in various climate-vulnerable sectors—including power, oil and gas, coal, air transportation and food products—are ignoring the issue with 'business as usual' responses that are putting their companies, and their shareholders, at risk.

This report is a valuable tool for company executives, board members, investors and Wall Street analysts. Here's how each group should use it:

- Company executives should evaluate their own company's performance relative to their particular set of circumstances and their industry peers. If their governance scores fall short, they should pursue the four key steps to manage climate risks and opportunities outlined later in this report.
- Board members at low-scoring companies should address the issue with management and begin educating themselves on the business and financial dimensions of this issue.
- Investors should evaluate how companies score relative to their industry peers—especially in high-risk sectors such as electric power, oil/gas and the auto industry—and should engage with poor corporate performers.
- Wall Street analysts should use the information in this report as a basis for rewarding companies that are responding to these challenges, and assigning risk to those that are not.

Tackling these issues is an enormous challenge. It requires that corporate leaders deliver short-term financial returns while also building capacity for the challenges that climate change presents in the long term. Companies such as GE and DuPont have stepped up to the challenge, but many other U.S. companies have not. There's simply too much at stake for that not to change.

Mindy S. Lubber
President, Ceres
Director, Investor Network on Climate Risk

Executive Summary

This report is the first comprehensive examination of how 100 of the world's largest corporations are positioning themselves to compete in a carbon-constrained world. With the launch of the Kyoto Protocol[1] in 2005, managing greenhouse gas emissions is now a routine part of doing business in key global trading markets. As the United States moves to join the international effort to combat global warming, climate governance practices will assume an increasingly central role in corporate and investment planning. Eventually, nothing short of an energy and technology revolution will be needed to stem rising greenhouse gas emissions across the globe.

Faced with record warmth, unprecedented hurricane activity and rapid shrinking of polar ice caps, industry opposition to confronting climate change is diminishing.

Faced with record warmth, unprecedented hurricane activity and rapid shrinking of polar ice caps, industry opposition to confronting climate change is diminishing. Skeptics no longer question whether human activity is warming the globe, but how fast. Companies at the vanguard no longer question how much it will cost to reduce greenhouse gas emissions, but how much money they can make doing it. Financial markets are starting to reward companies that are moving ahead on climate change, while those lagging behind are being assigned more risk.

Ultimately, effective corporate responses to climate change must be built on well-functioning environmental management systems and properly focused governance practices. Shareholders and financial analysts will increasingly assign value to companies that prepare for and capitalize on business opportunities posed by climate change—whether from greenhouse gas (GHG) regulations, direct physical impacts or changes in corporate reputation.

This report is designed to be used as a benchmarking tool by institutional investors and corporations that are ready to seize on these trends. It employs a "Climate Change Governance Checklist" to evaluate how 76 U.S. companies and 24 non-U.S. companies are addressing climate change through board oversight, management execution, public disclosure, emissions accounting and strategic planning. Information was gathered and synthesized over the past nine months from securities filings, company reports, company websites and third-party questionnaires. Each of the 100 companies in this report was given an opportunity to comment on the draft profiles and 84 companies offered comments.

U.S. Companies: Progress Since 2003

The first edition of this report, published in 2003, introduced the Climate Change Governance Checklist. It scored 20 global companies on 14 governance actions that companies should take to proactively address the climate issue. A key finding of that report was that major American companies and industries were largely ignoring or discounting climate change in their governance practices and strategic planning. This is no longer the case. Corporate leaders in many industries have begun to meet the climate challenge. Consider the following:

- In 2003, U.S.-based petroleum companies had virtually a single-minded focus on oil and gas development. ***In 2004, Chevron formally integrated renewable technologies into its energy portfolio, and now invests more than $100 million per year in low-carbon and carbon-free energy alternatives.***

1. The Kyoto Protocol was adopted at the Third Session of the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) in 1997 in Kyoto, Japan. It contains legally binding commitments, in addition to those included in the UNFCCC. Country signatories to the Protocol agreed to reduce their anthropogenic emissions of greenhouse gases (CO_2, CH4, N_2O, HFCs, PFCs, and SF6) by an average of 5.2% below 1990 levels in the commitment period 2008 to 2012.

- In 2003, U.S. auto companies relied on sales of big sport utility vehicles with low gas mileage as their main source of profits. ***In 2004, Ford introduced the first American-built hybrid SUV, and now plans to increase hybrid vehicle production tenfold, to 250,000 annually, by 2010.***
- In 2003, few U.S. electric power companies acknowledged the risks related to climate change. ***In 2004, American Electric Power announced plans to build the first commercial-scale power plant using coal gasification technology, calling it the "right investment" given foreseeable GHG regulations. Cinergy and many other companies are indicating that GHG regulations are likely and are now advocating for a national climate policy with mandatory controls.***
- In 2003, American equipment manufacturers were largely silent about their plans to develop GHG-saving technologies. ***In 2005, General Electric launched its "ecomagination" campaign, a plan to double investments in climate-friendly technologies and reach $20 billion in annual sales by 2010.***

"The era of easy oil is over... What we all do next will determine how well we meet the energy needs of the entire world in this century and beyond."

David J. O'Reilly, CEO/ Chairman, Chevron

The U.S. companies profiled in this report, covering 10 different industries, provide many positive examples of actions that companies are taking to integrate climate change in their governance practices and strategic planning. This report examines five such topics in detail.

- **Board oversight:** Companies like Anadarko Petroleum, Cinergy and Dow Chemical have created climate change task forces to integrate board oversight with executive-level actions to manage greenhouse gas emissions.
- **Management execution:** The CEOs of companies like Alcoa, Duke Power and United Technologies have become leaders in their industries by articulating the business case for GHG controls and a supportive government regulatory framework.
- **Public disclosure:** Companies like DuPont, Ford and Entergy have disclosed their climate risks and opportunities in their securities filings and other public documents.
- **Emissions accounting:** Companies like General Motors, Southern and Sunoco have provided detailed public accounts of their GHG emissions that include historical baselines, tracking of emissions savings and projections of future trends.
- **Strategic planning:** Companies like Air Products & Chemicals, Edison International and Weyerhaeuser have created business management and product development plans which are poised to seize new opportunities presented by climate change.

How Companies are Scored

This report analyzes 100 companies in the 10 most carbon-intensive sector industries in America—electric power, oil and gas, autos, chemicals, industrial equipment, metals and mining, coal, food products, forest products, and air transport. Profiled companies have major operations in the United States and rank among the largest in their industries, based on market capitalization and revenues.

Companies were evaluated according to a Climate Change Governance Checklist. The checklist consists of 14 governance steps that companies can take to proactively address climate change. For this report, the checklist has been expanded to rank companies on a 100-point scale. Each of the five governance categories carries a different number of maximum points to reflect the number of actions available and their relative importance to the overall score.

Climate Change Governance Checklist: 100 Point System

		Points
	BOARD OVERSIGHT	
1	Board committee has explicit oversight responsibility for environmental affairs.	**Up to 12**
2	Board conducts periodic review of climate change and monitors progress in implementing strategies.	
	MANAGEMENT EXECUTION	**Up to 18**
3	Chairman/CEO clearly articulates company's views on climate change and GHG control measures.	
4	Executive officers are in key positions to monitor climate change and coordinate response strategies.	
5	Executive officers' compensation is linked to attainment of environmental goals and GHG targets.	
	PUBLIC DISCLOSURE	**Up to 14**
6	Securities filings identify material risks, opportunities posed by climate change.	
7	Sustainability report offers comprehensive, transparent presentation of company response measures.	
	EMISSIONS ACCOUNTING	**Up to 24**
8	Company calculates and registers GHG emissions savings and offsets from projects.	
9	Company conducts annual inventory of GHG emissions from operations and publicly reports results.	
10	Company has set an emissions baseline by which to gauge future GHG emissions trends.	
11	Company has third party verification process for GHG emissions data.	
	EMISSIONS MANAGEMENT AND STRATEGIC OPPORTUNITIES	**Up to 32**
12	Company sets absolute GHG emission reduction targets for facilities and products.	
13	Company participates in GHG trading programs to gain experience and maximize credits.	
14	Company pursues business strategies to reduce GHG emissions, minimize exposure to regulatory and physical risks, and maximize opportunities from changing market forces and emerging controls.	

100 Company Scores by Sector—*Maximum Score: 100*

TOP SCORING SECTORS

Chemical Industry	51.9
Company	*Score*
DuPont	85
Bayer	71
ICI	60
BASF	59
Dow Chemical	59
Air Products	49
Praxair	43
Rohm & Haas	40
Monsanto	32
PPG	21

Electric Power	48.8
Company	*Score*
AEP	73
Cinergy	73
Entergy	65
Exelon	63
Calpine	55
PG&E	54
Xcel Energy	53
Edison Int'l	51
Southern	51
TXU	51
DTE	50
FirstEnergy	50
FPL Group	50
Duke	47
Progress	36
AES	34
Sempra	24
Dominion	27
Constellation	23

Auto Industry	47.9
Company	*Score*
Toyota	65
Honda	62
Ford	58
GM	52
Daimler	43
Volkswagen	37
BMW	35
Nissan	33

These charts show the 100 company scores, listed by sector. The chemical sector had the highest average governance scores, and the airline sector had the lowest average scores. Average scores for each sector are shown in white, followed by individual company scores.

