707:Climate Change: Minimizing Corporate Risk & Maximizing Opportunities

Daniel A. Barthold
Director of Energy & Environmental Engineering
Miller Brewing Company

Kathleen M. Hennessey
Senior Environmental Counsel
DaimlerChrysler Corporation

Thomas Kerr
Chief, Energy Supply & Industry Branch
U.S. Environmental Protection Agency

Mindy S. Lubber
Executive Director
Ceres

Faculty Biographies

Daniel A. Barthold

Daniel A. Barthold is director of environmental safety, security, facilities, and energy at Miller Brewing Company in Milwaukee. In the last ten years he has been responsible for the environmental and energy policy and direction for the company and recently has been given the safety and security responsibilities.

Previously, he worked as a plant staff engineer, plant engineering manager, process manager, operations manager, senior project manager and director. He was instrumental in the design and construction of five new manufacturing facilities, as well as the start up and operation of those facilities.

He received a bachelor of engineering from Youngstown State University.

Kathleen M. Hennessey

Kathleen M. Hennessey is senior environmental counsel for DaimlerChrysler Corporation in Auburn Hills, Michigan. Her responsibilities include advising DaimlerChrysler on compliance with environmental laws applicable to manufacturing operations and motor vehicles, representing DaimlerChrysler in administrative and judicial proceedings, and advising DaimlerChrysler on the impact of proposed rules and legislation.

Before joining DaimlerChrysler, Ms. Hennessey served as a member of the Illinois Pollution Control Board. She also was previously a partner in the environmental practice group of Mayer Brown & Platt (now Mayer Brown Rowe & Maw) and an assistant corporation counsel for the City of Chicago.

In addition to ACC, Ms. Hennessey is a member of the ABA and the Air & Waste Management Association.

Ms. Hennessey received an AB from the University of Michigan and a JD from the University of Chicago Law School.

Thomas Kerr

Thomas M. Kerr is a branch chief with the U.S. Environmental Protection Agency's (EPA) Office of Air & Radiation, Office of Atmospheric Programs, Climate Protection Partnerships Division. He manages staff working on a variety of voluntary climate change programs with industry, including the Climate Leaders program, a government/industry partnership that encourages major companies to set greenhouse gas (GHG) reduction targets and to track their progress toward these targets using an EPA protocol; the Green Power Partnership, which enters into partnerships with companies or other organizations that pledge to procure a set percentage of their power from renewable energy, and the Combined Heat and Power Partnership, which works with the industrial sector and the emerging distributed generation industry to promote clean, efficient, reliable onsite generation. He

has worked with EPA and in the private sector for the past eleven years in matters involving clean energy, climate change, and international investment and trade. He has also negotiated and structured a number of international climate change mitigation projects.

Mr. Kerr has written and lectured on topics relating primarily to climate change policies and industry practices related to climate change and environmental strategic planning. He is a member of the ABA's Section of Environment, Energy, and Resources, and is a vice chair of the Sustainable Development, Ecosytsems and Climate Change Subcommittee.

He earned his BA from the University of Michigan, his JD from DePaul University College of Law, where he was president of the Environmental Law Society, and his LLM in international environmental law from Georgetown University Law Center.

Mindy S. Lubber

Mindy S. Lubber is the executive director of CERES, a coalition of investment funds, environmental organizations, and public interest groups whose mission is to move business, capital, and markets to advance lasting prosperity by valuing the health of the planet, and its people.

Ms. Lubber has held leadership positions in government as the regional administrator of the Environmental Protection Agency's New England office, in the financial services sector as founder, president, and CEO of Green Century Capital Management, as the president of an environmental law and policy consulting group and in the not-for-profit sector for more than a decade leading environmental and public interest law organizations.

Ms. Lubber was senior advisor and communications director to former Governor Michael Dukakis, and for a decade, held leadership positions with the Massachusetts Public Interest Research Group (MASSPIRG), including chair of the board of directors. She founded the National Environmental Law Center, directed two successful, statewide ballot campaigns including the Massachusetts Bottle Bill Campaign and the Campaign to Clean Up Hazardous Waste, both of which resulted in the enactment of new environmental protection statutes. Ms. Lubber has specialized in areas of state and federal environmental law.

Ms. Lubber is an attorney and holds a Masters in business administration.

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SABMiller

- One of the world's largest brewers
- Over 80 breweries and 20 bottling plants operating in 40 countries on four continents
- Outside of the U.S., SABMiller is one of the largest coca-cola bottlers in the world

ACC Association of Corporate Counsel

Miller Brewing Company

- Second largest brewer in the U.S.
- Operates 6 major and 2 regional breweries in six states

ACC's 2004 Annual Meeting: The New Face of In-house Counsel October 25-27, Sheraton Chicago

ACC Association of Corporate Counsel

Historical Energy and Environmental Management

- Maintaining a good working relationship with regulatory agencies
- Energy use is now dictated by emissions limits, not just by cost as it had been (20-30 years ago)
- Monitoring and tracking energy use company-wide began in 1997, with emissions tracking added in 2001

ACC's 2004 Annual Meeting: The New Face of In-house Counsel October 25-27, Sheraton Chicago

Co-generation

- Approach in 1970's was from a cost savings and risk abatement perspective
- California energy crisis prompted adding co-generation in summer 2002 for risk abatement, despite expense
  - Affect on company emissions profile
- Maintain adequate fuel sources and back-up fuels to manage risk

Emissions Monitoring

- 3 coal fueled plants – GA, NC, OH
- 3 natural gas fueled plants – CA, TX, WI
  - CEMS – CA & WI
  - RECLAIM Permitting in SCAQMD

ACC Association of Corporate Counsel

Projects Affecting Emissions

- Focus on increasing efficiencies and conversion of older equipment to new more efficient equipment
- Current projects
  - Trenton - turbine & neural network
  - Fort worth – NH3 compressor controls
  - Leinenkugel - economizer
  - Milwaukee - new powerhouse
- Future projects
  - Milwaukee and Fort Worth - Compressed air controls
  - Eden – NH3 compressor controls

ACC Association of Corporate Counsel

Climate Leaders

- Charter member of the voluntary program with EPA to promote the tracking and reduction of GHGs
- Consultant provided by EPA to assist with the construction of GHG inventory and management plan
- Inventory and plan identify a base year and methods to be used to achieve a reduction goal
- GHG reductions are good for the environment as well as the company

ACC Association of Corporate Counsel

Wrap-up

- Cost and emissions levels must be considered
- Increasing efficiencies may be less costly than installing new equipment
- Relationships with members of regulatory agencies

FINAL DOCUMENT
JANUARY 2003

Response to U. S. Department of Energy Business Challenge

BMW GROUP • DAIMLERCHRYSLER • FORD MOTOR COMPANY • GENERAL MOTORS • MAZDA • MITSUBISHI MOTORS • NISSAN • PORSCHE • TOYOTA • VOLKSWAGEN

1401 H STREET, N.W. SUITE 900 • WASHINGTON, D.C. 20005
TEL: (202) 326-5500 • FAX: (202) 326-5598

Alliance Commitment

The Alliance of Automobile Manufacturers (Alliance) is a trade association of ten car and light truck manufacturers that account for more than 90 percent of U.S. vehicle sales. Member companies, which include BMW Group, DaimlerChrysler, Ford Motor Company, General Motors, Mazda, Mitsubishi Motors, Nissan, Porsche, Toyota, and Volkswagen, employ about 620,000 people in the United States in 35 states.

The Alliance supports the President's U.S. climate change strategy announced on February 14, 2002. In light of the global debate on climate change, we believe it is prudent to reduce emissions, including carbon dioxide, from our plants, products, and processes. We support the development of new technologies and the deployment of cost-effective energy strategies in all sectors to improve energy efficiency and reduce greenhouse gas (GHG) emissions.[1] We accept the President's challenge to reduce GHG intensity and improve the energy efficiency of our manufacturing facilities and will participate in the Department of Energy's (DOE) Business Challenge program.

- We support a single national voluntary reporting registry under the Department of Energy. Building on the reporting that some members are already engaged in, within one year all Alliance members will be reporting GHG emissions from their manufacturing facilities.
- Alliance member companies commit to achieve at least a 10% reduction in GHG emissions from their U. S. automotive manufacturing facilities, based on U. S. vehicle production, by 2012 from a base year of 2002.
- Progress toward this goal can be measured by DOE based on 1605(b) registry reporting by individual Alliance members of their emissions and avoidance, reduction, and sequestration activities.
- Alliance members will continue to support government/industry partnerships that further the development of practical and affordable energy efficiency solutions.

Clearly, achievement of this commitment and the national goal will depend on a number of external factors, including economic stability, coordinated regulatory policies that avoid mandates and other market barriers, weather variations which skew energy use, and support from the utilities' energy mix including emission factors reductions. With respect to the energy efficiency of our products, we will continue to work with the National Highway Transportation Safety Administration (NHTSA) on its ongoing rulemaking to address new vehicle fuel economy.

Greenhouse gas reduction policies must be balanced with sound energy policy for the United States. The challenge is to work together to meet the world's growing demands for energy while addressing long-term concerns about the environment. We agree with the President that it is critical to continue to sustain economic growth. It is through this growth that both the public and private sectors will be capable of financing investment in new, clean energy technologies. The climate issue is a global one, which must be addressed as a shared responsibility of government, industry, and individuals.

[1] Greenhouse gases, as defined by the UNFCCC, include carbon dioxide, methane, nitrous oxide, halogenated substances (e.g. HFCs and PFCs), and SF_6.

A Decade of Progress

Energy Conservation at Automotive Facilities

Carbon dioxide (CO_2), the primary GHG emitted from manufacturing facilities, is generated from the consumption of energy, direct and indirect. Direct CO_2 emissions are a product of efficient combustion of various fuels for purposes of heating and cooling buildings, operation of process equipment, and operation of emission control equipment (e.g., thermal oxidizers and incinerators). Indirect emissions result from the consumption of electricity and other forms of converted energy.

Over the past decade, the automotive industry has made significant advancements in projects that conserve energy and improve efficiency. A highly competitive market drives such advancements.

Improvements within existing manufacturing facilities include conservation activities, such as changes in operating practices and employee awareness programs, and efficiency improvements such as capital investments in new, more efficient, technologies and processes. Examples of projects include the widespread use of energy efficient lighting, development of automated facility energy management systems, efficiency improvements in heating, ventilation, and air conditioning systems, and upgrades and modernization of buildings and equipment to optimize energy use.

The industry has also undertaken fossil fuel conversion projects to utilize cleaner burning fuels. Powerhouses in older manufacturing facilities, designed to burn coal and fuel oil, have been converted to cleaner, less carbon-intensive natural gas.

At "greenfield" sites, Alliance members have invested in state-of-the-art manufacturing plants that produce vehicles and component parts at dramatically reduced rates of CO_2 emissions per unit of production.

In partnerships with energy suppliers, some of the auto companies have implemented energy management programs and have undertaken projects that reduce energy consumption and GHG emissions, including co-generation projects and landfill gas recovery.

Company-specific examples of energy efficiency / GHG reduction projects are published in corporate environmental reports and are also publicly available on some of the companies' websites. Alliance member companies also participate in a variety of governmental programs that promote energy conservation and energy efficiency.

Halogenated GHG Emissions

In the early 1990s, the automotive industry successfully re-designed air-conditioning systems in vehicles to eliminate the use of chlorofluorocarbons (CFCs). Automotive air conditioning systems today primarily utilize HFC134a, which has a significantly lower Global Warming Potential (GWP).

Similarly, Alliance members have successfully reduced the use of CFCs in fire suppression systems, refrigeration systems, and building chillers in automotive manufacturing facilities and office buildings.

Vehicle Technology: Government/Industry Partnerships

The fuel economy of passenger vehicles (cars and light trucks) is regulated under the existing Corporate Average Fuel Economy (CAFE) program. The agency responsible for setting CAFE standards, NHTSA, has already begun a rulemaking to increase the current standards over several years. In addition, auto manufacturers are engaged in a range of activities, as individual companies, investing billions of dollars to develop alternative and advanced technologies, such as fuel cell and hydrogen vehicles, and hybrid gasoline-electric vehicles, to reduce fuel consumption and emissions. Many of these advanced technologies have been introduced voluntarily, not in response to regulatory requirements or mandates, and member companies have already announced plans to expand the availability of technologies such as hybrids in the near future.

While regulation of vehicle fuel economy is a separate program administered by NHTSA, apart from the DOE Business Challenge, Alliance companies are also participating in various activities that will serve to promote technology aimed at reducing vehicle CO_2 emissions. Two examples of these are the California Fuel Cell Partnership and FreedomCAR.

California Fuel Cell Partnership

This partnership is advancing a new vehicle technology that could move the world toward more practical and affordable environmental solutions. For the first time ever, automobile companies, fuel suppliers, and government have joined together to demonstrate fuel cell vehicles under day-to-day driving conditions. In addition to testing the fuel cell vehicles, the partnership is examining fuel infrastructure issues and beginning to prepare the California market for this new technology.

Specifically, the partnership aims to achieve four main goals:

Demonstrate vehicle technology by operating and testing the vehicles under real-world conditions in California;

Demonstrate the viability of alternative fuel infrastructure technology, including hydrogen and methanol stations;

Explore the path to commercialization, from identifying potential problems to developing solutions; and

Increase public awareness and enhance public opinion about fuel cell electric vehicles, preparing the market for commercialization.

FreedomCAR

In January of 2002, USCAR, a consortium of auto companies, announced their participation in a new federal research partnership with the Department of Energy called FreedomCAR. FreedomCAR is a program for the advancement of high-efficiency vehicles that focuses on fuel cells and hydrogen produced from domestic renewable energy sources. FreedomCAR's long-term goal is to develop technologies for hydrogen-powered fuel cell cars and trucks that will require no foreign oil and emit no pollutants or greenhouse gases.

The transition of vehicles from gasoline to hydrogen is viewed as critical both to reducing carbon dioxide emissions and to reducing U. S. reliance on foreign oil. FreedomCAR will focus on technologies to enable mass production of affordable hydrogen-powered fuel cell vehicles and the hydrogen-supply infrastructure to support them. FreedomCAR also will continue its support for petroleum-dependent technologies that have the potential to dramatically reduce oil consumption and environmental impacts.

Deployment of Advanced Vehicle Technologies

Automakers share the goal of increasing fuel efficiency and believe the best way to continue making progress is through the development and purchase of advanced technology vehicles. Consumers purchase vehicles to meet their family needs for affordability, passenger room, payload capacity, increased safety features, and utility. Automakers offer more than 30 models with fuel economy ratings above 30 miles per gallon, but consumers purchase few of these vehicles because they do not offer all of the attributes that consumers desire. Breakthrough technologies will allow consumers to continue choosing vehicle attributes they need while enjoying increased fuel economy gains. Alliance members are developing and introducing vehicles that run on alternative fuels, as well as hybrid-electric cars, SUVs, and pickups that can significantly improve city fuel economy. Automakers are also working on the next generation of lean burn technology and have committed billions of dollars to bring zero-emission fuel cell vehicles to market as soon as possible.

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January 9, 2003

By Facsimile to 202-586-4403

The Honorable Spencer Abraham
Secretary, United States Department of Energy
Forrestal Building, Room 7A-257
1000 Independence Avenue, S.W.
Washington, D. C. 20585

Re: Alliance Response to the Business Challenge Program on Climate Change

Dear Secretary Abraham:

The members of the Alliance of Automobile Manufacturers (Alliance) support the President's Climate Change Initiative and are pleased to enclose their commitment to the related Department of Energy (DOE) Business Challenge Program. The program implements voluntary industry commitments to report and reduce greenhouse gas (GHG) emissions.

The Alliance is a trade association of 10 car and light truck manufacturers who account for more than 90 percent of U.S. vehicle sales. Member companies, which include BMW Group, DaimlerChrysler, Ford Motor Company, General Motors, Mazda, Mitsubishi Motors, Nissan, Porsche, Toyota and Volkswagen, employ more than 620,000 Americans at 250 facilities in 35 states.

Alliance member companies support a single national voluntary reporting registry under the Department of Energy. In response to the Administration's Business Challenge, Alliance member companies commit to achieve at least a 10% reduction in GHG emissions from their U. S. automotive manufacturing facilities, based on U. S. vehicle production, by 2012 from a base year of 2002. Progress toward this goal can be measured by DOE, based on members' participation in its ongoing 1605(b) registry program. Alliance members will continue to support government/industry partnerships that further the development of practical and affordable energy efficiency solutions, some of which are described in the attachment.

We look forward to working with the Department of Energy under this Program and would be happy to answer any questions you may have concerning the document provided.

Sincerely,

Jo Cooper

Josephine S. Cooper
President and CEO

Enclosure (1)

ccs: Donald Evans, Secretary, U.S. Department of Commerce
Norman Mineta, Secretary, U.S. Department of Transportation
Ann Veneman, Secretary, U.S. Department of Agriculture
Christine Todd Whitman, Administrator, U.S. Environmental Protection Agency
James Connaughton, Chairman, Council on Environmental Quality

Frequently Asked Questions for Proposed 1605(b) General Guidelines

1. ***How will the voluntary registry help address climate change?*** The proposed Guidelines will help U.S. companies, institutions, landowners and citizens undertake comprehensive reviews of their greenhouse gas emissions and take actions to reduce these emissions. By emphasizing the importance of providing a full accounting of all greenhouse gas emissions and emission reductions, the revised Guidelines will help identify and encourage cost-effective emissions reductions that will help make substantial progress toward the achievement of the President's goal of reducing the greenhouse gas intensity of U.S. economy, and to global efforts to address the risk of global climate change.

2. ***Why should entities report on their greenhouse gas emissions?*** An important step towards achieving the President's goal of reducing the greenhouse gas intensity of the U.S. economy is to encourage companies, institutions, landowners and citizens to inventory their greenhouse gas emissions and track annual changes in emissions per unit of output. Through the revised 1605(b) program, participating entities will gain an improved understanding of their own emissions, identify cost-effective opportunities for voluntary emissions reductions, and demonstrate to their stockholders and customers that they are contributing to the achievement of the President's goal. The revised 1605(b) guidelines will provide a mechanism for entities to demonstrate that they are taking action to inventory and reduce their greenhouse gas emissions.

3. ***What are the key features of the proposed revised General Guidelines?*** The proposed revisions to the Guidelines are designed to enhance the accuracy, measurement and verifiability of information reported under the 1605(b) program and to contribute to the President's climate change goals. The Guidelines continue to provide considerable flexibility to entities that wish to report emissions or emission reductions in the future, as they have in the past.

   The Guidelines will provide special recognition for those entities able to meet additional requirements necessary to register emission reductions achieved after 2002. For large emitters, these requirements include providing an inventory of their total emissions and calculating the net reductions associated with entity-wide efforts to reduce emissions or sequester carbon. Small emitters would be eligible to register emission reductions associated with specific activities without reporting an inventory of the total emissions or demonstrating a net decrease in entity-wide emissions. Small emitters would be required to provide a full accounting of the emissions and emission reductions associated with each category of their activity on which they choose to report.

   The Guidelines would enable entities to report (but not register) emission reductions achieved prior to 2003 and report (but not register) emission reductions associated with specific actions taken to reduce emissions – sometimes referred to as projects - even if these reports do not meet the criteria established by DOE for registering

reductions.

The chief executive officer of the company or institution, an agency head, head of household or other responsible official would be required to certify that the reporting entity accurately followed the revised Guidelines. Entities would be encouraged to obtain independent verification of the accuracy of their reports and their compliance with DOE Guidelines.

4. ***What are the key differences between the existing program and the proposed revisions?*** First, the proposed revised program increases reporting transparency. Transparency is improved by focusing on entity-wide reporting. Entities will need to identify and fully describe the entity on which they are reporting, such as a utility, manufacturer, commercial business or institution. The current program only requires identifying those facilities or projects the entity is reporting on. Under the revised program, entities would need to describe their entity boundaries and structure in an entity statement; report changes, if any, to those entity boundaries each year; and ensure no double counting occurs.

   Second, the proposed revised program offers utilities, manufacturers and other large emitters an opportunity to receive special recognition for their efforts to reduce emissions after 2002 if they provide a comprehensive accounting of their emissions and their emission reductions. To receive such recognition, entities with total average annual emissions greater than 10,000 metric tons of carbon dioxide equivalent must report on all emissions and emission reductions within their entity boundaries. Entities with annual emissions of less than 10,000 metric tons of carbon dioxide equivalent, such as farms, small businesses and households, would not be required to complete a comprehensive accounting of all of their emissions, but would still be required to meet other new requirements. For example, a farm wanting to report sequestration associated with conservation practices on one field must report on conservation practices on all fields, but would not need to provide emissions or emissions reductions data on its other activities, such as livestock operations.