MID SCORING SECTORS

Industrial Equip.	42.5
Company	*Score*
GE	58
ABB	54
UTC	52
Hitachi	51
Mitsubishi	45
Siemens	40
Caterpillar	27
Deere	14

Metals and Mining	42.2
Company	*Score*
Alcan	77
Alcoa	74
Nippon Steel	67
BHP Billiton	63
Anglo Amer.	56
Newmont	24
Nucor	21
U.S. Steel	20
Mittal Steel	14
Phelps Dodge	6

Forest Products	37.2
Company	*Score*
Int'l Paper	49
Abitibi	45
Weyerhaeuser	35
MeadWestvaco	31
Georgia-Pacific	26

LOW SCORING SECTORS

Oil and Gas	34.8
Company	*Score*
BP	90
Royal Dutch	79
Statoil	72
Total	62
Chevron	57
Anadarko	39
Sunoco	39
Amerada Hess	35
ConocoPhillips	35
ExxonMobil	35
Marathon	26
Occidental	25
Valero	24
Apache	22
Tesoro	15
Burlington	13
Devon Energy	11
El Paso	9
Murphy Oil	6
Williams	3

Coal Industry	21.4
Company	*Score*
Rio Tinto	57
Peabody	23
CONSOL	14
Arch	8
Foundation	5

Food Industry	17.6
Company	*Score*
Unilever	49
Nestle	29
General Mills	22
ADM	12
Altria	11
PepsiCo	9
Bunge	5
ConAgra	4

Airline Industry	16.6
Company	*Score*
UPS	30
British Airways	27
Air France	23
FedEx	18
AMR	9
Southwest	6
UAL	3

Climate Leaders: International Competitors Are Still Pacesetters

For all of the positive steps that American companies are taking to address climate change at the governance level, most are playing catch up with their international competitors—companies such as BP, Toyota, Alcan, Unilever and Rio Tinto. Based on the Climate Change Governance Checklist, foreign companies have the highest scores in five of the nine industries which included both U.S. and non-U.S. companies. (In the electric power sector, foreign companies were not analyzed.)

"If auto makers don't reduce smog-forming emissions, greenhouse gases and the need for petroleum, we won't be in business."

Fujio Cho, Former President, Toyota

Such international leadership is partly because these non-U.S. companies are based in countries that have ratified the Kyoto Protocol and have begun to implement greenhouse gas emission controls. However, because many U.S. firms also compete in these markets and are subject to the same regulations, geography alone does not account for all of these differences. Other company-specific factors, such as integration of board and management environmental roles, long-term planning cycles and a commitment to sustainability reporting, typically contribute to the industry-leading positions of many non-U.S. companies.

This report also identifies a handful of industry groups—especially coal, food product and airline companies—where climate change continues to be widely ignored as a governance priority, even though it could have a tremendous impact on their business. For example, many coal companies (especially in the U.S.) have done little to mitigate the financial impacts of carbon regulations, despite managing the world's most carbon intensive fuel source. Similarly, food product companies have agricultural-based raw materials and water resources at risk, but few have developed a strategy to manage this exposure. And while airline companies are among the world's fastest growing sources of CO_2 emissions, they have the lowest average governance scores among all 10 sectors examined, in part because they are looking mainly to other industries to find technological solutions and achieve emissions improvements.

Common Themes of Leadership Companies

While climate change should be a governance focus of all companies and major industry groups, the risks and opportunities presented by this issue are not distributed evenly. Some companies and industries—by virtue of the types and amount of energy they use or produce—will be better positioned to respond than others. Likewise, some companies and industries—by virtue of the types and location of their businesses and physical assets—will be more vulnerable to changing climatic conditions.

Among leadership companies, however, three common governance practices should serve as a model for all firms, regardless of the risk-reward ratio that climate change presents to their particular circumstances. At these leading firms:

- **Boards of directors and senior executives work together to address climate change and other sustainability issues.** A key challenge for all firms is ensuring that boards are adequately prepared and empowered to focus on GHG reduction and climate mitigation strategies.
- **CEOs embrace climate change as a near-term priority.** True leaders are speaking out on climate policy, risks and opportunities, rather than leaving the issue to their successors.
- **Management teams pursue practical solutions to climate change.** Rather than waiting for breakthrough technologies, management teams are working to find cost-effective, near-term ways to reduce GHG emissions, starting with energy conservation and more efficient production processes. At the same time, many of these companies are laying the building blocks toward a carbon-neutral economy, with projects focused on carbon sequestration and infrastructure for hydrogen fuels.

Following is a summary of governance actions taken by the top-scoring companies in each of the 10 industries examined in this report:

BP (Oil & Gas): BP was the first major oil company to state publicly, in 1997, that the risks of climate change are serious and that precautionary action is justified. The company has cut its operational GHG emissions 10 percent below 1990 levels, and now aims to hold its emissions steady through 2012. In 2005, BP established an alternative energy business unit that plans to invest $8 billion in solar, wind, hydrogen and combined-cycle power generation technologies over the next decade.

DuPont (Chemicals): DuPont's board of directors has overseen the company's climate change activities since 1994. The company is committed to reducing its GHG emissions 65 percent below 1990 levels by 2010 and plans to increase its usage of renewable energy to 10 percent of its total by 2010. It is actively engaged in GHG emissions trading and is developing next-generation refrigeration systems, fuel cells, biomaterials, lightweight materials and energy-saving insulation.

Alcan (Metals): Alcan created an executive-level steering team in 2001 to embed energy efficiency and GHG emissions reduction goals throughout the company. It achieved 2.9 million tons of GHG reductions between 2001–2004. Through recycling programs and the development of energy efficient products, Alcan believes the aluminum industry can become carbon neutral on a life-cycle basis by 2020.

AEP and Cinergy (Electric Power): In response to shareholder requests, the board of directors at these power companies agreed in 2004 to produce reports on their climate risk mitigation strategies. Both have targets to reduce GHG emissions and are pursuing development of integrated gasification combined cycle (IGCC) power plants. By gasifying coal to generate electricity and disposing of CO_2 emissions underground, these companies believe it is possible to make coal an emissions-free generating source.

"Nothing will happen on climate change without the CEO and board directly involved."

Jim Rogers, CEO/ Chairman, Cinergy

Toyota (Autos): Toyota formed a company-wide Global Warming Prevention Council in 1998 to meet the CO_2 emission targets set by the Kyoto Protocol. That same year, it introduced the Prius, now the best-selling gasoline-electric hybrid vehicle in the world. By 2010, the company plans to offer hybrid options across all of its major model lines. Additionally, Toyota has set a goal to reduce facility emissions by 20 percent on a sales-weighted basis in the period 2001–2010.

General Electric (Industrial Equipment): As part of the "ecoimagination" initiative announced in 2005, GE has pledged to achieve a 1 percent reduction in its GHG emissions from 2004 levels by 2012. GE plans to double its investments to $1.5 billion a year by 2010 in clean technologies, such as wind turbines, high efficiency gas turbines, IGCC power plants, and hybrid diesel-electric locomotives.

Rio Tinto (Coal and Minerals): Rio Tinto has a Climate Change Leadership Panel and a climate change executive to help coordinate GHG reduction efforts among its business groups. The company is developing "low emissions pathways" for its products to reduce the GHG emissions intensity in coal combustion, metals smelting and electricity use.

International Paper (Forest Products): International Paper has an internal committee comprised of senior executives that reviews its climate change policies. This work is overseen by the board's Public Policy and Environment Committee. The company plans to reduce absolute GHG emissions by 15 percent between 2000–2010. It was the first forest products company to join the Chicago Climate Exchange.

Unilever (Food Products): Unilever's Corporate Responsibility Council oversees the company's environmental and sustainability policies and performance. The company sets targets for energy efficiency improvements and GHG emission reductions. Unilever places particular emphasis on the use of refrigeration equipment that reduces or eliminates coolants that contribute to global warming. Additionally, the company makes life cycle assessments of the GHG emissions from its products.

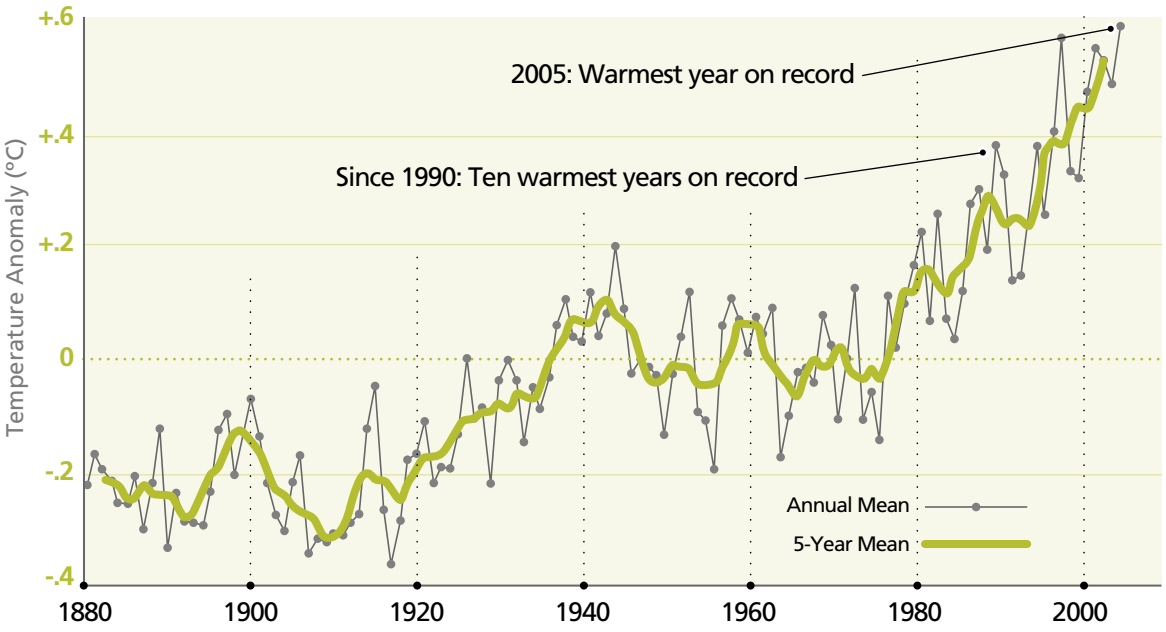
United Parcel Service (Air Transport): UPS's Corporate Environmental Affairs Group coordinates the company's GHG emission reduction strategies. These include increasing the fuel efficiency of aircraft and vehicles, and testing new technologies for use in facilities. UPS maintains a large fleet of alternative fuel vehicles and is deploying hybrid technologies.

Climate Change: A Growing Sense of Urgency

During the last several years, climate change has emerged as a top-tier concern for companies, investors and governments. The validity of the science supporting climate change is no longer debated. The atmosphere is warming, and human activity—principally the burning of fossil fuels—is a primary cause.

This section provides a basic overview of the science, how the problem may affect people and societies, and the rapidly-changing regulatory environment.