   Third, the proposed revised program increases reporting accuracy and verifiability by proposing more uniform calculation methods; specifying the need for three-year record-keeping; and requiring a senior official to certify data accuracy.

5. ***What does "entity-wide" mean?*** The term “entity-wide” refers to all greenhouse gas emissions or emission reductions by a company, utility, manufacturer or other reporting entity, as defined by its entity statement.

6. ***What does an "entity-wide emissions inventory" require?*** An entity-wide emissions inventory is a record of all direct emissions, indirect emissions from purchased energy, net emission changes due to sequestration, and a description of any de minimis emissions excluded. This record must encompass all activities and emissions within the entity boundaries as defined in the entity statement. All six greenhouse

gases specified by the guidelines must be covered.

7. ***What is the difference between "reported" and "registered" emission reductions?*** All emission reductions, whether reported or registered, must be calculated using the methods outlined in the General and Technical Guidelines and the reporting entity must file a baseline entity statement, identify any changes to its entity statement annually and certify that its reports are accurate.

   Entities interested in obtaining special recognition for reductions must provide additional information, which allows their reduction to be classified as "registered". Entities with average annual emissions of more than 10,000 tons of CO2 equivalent (referred to as "large" entities), must file an entity-wide emissions inventory and an entity-wide assessment of all changes in its emissions, including indirect emissions, avoided emissions and sequestration.

   Small entities are not required to file entity-wide inventories of emissions and reductions. Instead they must report information only on all emissions and reductions associated with the specific types of activities on which they have chosen to report. For example, a farm with estimated average annual emissions of 8,500 tons of carbon dioxide equivalent may want to report only on reductions achieved through carbon sequestration from improved soil management. In this case the farm would report on all of its soil management practices, not just those that have produced reductions. If the reporting entity does not supply this additional information, the reductions would not be eligible to be registered.

8. ***Can a firm participate in the registry if it does not want to register reductions?*** Yes. Entities not seeking to register reductions can report emissions and reductions for specific activities, facilities, or selected components of their entity provided they file a baseline entity statement, use the methods outlined in the General and Technical Guidelines, and certify their reports. Many firms may not yet be prepared to report at the more comprehensive level. This option would enable such firms to participate immediately and to begin registering emission reductions in the future, when they were able to meet the additional requirements.

9. ***Please explain the different methods for calculating reductions.*** There are many different ways to limit or reduce atmospheric greenhouse gases, such as by reducing direct emissions, increasing sequestration, or reducing emissions indirectly by increasing the generation of electricity from non-emitting sources, like renewable or nuclear energy. In trying to assess an entity's efforts to reduce emissions, it is also important to take into account how the entity's economic activity may have changed. A company that is reducing emissions only because it is reducing U.S. production does not warrant special recognition for its efforts, while a company that has expanded rapidly, but kept its emissions flat does deserve recognition. To accurately account for these different types of reductions and the impacts of changing economic output, it is necessary to use multiple methods of calculating reductions. In most situations, emissions intensity is likely to be used to determine when an entity has

reduced its emissions relative to its output. For example, an electric utility that reduced its rate of emissions per kilowatt hour would use the emissions intensity method to demonstrate that it had achieved an emission reduction. But a wind power generator that increased the amount of electricity it produced from wind could not use emissions intensity to demonstrate that it had reduced emissions (because it never had produced any direct emissions). In this case, the wind generator would have to use a different method, one capable of calculating the "avoided emissions" resulting from the increased generation of wind power.

10. ***Why is DOE focusing on output- or "intensity"- adjusted reductions?*** Changes in the level of production or output of a utility, manufacturer or institution directly affect the level of greenhouse gas emissions, but such changes in output are not a good indicator of the efforts to reduce emissions by a specific entity. For example, a manufacturing firm with increasing production could experience a net increase in absolute entity-wide emissions even though it is undertaking substantial investments to reduce greenhouse emissions. On the other hand, a firm may reduce its output by closing a plant. In this case, the firm's absolute emissions would decline because its output declines, but the emissions of a competitor that increased market share might go up simultaneously. Use of output-based measures ensures that true reductions in the emissions intensity of the U.S. economy are recognized and rewarded, consistent with the President's emissions intensity reduction goals.

11. ***Why do the guidelines require continuous annual reporting?*** Continuous annual reporting is necessary to ensure that all emission reductions achieved since the entity's initial base year are real and verifiable. Only through continuous reporting can an entity demonstrate that it has not increased its emissions during a break in their reporting record. If a break does occur, entities could fill in the gap later or begin again by establishing a new base year from which to calculate future reductions.

12. ***How does 1605(b) relate to the President's Climate VISION program and EPA's Climate Leaders program?*** The Administration intends to use the 1605(b) program to document, where possible, the progress of participants in these voluntary Federal programs. This is consistent with the President's desire that the 1605(b) registry be a "tool that goes hand-in-hand with voluntary business challenges…by providing a standardized, credible vehicle for reporting and recognizing progress." However, additional reporting may be required for other specific voluntary Federal programs in order to provide distinct benefits to program participants. DOE is soliciting comment on the merits of using the 1605(b) program for documenting the progress of participants in voluntary Federal programs toward their emissions reduction goals.

13. ***How does 1605(b) treat emissions or reductions that occur outside the United States?*** The proposed revised General Guidelines do not address explicitly the question of reporting and registering non-U.S. emissions and emission reductions. DOE is soliciting public comments on whether non-U.S. emissions and emission reductions should continue to be eligible for reporting under the revised program, recognizing that the original guidelines provide for reporting of international

activities. DOE is also soliciting public comments on whether non-U.S. emissions and emission reductions should qualify for registration and, if so, what procedures and requirements should be established for registration of such emissions and emission reductions.

14. ***How do the proposed Guidelines compare with other reporting programs?*** The proposed General Guidelines focus on obtaining a full accounting of the total emissions and emissions reductions of utilities, manufacturers, businesses, institutions and other large entities that choose to report. While the Greenhouse Gas Protocol Initiative (sponsored by the World Resources Institute and World Business Council on Sustainable Development) and several State reporting programs focus on entity-wide emission inventories, none provide a mechanism for assessing entity-wide emission reductions that excludes the effects of increasing or decreasing output (as would the proposed revision to the 1605(b) guidelines). Several states have created programs that collect state-wide inventories of emissions, though many of the inventories are only for one year. Several States have also begun to develop emissions reporting guidelines, but again most are not very extensive.

15. ***Does DOE require independent verification?*** No. The statute establishing the 1605(b) program specifies that entities should self-certify the accuracy of their reports. DOE believes that third-party, independent verification would be desirable in many instances, and the proposed guidelines would strongly encourage entities to take this extra step. But DOE does not believe it is necessary to require all participants to have their reports independently verified. We expect that the proposed revisions will substantially improve the transparency and credibility of the reports submitted to the 1605(b) program, even without a requirement for independent verification. We recognize that as potential markets develop for emission reductions, market participants might re-examine the need for and value of third party or independent verification.

16. ***The original 1605(b) program allows entities to report on projects. How are projects treated within the revised guidelines?*** The revised Guidelines would provide special recognition only to those large emitters that provide a full accounting of their entity-wide emissions and emission reductions, rather than to those entities that report on just individual projects. DOE believes that only through a full accounting of all emissions and emission reductions can a participating entity effectively demonstrate its contribution to the national effort to reduce greenhouse gas emissions. Nevertheless, those companies or other entities that are not yet prepared to provide such a full accounting of their emissions and emission reductions may still report, but not register, project-level efforts to reduce emissions.

17. ***What happens to the emissions and emission reductions previously reported under the existing program? Can entities register them under the revised 1605(b)?*** All data previously reported under the 1605(b) program will be maintained by DOE and will continue to be accessible to the public. However, under the proposed revised Guidelines, reductions recorded under the original reporting guidelines would not be

eligible for registration under the revised program unless the reduction was achieved during or after 2003, and the report met all of the requirements of the new guidelines. While only those reductions achieved during or after 2003 would be eligible for registration, entities would be permitted to "recast" prior year reports to make them consistent with the new reporting guidelines.

18. ***Isn't it true that some of the reductions eligible for recognition under the revised program would have occurred anyway, even without any extra effort by the reporting entities?*** Because technology and productivity are continually improving, most utilities, businesses, institutions and households are expected to gradually reduce their emissions per unit of output over time. However, new, more efficient means of production and energy technologies must still be deployed in order for these reductions to actually occur. The revised program will provide incentives to do so by providing a mechanism for recording emissions inventories over time, as well as emissions reductions through specific efforts. This should provide a good indication of the relative contribution individual entities are making toward this national objective.

19. ***How much will it cost a typical entity to comply with the revised program guidelines?*** Costs could vary widely depending largely on the characteristics of individual entities and the decisions they make on how best to account for their emissions. Entities that emit greenhouse gases mainly as a result of fuel consumption can prepare an emissions inventory by compiling their fuel use data and applying conversion factors specified by DOE. If the entity has a single measure of its basic output, such as utilities that produce kilowatt hours or cement producers that produce tons of cement, they can calculate their reductions using their records of annual fuel consumption and annual output. Firms that produce multiple products may have to calculate their reductions by matching the emissions and output of different elements of their business, which would increase the costs of participating in the 1605(b) program.

20. ***Who did DOE consult with developing these Guidelines?*** DOE took a number of actions to encourage broad public input into the development of these guidelines, including: issuing a Notice of Inquiry (which resulted in over 80 sets of written comments); hosting four DOE workshops across the United States and two USDA workshops focusing on terrestrial sequestration; and meeting with groups ranging from private sector firms, trade associations, environmental groups, and States. DOE staff has also made a large number of presentations to a variety of different groups on the 1605(b) process over the last year.

21. ***The existing program has reductions registered from school children as part of class projects. How will they register in this program?*** Those who have reported to the 1605(b) program in the past will continue to be able to do so under the revised Guidelines. However, in order to seek registration of emissions reductions, an entity-wide emissions inventory will be required for large emitters, while small emitters (such as classes of school children) may in certain circumstances register emissions

reductions from specific projects.

22. ***When is DOE publishing the technical guidelines?*** DOE will publish the technical guidelines early in 2004 and will offer opportunities for public comment.

23. ***The President said the revised 1605(b) program should provide firms registering real reductions with transferable credits and protection against a future climate policy. How do these proposed Guidelines do that?*** The proposed revised guidelines will provide an increased level of transparency, rigor, and comprehensiveness in reporting, which we expect will increase the credibility of the emission reductions registered under the program. As a result, such reductions may be more attractive to entities participating in private emissions trading markets.