- **Global temperatures:** 2005 was the warmest year on record, according to NASA's Goddard Institute. As shown below, nine of the last 10 years have been the warmest since modern records began in 1861. Warming has accelerated in recent decades and has boosted Earth's average temperature by nearly 1 degree Fahrenheit since 1976. The warming trend is especially severe in the Arctic, where the rate of warming has been twice as fast and 20 percent of the summer polar ice cap has been lost since the 1970s. If these trends continue, global average temperatures could increase by 3 to 10 degrees F by the end of the century, and the summer polar ice cap could disappear entirely. The melting of glacial ice could raise sea levels by three feet or more, inundating low-lying regions.



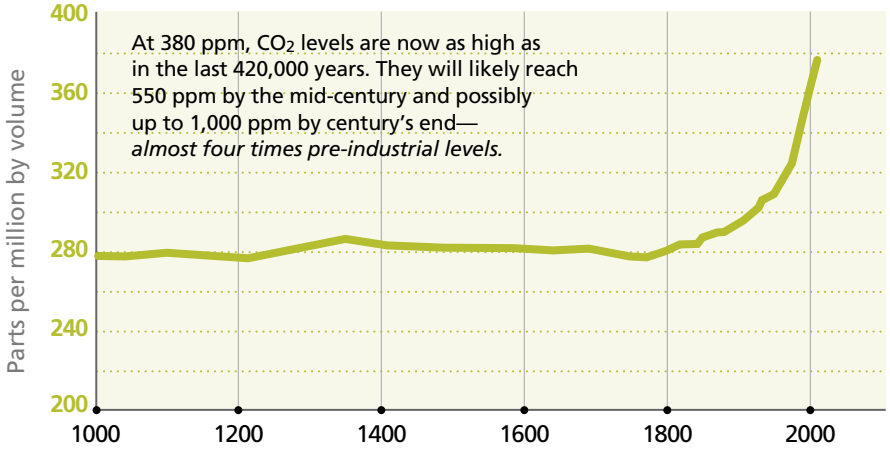
Global Temperature: Land-Ocean Index

Source: NASA's Goddard Institute

- **Cause of the Warming:** As shown on the next page, carbon dioxide in the atmosphere has risen from 280 parts per million since the start of the Industrial Revolution in 1750 to nearly 380 ppm today— its highest level in at least 420,000 years. If fossil fuels continue as the dominant energy source, and their carbon emissions are not contained, atmospheric CO_2 is expected to surpass 550 ppm by the middle of the century and possibly reach 1,000 ppm by the end of the century—almost four times pre-industrial levels.

Because carbon dioxide and other greenhouse gases linger in the atmosphere long after they've been produced, and because the ocean has already absorbed heat that will gradually transfer into the air, the Earth, even if all emissions stop now, will see additional warming in the decades ahead. One additional degree F of warming is expected just from today's levels of carbon dioxide. That would raise the Earth's

temperature to its highest level since the end of the last Ice Age some 9,000 years ago. However, because the current rate of warming equals 3 degrees F per century and is accelerating, present generations are almost assured of experiencing higher global temperatures than at any time in human history. If temperatures were to climb another 5 degrees F, an outcome squarely in the middle of the projected temperature range for the 21st century, then future generations could inherit an Earth as warm as it has been since the end of the dinosaur era some 65 million years ago.

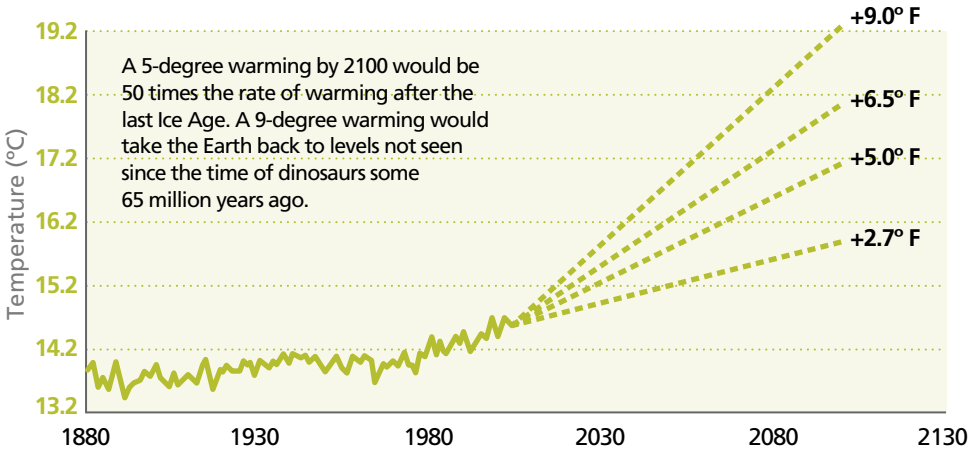


Atmospheric Concentrations of Carbon Dioxide, 1000–2003

Source: Scripps, ORNL, and IPCC

- **Rate of Warming:** More alarming than the temperature rise itself is the rate at which it may occur—leaving little time for adaptation to a hotter climate. Even a 2.5-degree F rise by 2100, which is at the lower end of the projected range for the next century, would represent more than a doubling of the rate of warming in the 20th century. A 10-degree warming, at the upper end of the range, would represent an eight-fold increase in the rate of warming. While humans have considerable ability to adapt to a rapidly changing climate, many natural ecosystems are not nearly as flexible and could be irreparably damaged.
- Agricultural regions and water resources could also be severely stressed. In this scenario, coastal areas, low-lying wetlands and estuaries could be inundated because of sea level rise. New studies point to rapid increases in the rate of snowmelt in Greenland and Antarctica. The Greenland and West Antarctic Ice Sheets contain enough ice to raise the sea level by nearly 40 feet if they all melted. Though climate models project no more than three feet of sea level rise in the 21st century, recent studies suggest much greater increases are possible. A 20-foot increase would place Miami and the Gold Coast of Florida underwater, and cause severe flooding in other port cities around the world.[2]
- Adding together all of the projected impacts of global warming from human casualties and dislocations, coastal losses and added costs for water management, agriculture and forestry, the annual toll could reach $300 billion worldwide by 2050, equal to 1.5 percent of projected gross domestic product, according to calculations by Munich Re, the German reinsurance company. Given that the costs of weather-related catastrophes topped $200 billion in 2005, this figure may prove to be conservative.

2. Institutional Investor Summit on Climate Risk at the United Nations, Presentation by Dr. John Holdren, professor at Harvard University, May 10, 2005

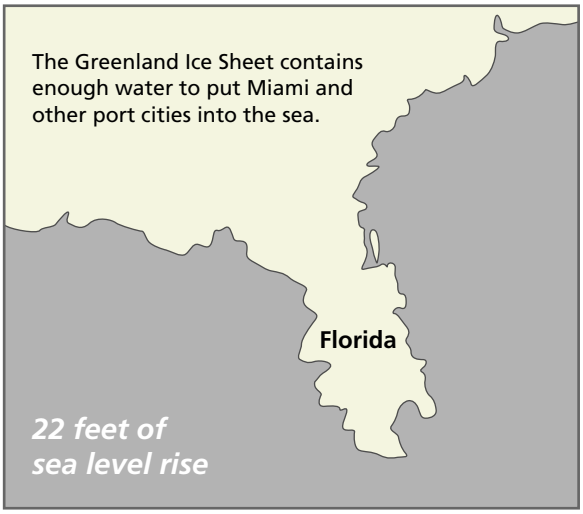


Average Global Temperature, 1880–2004, with Projection to 2100

Source: NASA Goddard Institute for Space Studies and the Intergovernmental Panel on Climate Change

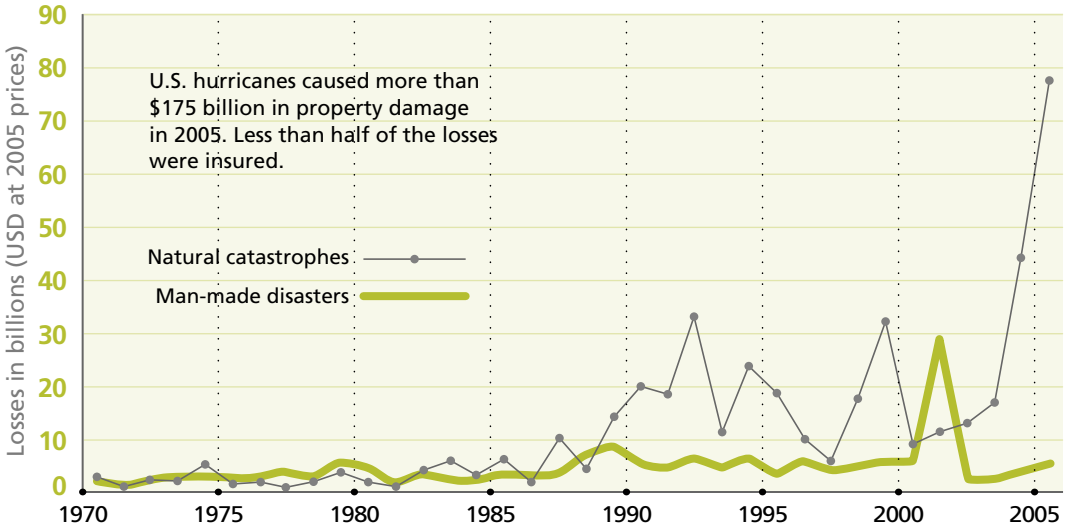
- **Climate change impacts in the United States:** Temperatures in the continental United States have risen about 1.2 degrees F in the last 30 years. In Alaska and western Canada, average winter temperatures have risen as much as 7 degrees F since 1950. Pine beetles have spread with the warmer weather, devastating millions of acres of forest. Rising temperatures are also associated with more intense wildfires throughout western North America, proliferation of West Nile Virus across the U.S., the spread of soybean and other crop pests in the Midwest, mold outbreaks in Texas, and shellfish disease in the Chesapeake Bay and parts of the East Coast. Torrential rainfall has become more common across the country, increasing the incidence of flash floods.

- **Extreme weather events:** A record 26 tropical storms and hurricanes formed in the Atlantic Ocean in 2005, including three Category 5 storms that made U.S. landfall. Hurricane Katrina caused a record $135 billion in property damage along the Gulf Coast. Seven of the nine costliest Atlantic hurricanes have struck since 2004. Disasters in 2005 also included the highest rainfalls ever recorded in India and record-high temperatures in drought-stricken southern Africa and Australia. A forthcoming report from the Intergovernmental Panel on Climate Change attributes such weather anomalies to rising concentrations of greenhouse gases in the atmosphere. It also warns that the Earth's temperature could rise well above previously forecast levels.