    DOE believes that registration of emissions reductions under the revised 1605(b) program may provide some protection against penalty under any future climate change policy to those entities that register emissions reductions.

24. ***Is the Administration planning to allow firms to register reductions in black soot, as some press reports have suggested?*** The revised 1605(b) guidelines do not allow entities to register emissions reductions for black soot, or any other gases or particles other than those explicitly listed in the guidelines. DOE is seeking guidance on which other gases or particles should be added to the registry and how such gases or particles might be added.

Federal Register

Friday,
December 5, 2003

Part V

Department of Energy

10 CFR Part 300
General Guidelines for Voluntary Greenhouse Gas Reporting; Proposed Rule

DEPARTMENT OF ENERGY

10 CFR Part 300

RIN 1901–AB11

General Guidelines for Voluntary Greenhouse Gas Reporting

AGENCY: Office of Policy and International Affairs, U.S. Department of Energy.

ACTION: Proposed rule and opportunity for public comment; proposed revised guidelines.

SUMMARY: Section 1605(b) of the Energy Policy Act of 1992 (EPACT), 42 U.S.C. 13385(b), directed the Department of Energy (DOE or Department) to issue guidelines establishing a voluntary greenhouse gas reporting program. The guidelines issued by the Department in 1994 to establish the Voluntary Reporting of Greenhouse Gases Program were intentionally flexible to encourage the broadest possible participation. On February 14, 2002, the President directed DOE, together with other involved Federal agencies, to recommend reforms to enhance this voluntary reporting program. The purposes of the proposed revised Guidelines are to establish revised procedures and reporting requirements for filing voluntary reports, and encourage corporations, government agencies, non-profit organizations, households and other private and public entities to submit annual reports of their total entity-wide greenhouse gas emissions, net emission reductions, and carbon sequestration activities that are complete, reliable and consistent. Public comments on these proposed revised Guidelines are solicited and a public workshop has been scheduled to encourage an open exchange of views on this subject.

DATES: Interested persons should submit written e-mail or written comments by February 3, 2004 to the addresses given below. You may present oral views and data at a public workshop that will be held at the Washington Plaza Hotel, 10 Thomas Circle, NW., Massachusetts Avenue at 14th Street, Washington, DC 20005, on January 12, 2004, from 8 a.m. to 5 p.m.

ADDRESSES: Send e-mail comments to: *1605bgeneralguidelines.comments@hq.doe.gov.* Alternatively, written comments may be sent to: Mark Friedrichs, PI–40; Office of Policy and International Affairs; U.S. Department of Energy; Room 1E190, 1000 Independence Ave., SW., Washington, DC 20585. DOE will hold a public workshop at the following address: Washington Plaza Hotel, 10 Thomas Circle, NW., Massachusetts Avenue at 14th Street, Washington, DC 20005. You may review comments received by DOE, the workshop transcript, and any other related material at the following Web site: *http://www.pi.energy.gov/enhancingGHGregistry/proposedguidelines/generalguidelines.html.* If you lack access to the Internet, you may access this Web site by visiting the DOE Freedom of Information Reading Room, 1000 Independence Avenue, SW., Washington, DC. See Section III of the **SUPPLEMENTARY INFORMATION** section of this notice for more information about public participation in this proceeding.

FOR FURTHER INFORMATION CONTACT: Mark Friedrichs, PI–40, Office of Policy and International Affairs, U.S. Department of Energy, 1000 Independence Ave., SW., Washington, DC 20585, or email: *1605bgeneralguidelines.comments@hq.doe.gov* [Please indicate if your e-mail is a request for information, rather than a public comment.]

SUPPLEMENTARY INFORMATION:

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I. Introduction

A. Background

Section 1605(b) of the Energy Policy Act of 1992 (EPACT) directed the Department of Energy, with the Energy Information Administration (EIA), to establish a voluntary reporting program and database on emissions of greenhouse gases, reductions of these gases, and carbon sequestration activities (42 U.S.C. 13385(b)). Section 1605(b) required that DOE's Guidelines provide for the ''accurate'' and ''voluntary'' reporting of information on: (1) Greenhouse gas emission levels for a baseline period (1987–1990) and thereafter, annually; (2) greenhouse gas emission reductions and carbon sequestration, regardless of the specific method used to achieve them; (3) greenhouse gas emission reductions achieved because of voluntary efforts, plant closings, or state or federal requirements; and (4) the aggregate calculation of greenhouse gas emissions by each reporting entity (42 U.S.C. 13385(b)(1)(A)–(D)). Section 1605(b) contemplates a program whereby voluntary efforts to reduce greenhouse gas emissions can be recorded, with the specific purpose that this record can be used ''by the reporting entity to demonstrate achieved reductions of greenhouse gases'' (42 U.S.C. 13385(b)(4)).

In 1994, after notice and public comment, DOE issued General Guidelines and sector-specific guidelines that established the Voluntary Reporting of Greenhouse Gases Program for recording voluntarily submitted data and information on greenhouse gas emissions and the

results of actions to reduce, avoid or sequester greenhouse gas emissions. The 1994 General Guidelines are appended to today's proposal to provide information with regard to reports that were filed under those Guidelines (The General Guidelines and supporting documents may be accessed at *http://www.eia.doe.gov/oiaf/1605/guidelines.html).* The Guidelines were intentionally flexible to encourage the broadest possible participation. They permit participants to decide which greenhouse gases to report, and allow for a range of reporting options, including reporting of total emissions or emissions reductions or reporting of just a single activity undertaken to reduce part of their emissions. From its establishment in 1995 through the 2001 reporting year, 365 entities, including utilities, manufacturers, coal mines, landfill operators and others, have reported their greenhouse gas emissions and/or their emission reductions to EIA.

On February 14, 2002, the President announced a series of programs and initiatives to address the issue of global climate change, including a greenhouse gas intensity reduction goal, energy technology research programs, targeted tax incentives to advance the development and adoption of new technologies, voluntary programs to promote actions to reduce greenhouse gases, and international initiatives. In addition, the President directed the Secretary of Energy, in consultation with the Secretary of Commerce, the Secretary of Agriculture, and the Administrator of the Environmental Protection Agency, to propose improvements to the current Voluntary Reporting of Greenhouse Gases Program required under section 1605(b) of EPACT. These improvements are to enhance measurement accuracy, reliability, and verifiability, working with and taking into account emerging domestic and international approaches.

On May 6, 2002, DOE published a Notice of Inquiry soliciting public comments on how best to improve the Voluntary Greenhouse Gas Reporting Program (67 FR 30370). Written comments were received from electric utilities, representatives of energy, manufacturing and agricultural sectors, Federal and State legislators, State agencies, waste management companies, and environmental and other non-profit research and advocacy organizations.

On July 8, 2002, after considering public comments, the Secretaries of Energy, Commerce and Agriculture, and the Administrator of the Environmental Protection Agency provided the President with ten recommendations on improvements to the Voluntary Greenhouse Gas Reporting Program. The four agencies also outlined a public process for developing specific revisions to the program Guidelines. Following are the ten recommendations for improving the greenhouse gas reporting program:

- Develop fair, objective and practical methods for reporting baselines, reporting boundaries, calculating real results, and awarding transferable credits for actions that lead to real reductions.
- Standardize widely accepted, transparent accounting methods.
- Support independent verification of registry reports.
- Encourage reporters to report greenhouse gas intensity (emissions per unit of output) as well as emissions or emissions reductions.
- Encourage corporate or entity-wide reporting.
- Provide credits for actions to remove carbon dioxide from the atmosphere as well as actions to reduce emissions.
- Develop a process for evaluating the extent to which past reductions may qualify for credits.
- Assure the voluntary reporting program is an effective tool for reaching the 18 percent goal.
- Factor in international strategies as well as State-level efforts; and
- Minimize transaction costs for reporters and administrative costs for the Government, where possible, without compromising the foregoing recommendations.

DOE held public workshops in Washington, D.C., Chicago, San Francisco and Houston during November and December of 2002 to receive oral views and information from interested persons. In addition, the U.S. Department of Agriculture sponsored two meetings in January 2003 to solicit input on the accounting rules and guidelines for reporting greenhouse gas emissions in the forestry and agriculture sectors. These workshops and meetings explored in greater depth many of the issues raised in the Notice of Inquiry and addressed in the written comments. The public comment covered a broad range of issues and views diverged widely on some key issues. Generally, there was substantial support for revising the current General Guidelines to enhance their utility and to accomplish the President's climate change goals.

DOE today is proposing revised General Guidelines, and subsequently will propose Technical Guidelines, that when effective will modify and replace the guidelines for the Voluntary Reporting of Greenhouse Gases issued by DOE in October 1994. The proposed revised General Guidelines would continue to provide procedures for entities to report their greenhouse gas emissions inventories and a wide range of actions they have taken to reduce, avoid or sequester greenhouse gas emissions. In addition, the proposal would enable entities that meet criteria established by DOE to register such reductions in a database maintained by the Energy Information Administration (EIA). The criteria established by DOE will ensure that units of registered reductions will be comparable with regard to the standards of accuracy, reliability and verifiability. Registered reductions will be recorded in a publicly accessible database.

The Secretary of Energy has approved issuance of this notice.

B. Process for Finalizing and Implementing Guidelines

After full consideration of the public comments received, DOE will develop and issue final revised General Guidelines. In parallel, DOE intends to propose Technical Guidelines that will, when finalized, specify the methods and factors to be used in measuring and estimating greenhouse gas emissions, emission reductions, and carbon sequestration. Concurrently with development of the General and Technical Guidelines, DOE's Energy Information Administration will, pursuant to the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35), solicit public comment on the reporting elements to be contained in the reporting forms to be used under the revised program Guidelines. With respect to the existing 1994 General Guidelines, DOE intends to publish a **Federal Register** notice of termination on the same day that DOE publishes the notice of final rulemaking setting forth the revised guidelines under section 1605(b) of EPACT. Both the notice of termination and the notice of final rulemaking will contain an effective date, which will be the beginning of a future reporting period.

II. Discussion of Proposal and Requests for Comments

The following section describes the proposed revised General Guidelines, summarizes the rationale for the key elements of the proposal and solicits public comments on a wide range of specific issues.