Seawater Rise Effect on Florida Coast

Source: Richard B. Alley, University of Pennsylvania



Insured Losses 1970–2005

Source: Swiss Re

- **Rising costs of natural disasters:** The cost of natural disasters exceeded $225 billion in 2005, up from the previous record of $118 billion in 2004, according to reinsurance giant Swiss Re. A 2005 Ceres report reveals a 15-fold increase in insured losses globally from catastrophic weather events in the past three decades—losses that have far out-stripped increases in premiums, inflation and population growth. Swiss Re's chief claims strategist now says that, "Global warming has accelerated from a problem that might affect our grandchildren, to one that could significantly disturb the social and economic conditions of our lifetime."
- **Climate change regulations take hold:** Assuming "business as usual" economic growth and population increases, and energy efficiency increases continuing at the historical rate of 1 percent a year, the world would need a six-fold increase in carbon-free energy by 2050 and a 15-fold increase by 2100 to maintain CO_2 levels below 550 ppm. In 2005, the world took its first official collective steps to combat global warming. In Europe, a cap-and-trade program went into effect that requires more than 11,000 industrial facilities to achieve greenhouse gas (GHG) emission reductions. More than 230 million tons of carbon dioxide was traded in the first year, with a value of over $5 billion. The year also was marked by the implementation of the Kyoto Protocol, which commits Europe, Canada, Japan, Russia and many other industrialized nations to cut their GHG emissions below 1990 levels by 2012. More than 150 countries have ratified the Kyoto treaty.
- **U.S. states fill federal policy vacuum:** At climate treaty negotiations in Montreal in December 2005, the Bush Administration re-affirmed its opposition to mandatory GHG emission controls and its support of voluntary reduction measures. A growing number of American CEOs say that a more aggressive approach is needed and that U.S. companies are hampered competitively by the lack of a clear national strategy. Since 1990, the nation's GHG emissions have risen more than 16 percent. Meanwhile, a growing number of municipalities and states are enacting their own regulations and laws to reduce GHG emissions. In December 2005, seven Northeast state governors approved a market-based accord to reduce GHG emissions from regional power plants, beginning in 2009. Twenty states have adopted renewable portfolio standards to diversify energy supplies. Eleven states have adopted or are in the process of adopting mandatory regulations to reduce greenhouse gas emissions from automobiles.

"Global warming has accelerated from a problem that might affect our grandchildren to one that could significantly disturb the social and economic conditions of our lifetime."

Richard Murray, Chief Claims Strategist, Swiss Re

Climate Change and Corporate Governance: Making the Connection

For corporations, climate change is a financial problem that presents significant economic and competitive risks and opportunities. Corporate boards, executives, and shareholders simply cannot afford to ignore it.

This section of the report covers four broad topics that outline how companies can address the climate issue and why they should be doing it:

- ***Why Companies Must Act Now***
- ***What CEOs Are Saying***
- ***What Companies Should Do***
- ***Investor Actions***

◆ Why Companies Must Act Now

Given the sweeping global nature of climate change, climate risk has become embedded, to a greater or lesser extent, in every business and investment portfolio. Companies with significant GHG emissions or energy-intensive operations face risks from new regulations. Climate change also poses direct physical risks to a wide array of firms and industries. Climate change deserves discussion in securities filings in the many instances in which direct financial risks or opportunities can be identified.

	Electric Power	Manu-facture	Auto & Trans.	Oil & Gas	For-estry	Agricul-ture	Fisher-ies	Health-care	Real Estate	Tourism	Water
Regulatory Risk	◆	◆	◆	◆	◆	◆					
Physical Risk (dependent on location)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Competitive, Reputational Risk	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Regulatory Opportunity	◆	◆	◆	◆	◆						◆
Technological Opportunity	◆	◆	◆	◆	◆	◆					◆
Competitive, Reputational Opportunity	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

Climate Risk & Opportunities in Selected Industries

Source: Ceres report – Managing the Risks and Opportunities of Climate Change: A Toolkit for Corporate Leaders

- **Physical Risks:** Businesses are at risk from the physical impacts of climate change, including the increased intensity and frequency of weather events, droughts, floods, storms and sea level rise. Changes in consumer habits that accompany changing weather patterns will also affect profitability in a number of sectors.
  - ✦ Six months after Hurricane Katrina, one of the strongest hurricanes on record, New Orleans remains a city in disrepair. Businesses along the Gulf Coast suffered billions of dollars of infrastructure damage, with particularly costly effects to oil and gas rigs and refineries. Forecasters are predicting another very active hurricane season in the months ahead.
  - ✦ Long-term capital investment plans may not properly account for climatic alterations. For example, a proposed $7 billion pipeline in Canada's Mackenzie Valley is dependent on permafrost, or frozen ground, as a supportive structure. When permafrost thaws, a process that has already begun, long-term investments in the pipeline will be at risk.

- All told, trillions of dollars of property on or near coastlines now stand in harm's way. Away from the coasts, drought and more frequent heat waves could lead to the collapse of local food systems. According to the World Meteorological Organization, the percentage of the Earth's land area stricken by severe drought has already more than doubled over the last quarter century.

- **Regulatory Risk:** State, national, and international regulations are putting increasing pressure on companies with emissions from operations or products to invest in emissions controls, purchase carbon credits, or face clean-up costs.
  - In the United Kingdom and throughout Europe, as well as in Canada and Japan, the Kyoto Protocol has come into effect. Developing countries like China also have emission reduction laws in place. Compliance with global emission reduction requirements is likely to be significantly more costly for companies with the poorest climate governance.
  - Nationally, it is only a matter of time before Congress enacts federal carbon constraints. A growing number of Wall Street firms, industry CEOs and evangelical leaders are questioning the U.S. government's voluntary approach to climate change and are calling for greater measures to reduce regulatory uncertainty.
  - In the face of federal inaction, regulatory activity is picking up at the state and regional level. California and ten other states[3] are moving to limit CO_2 emissions from automobiles. This would impact at least 33 percent of all new cars and light trucks sold in the U.S. Likewise, four states[4] are already regulating CO_2 from electric utilities, and others are considering it. Seven northeastern states[5] have agreed to a cap-and-trade emissions reduction program for the electric power sector, and California, Oregon, and Washington are working on a similar region-wide approach to limit greenhouse gases.

"For Alcan, addressing the economic, social, and environmental dimensions of climate change is directly related to the company's global competitiveness."

Alcan 2005 Sustainability Report

- **Competitive Risk:** Tightly linked to regulatory risk in the global and domestic marketplaces, climate risk preparedness will be a key driver in a company's ability to compete.
  - At present, Ford and General Motors are engaged in a high-stakes struggle to remain competitive as customers turn away from gas-guzzling SUVs in favor of hybrids and other vehicles from Japanese competitors. In China, auto sales are surging well beyond growth rates that the U.S. market has seen in recent decades. However, only 19 percent of current U.S. passenger cars and 14 percent of light-duty trucks can meet China's 2008 emission standards[6]. Both Toyota and Honda have decided to introduce their highly fuel-efficient hybrid models in the burgeoning Chinese market.
  - By some estimates, companies in the electric power sector that have not prepared for the inevitable future costs of carbon emissions could see losses in EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) of 24 percent to 83 percent[7]. Some public utility commissions now require utilities to include a cost for their carbon emissions, which will accelerate demand for cost-effective energy from providers of "clean" power such as wind, solar, hydro and possibly nuclear power.

3. Maine, Massachusetts, New York, Vermont, Connecticut, New Jersey, Rhode Island, Oregon, Washington, and Pennsylvania

4. Massachusetts, New Hampshire, Oregon, and Washington

5. Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, and Vermont.

6. According to an analysis by the U.S. Public Interest Research Group.

7. According to a February 2006 analysis by Sanford C. Bernstein & Company.

- **Technological and Competitive Risks and Opportunities:** Companies in many sectors can increase profitability by implementing energy efficiency strategies and developing emission-reducing technologies or new products that meet changing corporate and consumer demands.
  - ✦ Fossil fuels have been the driver of economic growth for more than two centuries, but change is clearly afoot. Global investments in renewable energy hit a record $30 billion in 2004, providing 1.7 million jobs worldwide. Far larger investments are expected in the years ahead, as Europe, the U.S., China and Japan aggressively embrace solar, wind and other climate-friendly options over increasingly costly fuels like oil and natural gas[8].

"We believe climate change is one of the most significant environmental challenges of the 21st century... Voluntary action alone cannot solve the problem."

Henry Paulson, Chairman, Goldman Sachs

  - ✦ Two remaining wildcards in this energy transition are coal and nuclear power, both of which face huge questions regarding waste disposal. In the case of coal, it is carbon dioxide disposal in the atmosphere that is the problem. If means are not found to capture and store CO_2 economically underground, coal, as the most carbon-intensive fossil fuel, will have to relinquish its role as the leading provider of electricity in a carbon-constrained world. Nuclear power could serve as a carbon-free alternative to coal. However, permanent disposal of high-level radioactive waste remains a vexing challenge, as do concerns over the safety of nuclear plants and proliferation of uranium fuel at a time of heightened global security risks.
  - ✦ To halve the projected rate of CO_2 emissions from energy by 2050, and stabilize atmospheric concentrations at twice pre-industrial levels, 25 billion tons of carbon dioxide emissions savings must be found. BP and Ford have supported research at Princeton University to explore ways in which energy demand could double over the next five decades (as is now projected) without increasing carbon dioxide emission rates above current levels. Princeton has identified seven strategies that could achieve this goal, each of which would supplant 3.5 billion tons of CO_2 emissions from other sources by 2050. For each of the strategies, U.S. businesses have an opportunity to capitalize on technological innovation:

1. Use existing energy efficiency methods to cut carbon emissions from buildings by 25 percent
2. Increase fuel economy in cars so that 2 billion vehicles run at an average of 60 miles per gallon
3. Use natural gas in place of coal at 1,400 one gigawatt (1,000 megawatt) generating plants
4. Capture and store the carbon dioxide generated at 1,600 gas-fired generating plants
5. Achieve a 50-fold increase in wind power
6. Achieve a 700-fold increase in the use of solar photovoltaics
7. Produce 34 million barrels of bio-fuels a day, using roughly 250 million hectares of arable land (approximately 16.5 percent of the world's available resources).

In short, the stakes could not be higher for U.S. companies and investors. The greatest investment opportunities as this new era takes hold will lie with companies that capitalize on this emerging shift in global energy use and production methods. The greatest risks will be with those that choose to ignore these trends and try to carry on with business as usual.

8. Renewable Energy Policy Network for the 21st Century, "Renewables 2005: Global Status Report," November 6, 2005

◆ What CEOs Are Saying

At the January 2005 World Economic Forum, British Prime Minister Tony Blair exhorted corporate and political leaders to acknowledge the serious threat posed by global warming and hasten their support for clean energy solutions. "Businesses and the global economy need to know this isn't an issue that is going away," said Blair, who has set an ambitious policy to reduce the United Kingdom's carbon dioxide emissions by 60 percent in the next half-century.

General Electric CEO Jeffrey Immelt echoed Blair's thoughts a few months later, saying "the time is now" to confront climate change and that it should be viewed as an opportunity, not a liability. Duke Energy CEO Paul Anderson came out in favor of a federal tax on carbon emissions in 2005, even though his company is merging with Cinergy to become one of the nation's largest carbon-emitting companies. According to Anderson, a carbon tax "would provide conservation incentives for everyone" and "foster the development of new technologies."

"We don't have a lot more time to deal with climate change," warned Goldman Sachs Chairman Henry Paulson, in announcing the adoption of a new climate change policy and support for federal GHG regulations in November 2005. Echoing what so many other business and government leaders recognized, Goldman's policy statement declared: "We believe climate change is one of the most significant environmental challenges of the 21st century" and "Voluntary action alone cannot solve the climate change problem."

Ford Motor's CEO Bill Ford said in 2005: "We see climate change as a business issue … and we're accelerating our efforts to find solutions." In Ford's recent climate risk disclosure report, the company made clear that "it is in the interest of society and business to reduce the uncertainty and increase the predictability of policy frameworks and market conditions around the issue of climate change."

"We see climate change as a business issue... and we're accelerating our efforts to find solutions."

Bill Ford, CEO/Chairman, Ford Motor

◆ What Companies Should Do

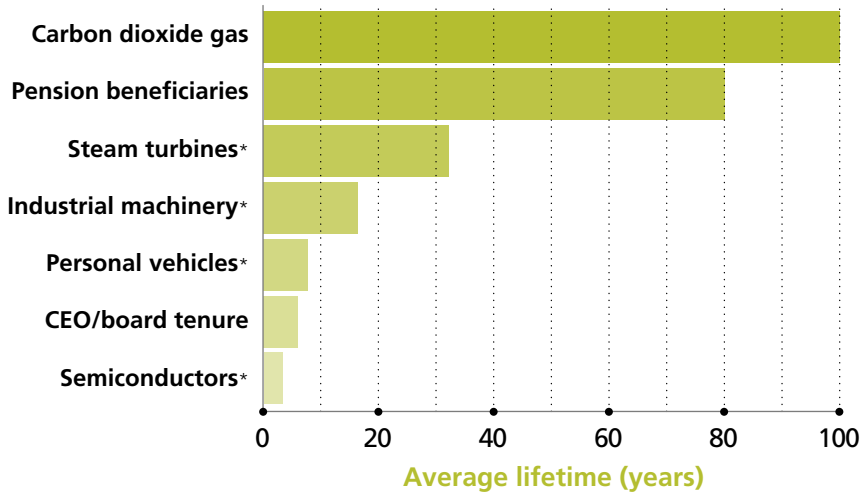
Companies that are successful in facing this challenge must have comprehensive climate change strategies, with the following four key elements[9]:

1. **Companies must assess the deepening financial connections between climate change and their businesses.** Companies with significant greenhouse gas emissions or high-energy use need to assess their exposure from new regulations and develop strategies for mitigating those risks. Companies vulnerable to the direct physical risks also need to take stock of their assets and supply chains. All of these assessments must be evaluated and managed at the highest corporate levels, including by CEOs and boards of directors.
2. **Companies must develop and implement action plans to manage climate risks and seize new market opportunities.** These plans should include new corporate policies and procedures for reducing and mitigating risk, setting absolute GHG reduction targets and energy efficiency goals, and developing or purchasing new clean energy technologies. Companies should also participate in climate policy dialogues that will reduce financial risks and enhance competitiveness opportunities.

9. Ceres and the Investor Network on Climate Risk, "Managing the Risks and Opportunities of Climate Change: A Toolkit for Corporate Leaders," January 2006

3. **Companies must share and discuss their climate strategies with investors, analysts and other stakeholders.** Companies should disclose their assessments and implementation plans in annual financial reports and corporate responsibility reports. Further, they should engage with shareholders, Wall Street analysts and public interest groups to obtain feedback in developing effective, proactive responses to climate change.
4. **Most important, corporate leaders must overcome a tendency toward short-term thinking to implement these climate strategies successfully—emphasizing long-term financial results and building long-term shareholder value.** In essence, the gap between corporate decision-makers and the lasting effects of their decisions must be narrowed.

This constitutes an enormous challenge. In almost every instance, chief decision makers leave their companies long before the capital they deploy does. A typical corporate CEO may look three to five years ahead when making a capital investment. By comparison, the average term of service for a long-lived asset like a fossil fuel energy plant is eight times longer and carbon dioxide emissions from such a plant last an average of 100 years.



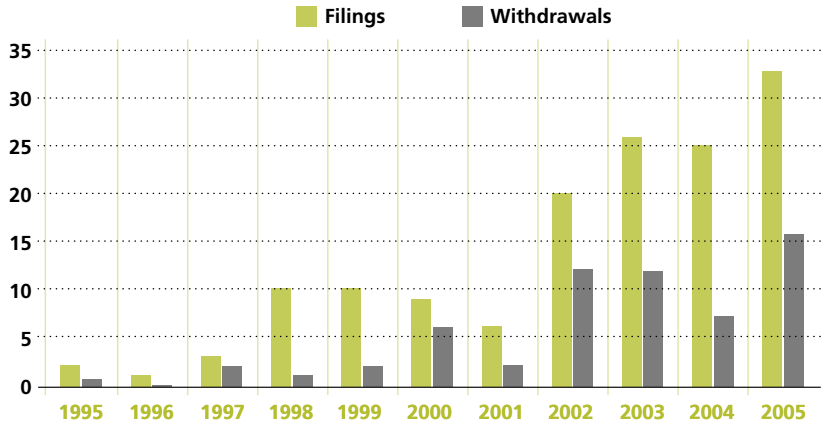
Capital Life Cycles vs. Natural Life Cycles

**Source for capital cycles: U.S. Department of Commerce, Bureau of Economic Analysis*

◆ Investor Actions

A growing number of institutional investors, many of them part of the $3 trillion Investor Network on Climate Risk (INCR), are banding together to place climate change squarely on the corporate governance agenda. At a climate risk summit in May 2005 at the United Nations, 28 INCR members endorsed a 10-point action plan seeking deeper analysis, disclosure and action from companies, Wall Street firms and regulators on the business risks and opportunities from climate change.

Investors' growing concern about climate change is also sparking a rising wave of shareholder proxy activity in the United States. Over two dozen global warming shareholder resolutions were filed with companies in 2004 and 2005—more than triple the number of filings in 2000 and 2001. And some of the resolutions received the highest voting support levels ever—a direct result of pension funds, labor funds and other institutional investors boosting their involvement in the climate issue. Three of the nation's five largest public pension funds, as well as the largest private pension fund TIAA-CREF, now routinely support climate change resolutions.



U.S. Climate Change Shareholder Resolutions, 1995–2005

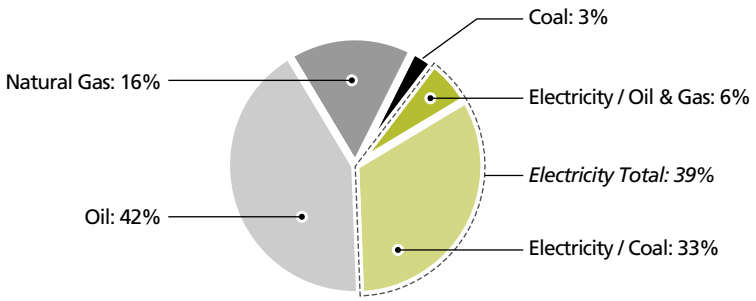
More than 200 institutions are participating in the Carbon Disclosure Project (CDP), which has been conducting annual surveys on climate practices at the world's leading companies. In February 2006, the project expanded its outreach to include more than 1,900 of the world's largest companies, including a new collaboration with INCR aimed at improving climate risk disclosure at S&P 500 companies in the United States. While substantially more companies are responding to the CDP's annual surveys, participation rates and levels of disclosure among U.S. companies remains relatively low compared to their foreign counterparts.

American and European investment banks are also boosting their attention to the climate issue, with several announcing new programs last year to include climate change in their lending, research and investment operations. In Europe, ABN AMRO Asset Management launched new climate-risk management services, including mutual funds focused on sustainability investments and trading of greenhouse gas emission allowances. Meanwhile, JPMorgan Chase announced it would track and control greenhouse emissions from its own operations and evaluate the effects of its lending operations on carbon-intensive industries. And in December 2005, Goldman Sachs became the first global investment bank to adopt a comprehensive environmental policy that acknowledges the value of "ecosystem services" and carbon savings.

As the profiles that follow in this report show, many businesses are embracing this new era of climate risk analysis and planning. But serious governance gaps remain, especially among U.S. companies, and the work of all businesses to achieve sustainable wealth in a carbon-constrained world is only just beginning.