A. Overview

The proposed revisions to the General Guidelines are designed to enhance the measurement accuracy, reliability and verifiability of information reported

under the 1605(b) program and to contribute to the President's climate change goals. The proposed revised Guidelines will continue to provide considerable flexibility to entities that wish to report emissions or emission reductions in the future, as they have in the past. In addition, the revised Guidelines will provide a means for entities that are able to meet additional requirements to register emission reductions achieved after 2002. This registry will provide special recognition to such emission reductions.

To register emission reductions, reporting entities with substantial emissions (average annual emissions of over 10,000 tons of carbon dioxide (CO_2) equivalent) will need to provide an inventory of their total emissions and calculate the net reductions associated with entity-wide efforts to reduce emissions or sequester carbon. Entities with average annual emissions of less than 10,000 tons of CO_2 equivalent (small emitters) would be eligible, under certain conditions, to register emission reductions associated with specific activities even without completing an entity-wide inventory or reduction assessment.

The proposed revised Guidelines would enable and encourage entities to report (but not register) emission reductions achieved prior to 2003. The revised Guidelines would also permit entities to report (but not necessarily register) emission reductions associated with specific actions or with specific parts of the entity, even if these reports were not accompanied by entity-wide emissions and reductions reports.

The chief executive officer of the company or institution, an agency head, head of household or other responsible official would be required to certify that the reporting entity accurately followed the revised Guidelines for determining emissions, emission reductions and sequestration. Entities would be encouraged to obtain independent verification of the accuracy of their reports, and their compliance with DOE Guidelines.

For convenience, the basic elements of the proposed revised guidelines are graphically represented in Figure 1. DOE solicits public comments on this approach and any suggestions of alternative means of achieving the objectives outlined above.

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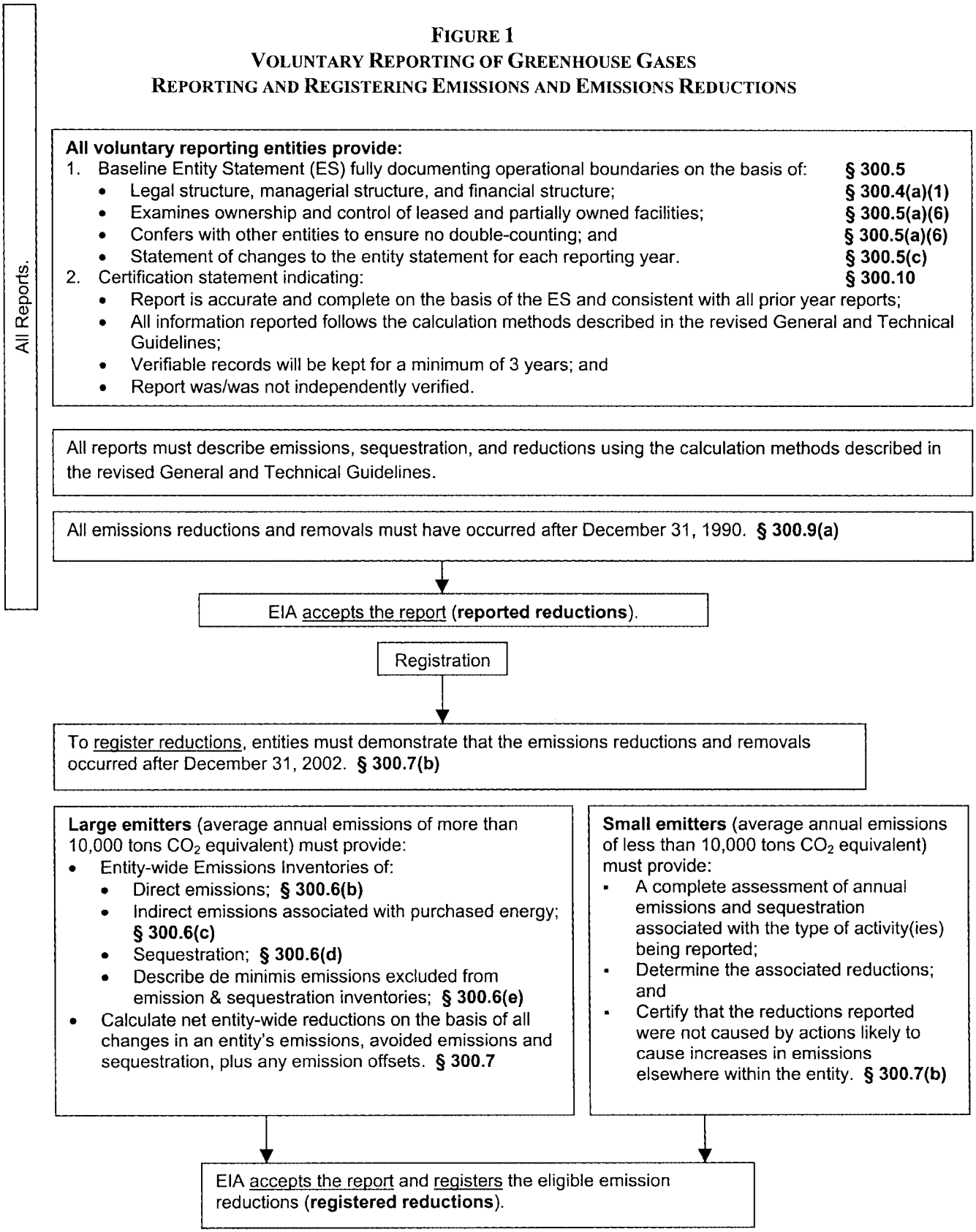

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B. Defining Reporting Entities

Under the proposed revised Guidelines, the first step in the reporting process is the definition of the corporation, institution, household or other entity that will be submitting reports. At a minimum, entities would have to be legally distinct businesses, institutions, organizations or households, although reporters would be encouraged to define themselves at the highest meaningful level of aggregation. The legal basis for determining whether an entity (or its subparts) is distinct could be derived from any Federal, state or local law (or regulation) governing the entity, including regulations applicable to corporations, partnerships, cooperatives, government agencies, non-profit organizations, households, or other entities. This approach would permit a legally-distinct company, plant or activity to define itself as an entity, even if it is partially-or wholly-owned by another company. In such cases, any registered reductions would accrue only to the reporting entity, rather than the parent company.

Given the flexibility inherent in this definition, some companies and institutions could be all or part of a reporting entity at any one of several different levels. For example, an individual electric power generating plant might be owned by a partnership of several different companies or individuals. One of these partners might be an electric utility that owns and operates several other electric generating plants, and a transmission and distribution system. And this utility might, in turn, be owned by a regional holding company that also owns other utilities, as well as other non-electric generating companies. In this case, the reporting entity could be defined as the electric generating plant, the utility or the holding company. The program encourages reporting entities to report at the highest level of meaningful financial and operational control, which in this case is likely to be either the utility or the holding company. DOE solicits comment on whether the proposed guidelines are likely to cause entities to establish boundaries that reflect a higher level of corporate or institutional aggregation, as is desired. DOE also solicits recommendations on what additional provisions might preserve flexibility in the establishment of boundaries while also preventing or further discouraging the shifting of emissions to non-reporting parts of the entity in order to create the appearance of net emission reductions. Finally, DOE solicits comment on the desirability of more prescriptive approaches to the definition of entities, such as a requirement that entity definitions correspond to those used for Federal tax purposes.

The Guidelines would require that the name chosen to represent the entity generally correspond to the activity covered by the report. For example, a large multi-product manufacturer should not use its corporate name to report the emissions and emission reductions of just one of its many subsidiaries. However, there may be instances when some, but not all subsidiaries of a large corporation may want to report as a single entity. One reason to report as a single entity might be that certain subsidiaries have a common business activity, while others do not. However, another reason might be that some subsidiaries could demonstrate emission reductions, while others could not. DOE solicits comments on how the Guidelines might provide the flexibility needed by entities with special circumstances, while discouraging abuses of this flexibility that could produce misleading impressions of entity performance.

Another question concerns the possible role of trade associations and other third parties as consolidators of entity-specific reports into an aggregate report to DOE. While associations may report information collectively for their memberships under the current guidelines, this may have implications for the accuracy and reliability—and transparency—of reports submitted under the revised guidelines. Should trade associations and other third parties be required to submit some or all of the entity-specific data that might be required by the revised Guidelines? Should the CEOs, other senior officials, or heads of entities be required to certify the accuracy of their companies' reports when submitted to or through trade associations? Should trade associations and other third parties be able to ''register emission reductions'' or only file reports for the record?

C. Defining Entity Boundaries

To report on an entity-wide basis and to register emissions reductions, reporting entities would have to provide an ''entity statement'' that meaningfully defines the operations and facilities (such as office buildings or vehicle fleets) covered by their entity-wide reports, and the greenhouse gas sources and sinks encompassed by these operations and facilities. Such operations would include those wholly owned and operated by the entity, and might include those operations that are partially-owned, leased or operated by the entity. Entities would be required to coordinate with other entities that shared ownership of particular operations to ensure that no double counting occurred. Entities would also have to ensure that each annual report consistently used the boundaries identified in prior year reports, unless an explicit description of any changes made and their effects on emissions accompanied the report. In cases where an entity undergoes a significant structural change, it may have to establish a new base year for all or part of its operations, or, in the case of acquisitions, recalculate its original baseline based on the prior year emissions of the acquired plant.

D. Emission Sources and Sinks Covered

Reports would be able to cover any greenhouse gas or sink that is consistent with the definitions established in the General Guidelines. An entity-wide inventory would need to cover all significant (determined by share of total emissions or absolute quantity of emissions), anthropogenic greenhouse gas emission sources within the entity's defined boundaries. Entity-wide reports must also cover all significant emission sinks. Entity-wide reports must encompass, at minimum, all six greenhouse gases specified in the Guidelines, whether emitted directly by the entity's operations and facilities, or indirectly in the generation of purchased electricity, steam or hot (or chilled) water used by the entity. Indirect emissions other than those specifically cited in the Guidelines may be reported separately, but reductions associated with such other indirect emissions may not be registered. Entities also may separately report, but not register, emissions and emission reductions associated with other gases (*e.g.* chlorofluorocarbons, black soot) that may have significant, quantifiable climate forcing effects, provided that DOE's Technical Guidelines specify the methods for measuring and reporting their emissions. DOE is soliciting comment on criteria for identifying such gases and on procedures for developing the necessary Technical Guidelines. All DOE proposals to permit the reporting of additional gases will be made available for public comment before being put into effect. DOE solicits comment on this approach and on a possible alternative that would permit participating entities to report (but not register) the emissions and emission reductions associated with other gases, even if DOE's Technical Guidelines did not specifically cover such other gases.