How Companies were Selected for this Report

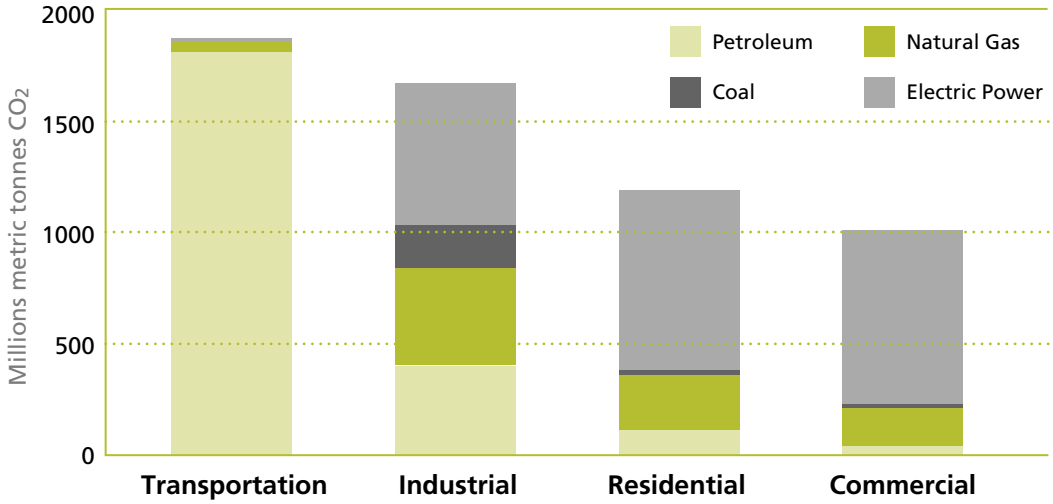
The 100 companies analyzed in this report come from the 10 most carbon-intensive industries in America, according to the U.S. Energy Information Agency. These industries are oil and gas, electric power, coal, autos, chemicals, metals/mining, forest products, industrial equipment, food products and air transport. Companies profiled have major operations in the United States and rank among the largest in their industries, based on market capitalization or revenues.



CO_2 Emissions by Fuel Source

Source: Energy Information Administration, data for 2002

Oil, natural gas and coal are the fuels responsible for virtually all of the nation's carbon dioxide emissions. These fossil fuels are either burned directly or are converted into electric power. This report covers the industries responsible for producing these energy sources—oil and gas, electric power and coal—as well as the largest energy-consuming industries in the transportation and manufacturing sectors.



CO_2 Emissions by Sector

Source: Energy Information Administration, data for 2002

Petroleum is responsible for virtually all CO_2 emissions in the transportation sector. Emissions in the industrial sector are more evenly divided among the four energy types listed above. In the residential and commercial sectors, electric power accounts for about three-quarters of all CO_2 emissions.

Coverage of companies: The 10 industry sectors analyzed in this report are:

Energy sector

- Oil & gas (20 companies)
- Electric power (19 companies)
- Coal (5 companies)

Industrial sector

- Metals & mining (10 companies)
- Chemicals (10 companies)
- Forest products (5 companies)
- Food products (8 companies)
- Industrial equipment (8 companies)

Transportation sector

- Autos (8 companies)
- Air transport (7 companies)

Statistics from the Energy Information Administration Annual Energy Review 2003

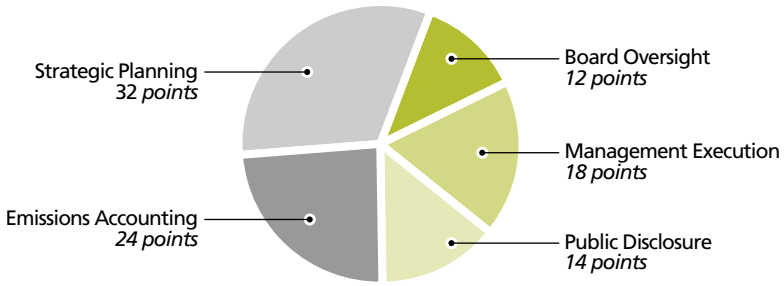
Industry	Total CO_2 Emissions[1]	Industry CO_2 Emissions[2]	Transportation CO_2 Emissions[3]	CO_2/$ shipment[4]
Oil & gas	3,285 (57.4%)			2,337
Electric power	2,165 (39.0%)			No data
Coal[5]	189 (3.3%)			No data
% of Total CO_2 Emissions	**5,639 (99.7%)**			
Metals & mining[6]		390 (25.8%)		1,546[7]
Chemicals		322 (21.6%)		786
Paper & wood products		239 (9.2%)		770[8]
Food		87 (5.7%)		202
Industrial equipment		15 (1.0%)		128
% of Industry CO_2 Emissions		**1,053 (69.6%)**		
Motor vehicles			1,153 (62.3%)	88
Airlines			234 (12.6%)	No data
% of Transportation CO_2 Emissions			**1,387 (74.9%)**	

1. Total CO_2 emissions were 5,720 million metric tons (MMT) in 2002.
2. Industry CO_2 emissions were 1,513 MMT in 1998, or 27.2% of total CO_2 emissions, based on fossil fuel and electricity use in manufacturing.
3. Transportation CO_2 emissions were 1,846 MMT in 2002, or 32.3% of the total, based on petroleum consumption by motor vehicles and jet aircraft. (This figure does not include fuel consumption by ships and locomotives.)
4. Figures reflect 1998 data.
5. Excludes coal for electricity generation, which accounted for 33% of total CO_2 emissions in 2002.
6. Includes primary metals, nonmetallic mineral products and fabricated metal products.
7. Figure is for primary metals. CO_2/$ shipment is 914.5 for nonmetallic minerals and 191.8 for fabricated metals.
8. Figure is for paper production. CO_2/$ shipment is 213.3 for wood products.

How Companies Are Scored

The scoring system used in this report is intended as a detailed benchmarking tool for institutional investors and corporations ready to take action on climate change; it is *not* a simplistic ranking of "best and worst" companies. The scoring system measures the degree to which companies perceive risks and opportunities posed by climate change, and the governance actions they are taking in response.

No two companies are alike and their possible response options to climate change vary. Because the choices, challenges, risks and opportunities that companies face in addressing climate change are not identical, they should be judged individually, within their industry groups, and against the overall survey sample. ***Of particular interest to investors should be companies that rank high or low in relation to their industry peers.***



Climate Change Governance Weighting

The scoring system used in this report rewards companies that have taken the following types of actions:

- **Public disclosure:** The analysis in this report is largely dependent on information companies have placed in the public domain for use by investors and other interested stakeholders. Companies with more information available on their governance responses to climate change—as presented in securities filings, sustainability reports, corporate websites, CEO presentations and responses to third-party questionnaires (like the Carbon Disclosure Project)—generally score better.
- **Policy advocacy:** This report credits companies that have spoken publicly about the need for a government regulatory framework to address climate change. Though companies express near-universal support for market-based actions taken on a voluntary basis to control GHG emissions, such measures have done little to slow rising emissions. In addition, the absence of U.S. government control targets has added to investor uncertainty and complicated corporate strategic planning. Accordingly, the scoring system rewards companies that support national regulatory action on climate change and are explicit in their own governance responses. It credits CEOs who have assumed advocacy roles in their industries, as well as boards of directors and executive committees that have strived to incorporate climate policy considerations into their strategic planning and decision-making.
- **Early action:** This report's scoring system reserves the most credit for companies that have taken early actions to address climate change and control GHG emissions. The Framework Convention on Climate Change (ratified by the U.S. Congress in 1992) set 1990 as a baseline year to reduce GHG emissions. Consistent with the science backing the need for GHG reductions, our scoring system awards the most points to companies that have achieved actual reductions below their 1990 levels. Whether these early movers reap long-term financial benefits from their actions will depend partly on how they are treated by regulators and the capital markets. In any case, this report assumes that companies with more experience preparing for carbon emission constraints stand to gain the greatest competitive advantages.

- **Long-term planning:** This report rewards companies that take a long-term view of their enterprises and capital investment decisions. As described earlier, climate change presents a "governance gap" in decision-making, whereby the warming effects of greenhouse gases in the atmosphere far outlast the tenure of corporate executives and the payback periods of their investments. Accordingly, our scoring system rewards companies that project their GHG emissions well into the future and that seek to reduce their carbon emission "footprints" over the life cycle of the products they sell. The scoring system also recognizes that because some products and capital equipment are more durable and carbon-intensive than others, some companies and industry groups have greater opportunities to address climate change in a long-term planning context.

Average Industry Scores

Industry	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
Chemicals	5.9	9.0	7.7	13.8	15.5	**51.9**
Electricity	5.5	8.8	8.7	13.7	11.9	**48.5**
Autos	6.5	9.0	7.9	12.9	11.6	**47.9**
Equipment	3.0	7.5	5.1	11.2	15.5	**42.3**
Mining	4.7	8.1	6.2	10.5	12.7	**42.2**
Forests	4.0	7.8	5.4	9.4	11.0	**37.6**
Oil & gas	4.1	6.1	4.9	10.3	9.5	**34.8**
Coal	1.6	3.6	5.4	5.2	5.6	**21.4**
Food	1.6	3.2	2.5	5.4	4.9	**17.6**
Airlines	0.9	3.0	3.7	4.6	4.4	**16.6**
Average	**5.5**	**8.9**	**8.7**	**13.7**	**11.7**	**48.5**

High Scoring Industries

Chemical Industry *(Average score: 51.9 points)*

Among the 10 industries evaluated, the chemical sector had the highest overall scores and tied with two other industries for the highest Management and Strategies scores. Chemical companies also scored strongly on Board Oversight.

- **Top Strategies scores:** Chemical companies are focused on new products that promote energy efficiency and growing demand for climate-friendly technologies. For example, DuPont is developing next generation refrigerants with low or no global warming potential and is leading an effort to build the world's first pilot-scale "bio-refinery," using the entire corn plant to produce ethanol. Air Products and Praxair are both involved in developing hydrogen and carbon sequestration technologies.
- **High Board and Management scores:** Most chemical companies have good management and/or board governance systems in place for addressing climate change. These high scores are partly the result of the industry's experience with the 1987 Montreal Protocol, which required a phase-out of chemicals that deplete the Earth's ozone layer. DuPont's board has been overseeing climate change activities since 1994.

- **High Emissions Accounting scores:** As a leading industrial energy consumer, many chemical companies have invested in more efficient energy systems and other changes in manufacturing processes that have reduced GHG emissions considerably. While a half-dozen companies have set GHG "intensity" reduction targets, DuPont and Bayer have set targets for 2010 to reduce overall emissions by 65 percent and 50 percent, respectively, relative to 1990 levels. Several companies conduct life-cycle assessments that measure product end-use GHG emissions.

Electric Utility Industry *(Average score: 48.5 points)*

The electric utility sector had the highest average Disclosure score of the 10 industries examined, as well as the second-highest Emissions Accounting score and the second highest average score.

- **Top Disclosure scores:** Accounting for nearly two-fifths of the nation's CO_2 emissions, electric utilities face considerable risks from climate change regulations. Six of the 19 companies profiled have published climate risk reports. Nine have expressed varying degrees of support for mandatory curbs on CO_2 emissions.
- **High Emissions Accounting scores:** Power companies have been required since 1990 to monitor and report CO_2 emissions. Many companies have also taken advantage of the 1992 Energy Policy Act to register CO_2 emissions savings under the Section 1605(b) program.
- **Above-average Strategies scores:** High-scoring companies are pursuing low- and no-carbon energy options—renewables, natural gas and clean coal—to generate electricity. Noteworthy examples include the FPL Group, the nation's largest wind power generator, AEP and Cinergy, which are moving forward with plans to build commercial-scale integrated gasification combined cycle (IGCC) power plants, and Edison International which is partnering with BP to build the nation's first hydrogen fueled power plant, with most of the CO_2 being captured and stored underground. Lower scoring utilities remain committed to traditional forms of coal-fired generation and are less focused on demand-side management programs.

Auto Industry *(Average score: 47.9 points)*

Auto companies had the highest average Board score, and tied with the chemical industry for the highest average Management score. They also had the third highest Disclosure score.

- **Top Board and Management scores:** Automakers recognize that policies to address climate change pose risks to the industry, which remains dependent on petroleum and is one of the fastest growing sources of CO_2 emissions. Many companies have task forces to coordinate board and executive level actions, and include climate change in strategic planning. Ford recently issued the industry's first stand-alone report examining the business impacts of the climate issue.
- **High Emissions Accounting scores:** Auto companies have developed reliable and consistent systems to measure emissions from their operations. GM has been tracking its GHG emissions since 1990 and has been a leader in setting targets and recording savings from its global facilities. However, GM, Ford and other auto companies have backed away from estimating carbon emission footprints resulting from the operation of their products, which is a far greater source of emissions.
- **Above-average Strategies scores:** Japanese automakers have long held the lead in developing fuel-saving technologies. Honda's product line has the highest fleet fuel economy average, while Toyota has established itself as the leader in gasoline-electric hybrids. Ford is developing multiple advanced fuel technologies and has two hybrid models on the market. GM has spent more than $1 billion on fuel cell research and recently expanded its offerings of flexible fuel vehicles that run on E85 ethanol. European automakers lead in diesel engine technology, which offers fuel economy advantages over gasoline-powered engines.

Middle Scoring Industries

Industrial Equipment Industry *(Average score: 42.3 points)*

Industrial equipment companies tied with chemical companies for the highest average Strategies score, but had weak Board scores.

- **Top Strategies scores:** Industrial equipment manufacturers are in a strong position to reduce GHG emissions with technologies that are energy efficient and use alternative energy sources. The highest scores were posted by General Electric, ABB and United Technologies, which are major providers of efficient power plants and distributed energy systems.
- **Above-average Management scores:** Environmental and sustainable development issues are becoming a higher management priority at these companies, since most of the products they produce are very energy intensive and a major source of emissions. Below-average Board scores occurred because equipment manufacturers serve many "smokestack industries" that until recently have placed little emphasis on reducing GHG emissions. Limited board action may reflect the involvement of these other industries as board members and primary customers.

Metals and Mining Industry *(Average score: 42.2 points)*

This industry had above-average overall scores, led by aluminum producers Alcan and Alcoa. U.S. steel companies had among the lowest average industry scores.

- **Above-average board and Management scores:** Metals and mining companies face a constant sustainable development challenge of producing affordably priced products as natural resources are depleted. Alcan created an executive-level team in 2001 to incorporate energy efficiency and GHG reduction goals throughout the company.
- **Above-average Emissions Accounting and Strategies scores:** Changes in manufacturing processes, more efficient energy use and expanded resource recovery programs have enabled many companies to reduce GHG emissions considerably, including a 25 percent reduction at Alcoa facilities since 1990.
- **High scores for Aluminum producers:** Aluminum producers believe that aluminum use in transportation and recycling of primary aluminum can have substantial positive impacts in reducing GHG emissions. Alcoa has set a goal to make 50 percent of its products from recycled aluminum by 2020. Alcan and Alcoa believe the aluminum industry can become carbon neutral by 2020.

Forest Products Industry *(Average score: 37.6 points)*

Forest product companies had relatively strong Board, Management and Strategies scores, but weak Disclosure scores.

- **Above-average Strategies scores:** Forest product companies manage vast terrestrial carbon 'sinks' through the forests they grow, putting them in an advantageous position if they can manage their resources sustainably. Biomass energy, which is carbon neutral, is the primary power source for most of these forest products companies. International Paper was the first company in this industry to join the Chicago Climate Exchange, a voluntary GHG trading market.
- **Average Board and Management scores:** Company leadership has focused on energy efficiency and fuel-switching to reduce GHG emissions, but less attention has been devoted to climate-related product opportunities and physical risks.
- **Below-average Disclosure scores:** Forest product companies face comparatively high risks from the physical effects of climate change, such as increases in wildfires, windstorms and pest infiltrations, as well as migration of tree species away from forests they own or manage. Company disclosure on these potential risks is very weak.

Oil and Gas Industry *(Average score: 34.8 points)*

Oil and gas companies had the widest disparity of responses, with European companies showing strong leadership and many U.S. companies lagging behind, especially U.S. oil refiners and natural gas distributors.

- **Wide variations on Board, Management and Emissions Accounting scores:** The three highest scoring companies—BP, Royal Dutch Shell and Statoil—distinguish themselves with strong Board and Management involvement on climate issues. BP and Royal Dutch Shell are the only two companies that have set long-term GHG reduction goals and measure emissions from customer use of products. Statoil stands out for emitting only 40 kilograms of CO_2 per unit of production, compared to the industry average of 130 kilograms, and for its efforts (along with BP and Shell) to demonstrate carbon sequestration to enhance oil recovery.
- **Wide variations on Strategies scores:** BP and Royal Dutch Shell have made major financial commitments to alternative energy sources, such as solar, wind and hydrogen. Among U.S. firms, Chevron is investing over $100 million a year in low-carbon technologies, while ExxonMobil has dismissed wind and solar power as being "inconsequential."
- **Low scores for U.S. natural gas producers:** Natural gas-focused firms such as Burlington Resources, El Paso and Williams have done little to examine the climate issue. Such companies stand to benefit from CO_2 regulations that favor clean-burning, lower-carbon domestic energy sources.

Low Scoring Industries

Coal Industry *(Average score: 21.4 points)*

- **Well-below average scores in four of five governance areas:** Coal is the most carbon-intensive fuel source, accounting for 36% of the nation's CO_2 emissions (including coal burned to generate electricity). The coal industry arguably has more at stake in addressing climate change than any other industry. Yet many companies' governance responses have been limited or nonexistent.
- **Near-average Disclosure score:** As with domestic natural gas suppliers, domestic coal producers have a narrow geographic focus and one main delivery option. Unlike gas producers, however, coal companies stand to lose much more as a result of carbon emission constraints. Most companies acknowledge that GHG regulations could adversely affect power-sector demand for coal, but otherwise choose to downplay or ignore the issue.
- **Well-below Strategies score:** The primary strategy being pursued (especially by larger coal companies) is support of research on technologies to gasify coal and store carbon dioxide emissions underground. Companies pursue this research in conjunction with government energy agencies and electric utilities. However, carbon sequestration technologies have yet to be proven technologically and commercially. Coal-bed methane recovery is another important, but more limited, commercial option.

Food Products Industry *(Average score: 17.6 points)*

- **Lowest Disclosure score:** Although several leading food products companies acknowledge the threat posed by climate change to food-based raw materials and water resources, few have articulated a strategy to address this threat. Leading companies like Unilever are at least focused on the issue.
- **Low Emissions Accounting score:** While food products are not GHG-intensive, food processing is relatively energy intensive. Many food products companies have taken steps to make their operations more energy efficient. Leading companies like Unilever and Nestle have also focused on GHG emissions from product packaging and refrigeration systems.
- **Low Strategies score:** Some food products companies like ADM and Bunge develop feedstocks for ethanol-based transportation fuels. Biomass fuels could be a boon to the agricultural industry, However, CO_2 benefits will come mainly from cellulosic sources (like grasses) that are nearly carbon neutral, rather than corn-based ethanol, which provides about a 20 percent savings in GHG emissions relative to gasoline.

Air Transport *(Average score: 16.6 points)*

- **Lowest average score in four of five governance areas:** Aircraft are among the world's fastest growing sources of CO_2 emissions, expected to reach 5 percent of global CO_2 emissions by 2020. Emissions improvements are largely outside of the companies' control, however, and depend on advances in engine and airframe design, and improvements in airport and air traffic management systems.
- **Low Management scores:** Airline profitability is largely dependent on managing fuel costs, giving these companies a built-in incentive to improve the fuel efficiency of their operations. This suggests that many companies have an indirect focus on reducing GHG emissions that may not be reflected in these scores.
- **Higher scores for freight carriers:** Freight carriers have large ground delivery fleets, with GHG management options available through logistics and fuel alternatives. Passenger carriers are more dependent on GHG reductions available through logistical changes in government-controlled air traffic management systems.

Company Scores (by Industry)

Energy sector

Oil and gas: Petroleum fuels and natural gas are the largest sources of carbon dioxide (CO_2) emissions in America, accounting for 58 percent of the nation's total CO_2 emissions. (Petroleum's share is 42 percent; natural gas is 16 percent). Petroleum and natural gas account for the following percentages of CO_2 emissions by sector:

Transportation—100 percent
Industrial—51 percent
Residential—31 percent
Commercial—22 percent

These figures exclude petroleum and natural gas used for electric power generation. (Including power generation, petroleum and natural gas account for 64 percent of the nation's CO_2 emissions.)