E. Entity-Wide Reporting of Emissions Inventories

To be eligible to register emission reductions, entities with substantial emissions (an annual average in excess of 10,000 tons of CO_2 equivalent) would need to report annual entity-wide inventories of their emissions and sequestration. Such inventories would provide a basis for assessing the significance of reported emission reductions relative to the entity's total emissions.

F. Entity-Wide Emission Reductions

To register emissions reductions, entities with average annual emissions over 10,000 tons of CO_2 equivalent would be required to demonstrate, to the maximum extent practicable, that the reported reductions represent an actual net decrease in entity-wide emissions, as calculated using one or more of the methods allowed by the General and Technical Guidelines. Some entities, such as electricity generators, would be expected to calculate net emission reductions for their entire entity (using one or more of the methods described below and in the Technical Guidelines). Others, such as multi-product manufacturers, may not be able to determine the net emission reductions achieved by all elements of their entity using the methods allowed by the Guidelines. These types of reporters could report the net emission reductions for as much of their entity as was practicable, in addition to reporting their entity-wide emission inventories.

Example: A multi-product manufacturer has instituted company-wide efforts to reduce emissions, but because its U.S. output is growing rapidly, its absolute U.S emissions have not declined. By using different calculation methods (intensity for many facilities and absolute emissions for others, as well as some project-specific calculations) it can quantify the emission reductions associated with 90% of its total emissions. It would report its total emissions and quantified emission reductions to DOE, and explain that it is not practicable to quantify the emission reductions associated with the remaining 10% of its operations because there are no year-to-year measures of output for these operations (because they involved the production of totally new products). In this case, the entity could register its reported emission reductions, but the data submitted in its report would clearly indicate that these reductions were based on an assessment of just 90 percent of the entity's emissions.

Net emission reductions achieved by third parties (offsets) could be included in an entity's report and be registered as long as the third party or other entity involved observed all of the rules that would have applied had it chosen to report its net emission reductions directly, and the entities involved have agreed that the reporting entity can register the emission reductions identified (*see* section II.O.5 below for additional discussion on the treatment of offsets).

The proposed Guidelines indicate that the owner of the facility, land or vehicle that generated the emission reductions or sequestration is the entity presumed to have the right to report and register any emission reductions or sequestration. For example, the owner of a wind turbine that sells its power to the grid is presumed to have the right to register such resulting emission reductions, even though this wind-generated electricity might be purchased at a premium by a local utility and, ultimately, resold at a premium rate to a local manufacturer. This presumption can be altered, however, if there is a written agreement between the entities involved to transfer this right.

G. Guidelines for Small Emitters

Entities with average annual emissions of less than 10,000 tons of CO_2 equivalent, such as many farms and forest operations, small businesses and individuals, could report and register emission reductions that have occurred during and after 2003 without submitting the results of an entity-wide emissions inventory or an entity-wide assessment of the annual changes in their emissions, avoided emissions and sequestration. Entities reporting under this provision would be required to determine the total annual emissions and sequestration associated with the type of activities on which they choose to report, the net emission changes associated with these specific activities, and to certify that the changes reported were not caused by actions likely to cause increases in emissions elsewhere within the entity's operations. Small emitters would be required to use the same methods for calculating emission reductions available to other reporters. DOE's Technical Guidelines will provide a list of the types of activities about which small emitters might report. It is expected that households and many small businesses, farms, and forest operations would be exempt from the requirement to submit entity-wide inventories. The use of a multi-year average rate of emissions is intended to enable certain small entities that have periodic spikes in their annual emissions (for example, a land owner that periodically harvests trees) to qualify for this exemption. Comments are specifically solicited on (1) whether 10,000 tons of CO_2-equivalent emissions would be the appropriate threshold quantity to achieve this objective, and (2) the appropriate period of time over which small entities should be permitted to average their annual emission rates. DOE is also soliciting comments on whether these special rules for small emitters are appropriate and how to ensure that reductions reported by small emitters are not a result of shifting emissions to non-reporting parts of the entity.

H. Emission Reduction Calculations

All reported and registered emission reductions would have to be calculated using one of the methods identified below, together with the procedures to be set forth in DOE's Technical Guidelines. The proposed revised General Guidelines recommend the use of emission intensity indicators as the basis for determining emission reductions, but would permit the use of several other methods to calculate emission reductions and sequestration as long as the method used excludes reductions caused by reductions in output. Regardless of the method used, a reporting entity would have to certify that none of the reported emission reductions were: Double counted by the reporting entity (or, to its knowledge, by any other reporting entity); or were the result of shifts in operations or activity from one part of the entity to another part of the entity, or to outside the boundaries of the entity. Entities would be required to report each emission reduction and sequestration calculation by type, indicate the types of actions taken that resulted in the reported emission reduction, and explain the selection of each indicator of output used. Comments are invited on the appropriateness of each of the methods described below and on the definitions provided in the proposed Guidelines. Additional guidance on each of these methods will be provided in the Technical Guidelines, including lists of possible output indicators, calculation methods for determining reductions associated with agricultural, forestry and geologic sequestration, methods and emission factors for calculating avoided emissions, and project-based methods, among others.

1. *Reductions in emissions intensity,* as long as the reporting entity demonstrates that the intensity metrics used are based on measured (or estimated) emissions and measured indicators of output that accurately represent the physical (or, in some cases, economic) output associated with the covered emissions, and that acquisitions, divestures or changes in products have not contributed significantly to the reductions.

2. *Absolute reductions in emissions,* as long as the entity demonstrates that these measured reductions were not caused by declines in its U.S. output.

3. *Increased carbon storage* (for actions within entity boundaries), as long as the entity demonstrates the sequestration measured or estimated represents a net increase in the quantity stored by the entity and has not been re-released to the atmosphere (ongoing, annual reports would be required).

4. *Avoided emissions* (for actions within entity boundaries that reduce emissions outside entity boundaries) that reflect the indirect emission reductions achieved as a result of a measured increase in the net sales of energy generated by low-or no-emission technologies.

5. *Project emission reductions* (for actions taken to reduce direct or indirect emissions within entity boundaries), as long as they exclude any reductions that might have resulted from reduced output or from shifting emissions to operations not included in the reported projects, and are derived from measured performance data or by using estimation methods consistent with DOE Technical Guidelines. In the context of entity-wide reports, this last calculation method is intended only for use when none of the other methods is practicable.

I. Recordkeeping, Report Certification, and Verification

Reporters under the existing program must certify the accuracy of their reports, but are not required to maintain records. Under the proposed revised Guidelines, the chief executive officer, agency head, head of household or person responsible for the reporting entity's compliance with environmental regulations would certify that reports are complete, accurate and consistent with DOE guidelines, and that sufficient records will be maintained for at least three years to enable independent verification. Reporting entities are strongly encouraged to obtain independent verification of their reports. The proposed Guidelines describe what would constitute such verification, including a description of the types of firms or institutions that might be qualified to independently verify the entity's reports, and the elements of an entity's records and reports that should be verified.

The proposed General Guidelines would require reports to EIA that are sufficiently detailed to enable EIA to review and confirm the final emission reduction calculations for each method and output measure utilized, and to review and confirm the rates of conversion used for each category of greenhouse gas covered and for electricity-related use or emissions avoidance, by region. EIA's review of the data submitted would be intended to assure consistency with the requirements specified in the General and Technical Guidelines. This level of reporting would indicate the basic components of each entity's emission inventory and of its entity-wide emission reductions. Entities would be required to maintain more detailed records, sufficient to permit an independent verification. The proposed levels of data reporting and recordkeeping represent a middle ground between the views of stakeholders who favor summary data and those stakeholders who prefer more detailed data that would be the basis for independent verification.

The proposal limits the recordkeeping requirement to three years. Of course, reporting entities may keep their records for a longer period of time if they deem it in their interest to do so.

The proposed Guidelines would require that the chief executive officer or other senior official of the reporting entity certify the accuracy, consistency and completeness of all reports. In addition, the Guidelines would encourage, but not require, independent verification of all reports. The proposed Guidelines would provide only general guidance on what DOE considers the necessary qualifications of verifiers and the information that they must verify. This guidance is intended to provide some assurance that such verifiers are independent and appropriately qualified, while still giving entities considerable flexibility in the selection of the type of firm most appropriate to perform such an independent verification. DOE invites comments on whether the general guidance provided is sufficient to achieve this objective.

While some stakeholders believe that independent verification should be required of all reports, many felt that independent verification is only necessary if entities seek to sell their registered emission reductions and, in such cases, private markets are likely to specify the type of independent verification required. While DOE received many comments that questioned the credibility of many of the emission reductions reported under the existing program, most of these concerns related to the methodology used to calculate the reported reductions, rather than the validity of the data used or reported. While DOE believes that requiring a senior officer to certify reports will provide adequate assurance that the data reported are reliable, the proposed Guidelines would strongly encourage reporters to obtain independent verification. DOE solicits public comment on this approach and on whether further consideration should be given to requiring independent verification of emission reductions prior to registration.

J. Starting To Report

Under the proposed revised Guidelines, entities would be permitted to begin reporting their prior-year emissions and emission reductions at any time. In general, the first full year for which an emissions inventory is available would be considered the entity's base year, although DOE would encourage entities to determine their base year by calculating the average emissions or emissions intensity during a base period of up to four years in length. This flexibility would permit a reporter to select the base year or base period most representative of actual operations. It may also, however, allow a reporter to select the most advantageous base year or base period (*i.e.*, a period that would enable the reporter to register the greatest amount of reductions). DOE solicits comments on whether this flexibility is appropriate and, if not, what steps might be taken to limit this flexibility. To focus the program on current and future efforts to reduce greenhouse gas emissions, entities would be permitted to register only those emission reductions calculated using a base year no earlier than 2002 (or base period of up to four sequential years ending no earlier than 2002). However, entities may still report emission inventories and reductions for previous years, as long as any prior year emission reductions are calculated using a base year no earlier than 1990 (or a base period no earlier than 1987–1990). To be accepted as entity-wide reports under the revised Guidelines, emission reductions already reported to the 1605(b) registry must be recast to fully comply with the revised Guidelines.

K. Report Acceptance

Upon receipt, EIA would review all reports to ensure consistency with the revised Guidelines. If EIA determines the report follows the General and Technical Guidelines, and EIA's Reporting Form Instructions, the report would be classified as either an entity-wide report or otherwise, and accepted.

L. Registration of Emission Reductions

Accepted entity-wide reports and reports from small emitters would then be further reviewed to determine if reductions were eligible to be registered. Entity-wide reports and reports from small entities that have used the methods identified in the General and Technical Guidelines, as well as EIA's Reporting Form Instructions, to

demonstrate they have achieved emission reductions after 2002 and have met all other applicable requirements would have the identified reductions registered in the 1605(b) database under the name of reporting entity and the year the reduction was achieved.

Registering only reductions that are achieved after 2002 would focus the program on those reductions most likely to contribute to the achievement of the President's goal for reducing U.S. emissions intensity by 18% between 2002 and 2012. In addition, because all of the data required to register reductions would be relatively recent, it would help ensure that all entities have an equal opportunity to register emission reductions under the new program. Nevertheless, the revised Guidelines would continue to permit entities to *report* emission reductions back to 1991, the earliest year permitted by the authorizing statute, and reports that comply with the Guidelines would be made publicly available by EIA. DOE solicits public comments on this approach and any suggestions of alternative means of achieving the objectives outlined above.

M. Sustaining Entity Reports of Emissions and Emission Reductions

To register emission reductions in any future year, an entity would be required to submit ongoing annual reports that document the net, cumulative emission reductions achieved relative to the entity's base year (or base period). Only additions to cumulative emission reductions (relative to the chosen base year or base period) would be recognized in future years. This requirement would reduce the quantity of emission reductions eligible for registration in future years if the reporting entity experiences a net increase in output-adjusted emissions after beginning to report. This approach would preserve the recognition given to all previously registered emission reductions, even if an entity experienced net emission increases in the future or stopped reporting. DOE solicits comments on this approach and possible alternatives, including those that might permit or require DOE to delete previously registered emission reductions if an entity did not continue to submit annual reports. Ongoing, annual reporting would be required to maintain recognition for registered emission reductions resulting from sequestration.

N. EIA Database and Summary Reports.

The EIA Administrator would establish a public database including all data that meets the definitional, measurement, calculation and certification requirements of the revised Guidelines. The database would provide summary information on each reporting entity's greenhouse gas emissions and its registered emission reductions, by year, according to the categories described above. The database would also provide access to all accepted reports.

O. Cross-Cutting and Other Important Issues

This section discusses various issues that affect more than one provision of the proposed revised Guidelines or were not highlighted in any of the preceding sections. DOE is seeking public comment on all of these issues, and certain specific questions are posed.

1. Entity-Wide v. Sub-Entity or Project-Only Reporting

The proposed Guidelines would highlight the net contribution of reporting entities to reducing greenhouse gas emissions, rather than sub-entity reductions resulting from actions taken in only some parts (rather than the whole) of the entity. This reflects the Administration's interest in fostering broad efforts by corporations, institutions and other entities to reduce their total emissions. Over time, individual companies and other entities often take many actions that either increase or decrease their emissions of greenhouse gases. It is the net effect of all of these actions on an entity's emissions that is the most important indicator of an entity's contribution to the President's goal of reducing U.S. emissions intensity. Under the revised Guidelines, most reporters would be able to register emission reductions only if they could demonstrate they had achieved a net reduction in their total emissions, relative to their physical or economic output. Small emitters, such as households, and some farms, forest operations, and small businesses, would be permitted to register the reductions achieved in just one area of activity, such as building operations or forestry, rather than accounting for all of their emissions, so long as they certify that these reductions are not a product of shifting emissions to non-reporting parts of the entity. In addition, the proposed Guidelines would continue to provide a mechanism for large emitters to report, but not register, the reductions resulting from individual actions or projects affecting a part of the entity's emissions, even if they could not demonstrate that they had achieved a net reduction in their total emissions, relative to their physical or economic output. DOE solicits comments on this approach and on possible alternatives to this approach, including circumstances under which project-based or sub-entity reductions might be registered in the absence of net entity wide reductions.

2. Treatment of Certain Small Emissions

The proposed Guidelines would permit reporters to exclude certain emissions that are comparatively small, as well as all non-anthropogenic emissions. Specifically, an entity could exclude emissions from multiple sources (and multiple gases) as long as the total emissions excluded did not exceed 3% of its total emission inventory or 10,000 tons of CO_2 equivalent, whichever was smaller. This exclusion is intended to enable entities to exclude small, and possibly widely dispersed, emissions that are likely to be especially costly to monitor and report, but which would have little effect on the total emissions or emission reductions reported. However, this approach has some potential drawbacks. For example, very large emitters, such as large power generators or large energy intensive industries applying this standard would have to account for a very high percentage of their total emissions (in some cases over 99.9%). Accounting for such a high percentage of total emissions could be burdensome and would have little effect on the totals reported. Several possible alternatives exist. One option might be to provide for uniform percentage exclusion, such as permitting all entities to exclude up to 3 percent of their emissions. This could lead some large utilities or industries to exclude large quantities of emissions that would be relatively easy to include in their reports. Another possible alternative is the addition of a minimum percentage exclusion, such as 1 percent. Still another alternative might be to permit firms to exclude up to 3 percent or 10,000 tons of CO_2 equivalent, whichever is greater. DOE solicits comments on the approach proposed, as well as various alternatives approaches.

3. Excluding the Effects of Changes in Output on Emissions

The proposed Guidelines would strongly encourage the use of emissions intensity indicators as the basis for calculating emission reductions and would require that any method used to calculate emission reductions ensure that reductions caused by declines in the reporting entity's output be excluded. This would require entities to develop useful physical (and/or possibly economic) indicators of the output associated with the emissions being assessed. For power generators

supplying electricity to the grid, the preferred measure of output is clear: kilowatt hours. Certain large manufacturers also have well-established measures of output that have already been widely used for many years, such as tons of cement. But many product manufacturers may have some difficulty identifying useful output indicators especially if they desire to develop indicators that represent the output associated with a large a number of different processes and products. Broad physical units, such a pounds of product (sometimes used by chemical manufacturers), often encompass a wide range of different products, and a similarly wide range of production processes and product values. As a result, some important shifts between processes or product types may not be captured by such a broad indicator. As an alternative, some entities might consider the use of economic indicators, although analysis of some entity-level economic indicators suggests that they may be significantly affected by changes in market conditions and may serve as poor indicators of production-related changes by individual entities. DOE intends to identify in the Technical Guidelines various output indicators and provide guidance on the selection of appropriate indicators. DOE may specify the use of particular indicators for certain types of economic activity, but is likely to give most reporters the flexibility to adopt the best indicators for their particular circumstances. Given the potential deficiencies of some output indicators, DOE invites public comment on what information entities should be required to provide to justify the selection of their output indicators and what criteria DOE should use to determine whether a particular output measure is acceptable.

A related issue concerns entities that base their emission reductions on changes in their ''absolute'' emissions. The proposed Guidelines would require such entities to demonstrate that any reported reductions were not associated with declines in the output associated with those emissions. Because entities should only use this approach if they could not develop an output indicator that would enable them to track their emissions intensity, they may have difficulty demonstrating that their output had not declined. Again, DOE is interested in receiving comments on what output measures or other information such entities should be required to provide to demonstrate that their output has not declined and what criteria DOE might use to determine whether the information provided was sufficient.

4. Emissions and Reductions Associated With Electricity Generation and Use

Several key provisions of the Guidelines deal with how entities are to report emissions and emission reductions associated with electricity generation and use. Approximately 32 percent of total U.S. emissions of greenhouse gases are released in the generation of electricity. As there are substantial opportunities to reduce the emissions associated with both the generation and use of electricity, it is important that the program cover both electricity generators and consumers. In doing so, however, it is also important to ensure: (1) That electricity-related emissions and emission reductions are not double counted; (2) that the conversion factors used to translate kilowatt hours into emissions are accurate indicators of the actual emissions associated with the generation of the electricity; and (3) that recognition for reductions is given to those entities primarily responsible for those reductions. Both these proposed General Guidelines and the Technical Guidelines, to be proposed subsequently, will attempt to achieve these objectives.

To avoid double counting, the proposed General Guidelines would require users to distinguish between the ''indirect'' emissions associated with electricity purchases (as well as purchased steam, and chilled/hot water) and their direct emissions. This will enable entity-level emission inventories to include such indirect emissions, while permitting DOE to exclude such emissions from compilations of multiple reports, if desired. In the Technical Guidelines, DOE will specify the factors to be used to convert purchased electricity use to greenhouse gas emissions. For the purposes of emission inventories, DOE is likely to specify a factor based on the average emissions per kilowatt hour for the region in which the electricity was consumed. However, for the purpose of calculating emission reductions associated with reduced electricity demand, DOE may specify an alternative factor, such as one based on the emissions associated with regional electricity supplies at the margin (largely excluding electricity generated by hydro, nuclear power plants and some coal, which tend to be fully utilized, regardless of changes in regional demand for power). These factors might change annually and could be required to be used by all consumers of purchased electric power, unless the reporter could demonstrate special circumstances.

There may be two methods for determining emission reductions associated with the generation of electricity. One method might be used to calculate reductions in the emissions intensity of existing power production (*e.g.*, through fuel switching or increased efficiency) and the other might be used to calculate the indirect reductions (or avoided emissions) that result from increasing the electric power generation from non-emitting or low-emitting sources. DOE is seeking to provide recognition to existing power generators that reduce their emissions intensity, while also establishing a level playing field among producers of new or additional power supplies, and end-users of electricity that reduce their demand.

DOE intends to provide, through its Technical Guidelines, clear direction on how to calculate emission reductions associated with the generation and purchase of electricity. While the specific methodologies and factors to be used have yet to be defined, DOE is soliciting suggested approaches that would achieve the objectives identified, as well as specific recommendations on how to develop the conversion factors described and how to most appropriately distinguish between existing and new power production and emissions.

5. Reporting and Registering Changes in Terrestrial Carbon Stocks

The proposed guidelines would require entity-wide emission inventories to include emissions and sequestration associated with terrestrial carbon stocks. Changes in the amount of carbon stored in sinks within the entity's boundaries over the inventory year would determine the quantities of such emissions and sequestration included in inventories. Entities that meet all of the relevant requirements in the general and technical guidelines may also register year-to-year increases in carbon stocks as ''registered reductions.'' Ongoing reporting will be required to ensure that any future changes in these stocks are fully reflected in the entity's emission inventories and registered emission reductions. The Department seeks comments on this provision as well as alternatives. For example, one alternative approach would calculate registered reductions as the change in carbon stocks during an inventory year relative to the change in stocks during a base year or period.