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
BP	9	16	13	23	29	**90**
Royal Dutch	7	15	7	23	27	**79**
Statoil	10	13	12	15	22	**72**
Total	6	15	12	13	16	**62**
Chevron	7	10	5	17	18	**57**
Anadarko	5	8	9	11	6	**39**
Sunoco	2	5	7	17	8	**39**
Amerada Hess	4	6	5	12	8	**35**
ConocoPhillips	3	5	7	9	11	**35**
ExxonMobil	5	5	5	12	8	**35**
Marathon	3	4	3	10	6	**26**
Occidental	5	2	4	11	3	**25**
Valero	1	3	3	9	8	**24**
Apache	3	6	2	6	5	**22**
Tesoro	6	4	0	3	2	**15**
Burlington	1	2	1	4	5	**13**
Devon Energy	0	1	1	6	3	**11**
El Paso	3	1	1	3	1	**9**
Murphy Oil	3	1	0	1	1	**6**
Williams	0	0	0	1	2	**3**
Average	**4.15**	**6.1**	**4.85**	**10.3**	**9.5**	**34.8**

Electric power: Electricity is the nation's second largest source of CO_2 emissions, accounting for 39 percent of total CO_2 emissions. Fossil fuel inputs for electricity are coal (51 percent of the fuel mix), natural gas (13 percent) and oil (3 percent). Nuclear power and renewable energy sources make up the balance of the electricity supply. Electricity generation accounts for the following percentages of CO_2 emissions by sector:

Transportation—0 percent
Industrial—38 percent
Residential—69 percent
Commercial—77 percent

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
AEP	10	11	12	19	21	**73**
Cinergy	9	16	13	19	16	**73**
Entergy	4	11	12	21	17	**65**
Exelon	8	14	11	15	15	**63**
Calpine	4	9	11	11	20	**55**
PG&E	6	12	9	17	10	**54**
Xcel Energy	7	11	10	13	12	**53**
Edison Int'l	4	10	8	14	15	**51**
TXU	7	6	10	18	10	**51**
Southern	9	7	8	17	10	**51**
DTE	8	8	9	11	14	**50**
FirstEnergy	7	8	9	17	9	**50**
FPL Group	3	11	9	17	9	**50**
Duke	5	10	8	13	11	**47**
Progress	7	9	6	8	6	**36**
AES	3	9	5	7	10	**34**
Sempra	1	3	2	9	9	**24**
Dominion	1	2	8	11	5	**27**
Constellation	3	1	6	5	8	**23**
Average	**5.5**	**8.9**	**8.7**	**13.7**	**11.7**	**48.5**

Coal: Coal is the nation's third largest source of CO_2 emissions (excluding coal for electricity). Direct use of coal accounts for 11 percent of industrial CO_2 emissions and 3 percent of the nation's total CO_2 emissions. Coal for electricity accounts for another 33 percent of the nation's CO_2 emissions. When including coal for electricity, coal accounts for 36 percent of nation's CO_2 emissions, second only to petroleum.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
Rio Tinto	7	11	10	16	13	**57**
Peabody	1	2	5	7	8	**23**
CONSOL	0	3	5	3	3	**14**
Arch	0	2	4	0	2	**8**
Foundation	0	0	3	0	2	**5**
Average	**1.6**	**3.6**	**5.4**	**5.2**	**5.6**	**21.4**

Manufacturing sector

Metals and mining: This industry sector includes primary metals (such as steel, aluminum and copper), nonmetallic mineral products (such as concrete, lime and gypsum) and fabricated metal products (such as steel and iron foundries). This industry is among the nation's most energy- and carbon-intensive in terms of CO_2 emissions per dollar of shipment. The aluminum industry is a major emitter of greenhouse gases, particularly perfluorocarbons (PFCs), gases that have a global warming intensity over 6,000-times that of CO_2.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
Alcan	9	15	11	20	22	**77**
Alcoa	6	16	6	22	24	**74**
Nippon Steel	7	12	7	18	23	**67**
BHP Billiton	6	12	12	16	17	**63**
Anglo Amer.	5	12	7	15	17	**56**
Newmont	3	2	6	8	5	**24**
Nucor	3	2	3	3	10	**21**
U.S. Steel	3	7	4	1	5	**20**
Mittal Steel	2	2	4	2	4	**14**
Phelps Dodge	3	1	2	0	0	**6**
Average	**4.7**	**8.1**	**6.2**	**10.5**	**12.7**	**42.2**

Chemicals: This industry sector includes basic chemicals (such as acids, salts and organic chemicals), chemical products (such as synthetic fibers, plastics materials and pigments) and finished chemical products (such as paints, fertilizers and explosives). Overall, the chemical industry is the second largest industrial user of energy, after petroleum refining.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
DuPont	8	16	12	21	28	**85**
Bayer	8	11	8	21	23	**71**
ICI	9	10	10	16	15	**60**
BASF	9	11	7	15	17	**59**
Dow Chemical	4	10	12	16	17	**59**
Air Products	4	11	6	11	17	**49**
Praxair	5	8	5	13	12	**43**
Rohm & Haas	7	6	10	10	7	**40**
Monsanto	4	2	5	12	9	**32**
PPG	1	5	2	3	10	**21**
Average	**5.9**	**9.0**	**7.7**	**18.8**	**15.5**	**51.9**

Paper and wood products: This industry sector includes pulp and paper mills, paperboard

containers and products, logging, sawmills and structured wood products. Overall, the forest products industry is the third largest industrial consumer of energy. It is especially vulnerable to the physical effects of climate change.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
Int'l Paper	6	9	6	12	16	**49**
Abitibi	6	7	5	11	16	**45**
Weyerhaeuser	2	7	7	10	9	**35**
MeadWestvaco	4	7	4	8	8	**31**
Georgia-Pacific	2	7	5	6	6	**26**
Average	**4.0**	**7.4**	**5.4**	**9.4**	**11.0**	**37.2**

Food Products: This industry sector includes meat and dairy products, grain and sugar products, and fats and oils. Overall, the food industry consumes as much energy as the nonmetallic minerals industry and twice as much energy as the wood products and transportation equipment industries. It is also especially vulnerable to physical effects of climate change.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
Unilever	6	8	8	15	12	**49**
Nestle	2	6	3	10	8	**29**
General Mills	3	3	4	8	4	**22**
ADM	0	0	0	2	10	**12**
Altria	2	2	1	5	1	**11**
PepsiCo	0	3	3	2	1	**9**
Bunge	0	1	1	1	2	**5**
ConAgra	0	3	0	0	1	**4**
Average	**1.6**	**3.6**	**5.4**	**5.2**	**5.6**	**21.4**

Industrial equipment: This industry sector includes power generation, motors and generators, appliances and lighting. Although the industry is not a large consumer of energy in manufacturing, its products are large users of petroleum and electricity.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
GE	5	12	9	12	20	**58**
ABB	4	10	7	13	20	**54**
UTC	6	13	5	12	16	**52**
Hitachi	2	7	6	18	18	**51**
Mitsubishi	1	5	5	15	19	**45**
Siemens	4	8	4	9	15	**40**
Caterpillar	3	3	2	7	12	**27**
Deere	1	2	3	4	4	**14**
Average	**3.2**	**7.5**	**5.1**	**11.2**	**15.5**	**42.5**

Transportation Sector

Motor vehicles: This industry sector includes passenger cars and trucks. Although this industry is not a large consumer of energy in manufacturing, its products are the largest consumers of petroleum, accounting for 20 percent of the nation's total CO_2 emissions.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
Toyota	9	14	10	14	18	**65**
Honda	9	13	7	13	20	**62**
Ford	9	13	12	12	12	**58**
GM	6	8	8	17	13	**52**
Daimler	5	8	8	14	8	**43**
Volkswagen	4	9	7	9	8	**37**
BMW	5	3	7	14	6	**35**
Nissan	6	5	4	10	8	**33**
Average	**6.5**	**9.0**	**7.9**	**12.9**	**11.6**	**47.9**

Air Transport: This industry sector includes freight and passenger airlines. The airline industry accounts for 13 percent of transportation emissions and more than 4 percent of the nation's total CO_2 emissions. Along with motor vehicles, aircraft are among the nation's fastest growing sources of emissions. In 1999, transportation emissions surpassed industrial emissions as the nation's largest source of CO_2 emissions.

Company	Board	Mgmt.	Disclosure	Emissions	Strategies	Total
Maximum	*12*	*18*	*14*	*24*	*32*	*100*
UPS	3	4	6	10	7	**30**
British Airways	0	9	7	5	6	**27**
Air France	1	2	6	11	3	**23**
FedEx	0	3	3	6	6	**18**
AMR	0	2	2	0	5	**9**
Southwest	0	1	2	0	3	**6**
UAL	2	0	0	0	1	**3**
Average	**0.9**	**3.0**	**3.7**	**4.6**	**4.4**	**16.6**

About The Author

Douglas G. Cogan is Deputy Director of the IRRC Social Issues Service, now a division of Institutional Shareholder Services. He is the author of several books on environmental and energy topics. His 1992 book, *The Greenhouse Gambit: Business and Investment Responses to Climate Change*, was one of the first to focus on the investment implications of global warming for major industry groups. In 2003, he wrote the first edition of *Corporate Governance and Climate Change: Making the Connection*. In 2004, he wrote an *Investor Guide to Climate Risk: Action Plan and Resource for Plan Sponsors, Fund Managers and Corporations*. In 2005, he wrote *Unexamined Risk: How Mutual Funds Vote on Climate Change Shareholder Resolutions*. Each of the reports written since 2003 were commissioned by Ceres. Mr. Cogan has also written extensively on fiduciary issues related to social investing and shareholder activism.

The Investor Responsibility Research Center has been a leading source of high quality, impartial research and consulting on corporate governance and social responsibility issues since 1972. In August 2005, Institutional Shareholder Services acquired IRRC's proxy voting, portfolio screening, benchmarking, and corporate services. Proceeds from the sale of these businesses have been used to establish the IRRC Institute for Corporate Responsibility. The IRRC Institute will continue to conduct in-depth research and analysis of contemporary issues affecting companies and shareholders worldwide.

About Ceres

Ceres is a national coalition of investors, environmental groups, and other public interest organizations working with companies to address sustainability challenges such as climate change. Ceres also directs the **Investor Network on Climate Risk**, a group of 50 institutional investors from the U.S. and Europe managing nearly $3 trillion of assets. INCR was launched at the Institutional Investor Summit on Climate Risk at United Nations Headquarters in 2003. The purpose of INCR is to promote better understanding of the risks of climate change among institutional investors. For more information, visit www.ceres.org and www.incr.com.

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