6. Recognizing Emission Offsets

As proposed, the General Guidelines would permit entities to report and register emission reductions achieved by others, as long as the entity that achieved the reductions observed all of the requirements applicable to reporters and the entities involved indicated that they had an agreement stipulating who would report the emission reductions. These provisions are designed to enable and encourage large emitters to support efforts to reduce emissions outside the boundaries of their entities. DOE believes this may be especially desirable when the opportunities for reducing emissions within an entity's boundaries are comparatively limited or costly. However, these provisions raise a number of issues upon which DOE is seeking public comment.

Most of these issues concern the information that must be submitted by a reporting entity about the emission reductions achieved by a non-reporting entity. For example, must the reporting entity provide all of the information that the non-reporting entity would have been required to submit directly, including an Entity Statement, an emissions inventory (unless exempted), and an entity-wide assessment of emission reductions (unless exempted)? Must the chief executive officer or other senior manager of the non-reporting entity certify to the accuracy of all of the information reported by the reporting entity? Could a non-reporting entity enter into agreements permitting some of its emission reductions to be registered by one entity and the remainder by one or more other entities? Must the reporting entity demonstrate that it helped finance or manage the achievement of the emission reductions achieved by some other entity? One approach that might avoid many of these potential issues would be to require direct reporting by all entities that generate emission reductions. This approach would ensure that complete reports, submitted directly by the entity that owned the facilities or land that produced the emission reductions, would be available for all registered emission reductions. But requiring direct reports by all entities might discourage emission reductions by entities that are unwilling to report directly and might discourage support for such offset projects by large emitters, such as utilities. DOE solicits comments on the approach proposed and on possible alternatives.

7. International Emission Reductions

The proposed revised Guidelines do not address either the reporting of non-U.S. emissions and emission reductions or the registration of non-U.S. emissions reductions. DOE is soliciting public comments on whether non-U.S. emissions and emission reductions should continue to be eligible for reporting under the revised program, recognizing that the current guidelines provide for reporting of international activities.[1] DOE is also soliciting public comments on whether non-U.S. emissions and emission reductions should qualify for registration and, if so, what procedures and requirements should be established for registration of such emissions and emission reductions.

Many factors are relevant to how non-U.S. emissions and emission reductions should be treated under the program with respect to both reporting and registration. Since 1994, many entities have reported on overseas activities; many companies likely to participate in the revised program have substantial business operations both inside and outside the United States. At the same time, reporting and registration of non-U.S. emissions and emission reductions raise certain issues that do not arise in the context of the reporting and registration of U.S. emissions and emission reductions. (For example, certifying the accuracy of data may be more complicated.)

In addition to requesting comment on the overall issue of whether to include international activities, DOE specifically requests comment on the following questions: How would the concept of ''entity-wide'' reporting be extended to include non-U.S. activities? Should an entity wishing to report non-U.S. emission reductions achieved in its own non-U.S. operations be required to inventory and report on all non-U.S. emissions and to assess changes in its emissions worldwide? Or should such entity only be required to report on its non-U.S. operations in specific countries? What requirements should third-party non-U.S. offsets be required to meet? To be eligible for registration, should reports of non-U.S. emissions reductions require independent verification? What would be the implications, including for participation in the 1605(b) program, if non-U.S. activities were excluded from reporting and/or registration?

[1] Since the current Guideline became effective in 1994, DOE has interpreted the Congressional intent underlying the statute to allow for the reporting of international activities.

8. Relationship of Proposed Guidelines to Climate VISION, Climate Leaders and Other Voluntary Programs To Reduce Greenhouse Gas Emissions

DOE, the Environmental Protection Agency and other Federal agencies have established programs to encourage companies, trade associations and other non-government organizations to take voluntary actions to reduce, sequester, or avoid greenhouse gas emissions. For example, industry participants in DOE's ''Climate VISION'' program, a Presidential initiative launched in February 2003, and EPA's Climate Leaders program have made voluntary commitments to reduce GHG emissions or emissions intensity by a specified amount, and to monitor and report on their progress.

The Administration intends to use the 1605(b) program to document, where possible, the progress of participants in these voluntary Federal programs. This is consistent with the President's desire that the 1605(b) registry be a ''tool that goes hand-in-hand with voluntary business challenges * * * by providing a standardized, credible vehicle for reporting and recognizing progress.'' However, additional reporting may be required for other specific voluntary Federal programs in order to provide distinct benefits to program participants.

DOE is soliciting comment on the merits of using the 1605(b) program for documenting progress of participants in voluntary Federal programs towards meeting their emissions reduction goals.

III. Opportunity for Public Comment

A. Written Comments

You should submit written comments by February 3, 2004. Because we continue to experience occasional mail delays due to extra processing required for delivery of mail to Federal agencies, we encourage you to submit comments electronically by e-mail at *1605bgeneralguidelines.comments@hq.doe.gov.* We will consider comments received after the comment deadline only to the extent practicable. Comments should be submitted to the e-mail or street addresses given in the **ADDRESSES** section of this notice. Written comments should be identified on the documents themselves and on the outside of the envelope, or in the e-mail message, with the designation [insert name of rulemaking and docket number]. All comments received and transcripts of any public workshop held will be available for public inspection at the following Web site: *http://www.pi.energy.gov/*

enhancingghgregistry/proposedGuidelines/comments. Persons without access to the internet can obtain such access to this Web site by visiting the DOE Freedom of Information Reading Room, Room 1E–190, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586–3142, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays.

If you submit information that you believe to be exempt by law from public disclosure, you should submit one complete hardcopy and two hardcopies from which the information claimed to be exempt by law from public disclosure has been deleted. DOE is responsible for the final determination with regard to disclosure or non-disclosure of the information and for treating it accordingly under the DOE Freedom of Information Act regulations at 10 CFR 1004.11.

B. Participation in Public Workshop

You will find the time and place of the public workshop at the beginning of this notice. We invite any person who has an interest in today's notice, or who is a representative of a group or class of persons that has an interest in these issues, to participate in the workshop. Because space may be limited, persons wishing to participate in the workshop should inform DOE by identifying the person or persons likely to attend, an e-mail or phone number for follow-up contacts, and providing a brief description of the specific issues of particular interest. This information may be provided electronically at the following Web site: *http://www.pi.energy.gov/enhancingGHGregistry/proposedguidelines/generalguidelines.html* or may be provided in writing to the person listed in the beginning of this notice.

DOE will designate a DOE official to preside at the workshop, and may also use a professional facilitator to facilitate discussion. The workshop will not be conducted under formal rules governing judicial or evidentiary-type proceedings, but DOE reserves the right to establish procedures governing the conduct of the workshop. The workshop will be organized so as to encourage the open discussion of specific issues by the range of stakeholders and government representatives present. Prior to the workshop a draft agenda, identifying specific issues for discussion, will be made available at the following Web site: *http://www.pi.energy.gov/enhancingGHGregistry/proposedguidelines/generalguidelines.html.* There will also be opportunities during the workshop for the identification and discussion of issues not specifically identified on the agenda. The presiding official will announce any further procedural rules, or modification of the above procedures, needed for the proper conduct of the workshop. Statements for the record of the workshop will be accepted at the workshop.

DOE will make the entire record of the rulemaking, including the workshop transcript, available for inspection at the following Web site: *http://www.pi.energy.gov/enhancingGHGregistry/proposedguidelines/generalguidelines.html.* In addition, any person may purchase a copy of the transcript from the transcribing reporter.

IV. Regulatory Review and Procedural Requirements

A. Review Under Executive Order 12866

Today's action has been determined to be ''a significant regulatory action'' under Executive Order 12866, ''Regulatory Planning and Review'' (58 FR 51735, October 4, 1993). Accordingly, this action was subject to review under that Executive Order by the Office of Information and Regulatory Affairs of the Office of Management and Budget (OMB).

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking'' (67 FR 53461, August 16, 2002), DOE published procedures and policies to ensure that the potential impacts of its draft rules on small entities are properly considered during the rulemaking process (68 FR 7990, February 19, 2003), and has made them available on the Office of General Counsel's Web site: *http://www.gc.doe.gov.* DOE has reviewed today's proposed Guidelines under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. Although section 1605(b)(1) of EPACT mandates a public comment opportunity before Guidelines can be issued, the proposed guideline provisions are policy statements and procedural rules. They are not substantive regulatory requirements that would have an economic impact on small entities. On the basis of the foregoing, DOE certifies that the proposed Guidelines, if promulgated, would not have a significant economic impact on a substantial number of small entities. Accordingly, DOE has not prepared a regulatory flexibility analysis for this rulemaking.

C. Review Under the Paperwork Reduction Act

The Energy Information Administration previously obtained Paperwork Reduction Act clearance by the Office of Management and Budget (OMB) for forms used in the current Voluntary Reporting of Greenhouse Gases program (OMB Control No. 1905–0194). EIA will prepare new forms and associated instructions to implement the revised guidelines for the program, and it will publish a separate notice in the **Federal Register** requesting public comment on the proposed collection of information in accordance with 44 U.S.C. 3506(c)(2)(A). After considering the public comments, EIA will submit the new forms, instructions, and related guidelines to OMB for approval pursuant to 44 U.S.C. 3507(a)(1).

D. Review Under the National Environmental Policy Act

DOE has concluded that this proposed rule falls into a class of actions that would not individually or cumulatively have a significant impact on the human environment, as determined by DOE's regulations implementing the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*). This action deals with the procedures and policies for entities that wish to voluntarily report their greenhouse gas emissions and their reduction and sequestration of such emissions to the Energy Information Administration. Because the proposed Guidelines relate to agency procedures and impose no substantive requirement on those entities wishing to report, the proposed Guidelines are covered under the Categorical Exclusion in paragraph A6 to subpart D, 10 CFR part 1021. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

E. Review Under Executive Order 13132

Executive Order 13132, ''Federalism'' (64 FR 43255, August 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. Agencies are required to examine the constitutional and statutory authority supporting any action that would limit

the policymaking discretion of the States and carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations (65 FR 13735). DOE has examined today's proposed action and has determined that it does not preempt State law and does not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. No further action is required by Executive Order 13132.

F. Review Under the Treasury and General Government Appropriations Act, 2001

The Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516, note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (February 22, 2002), and DOE's guidelines were published at 67 FR 62446 (October 7, 2002). DOE has reviewed today's notice under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

G. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, ''Civil Justice Reform'' (61 FR 4729, February 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; and (3) provide a clear legal standard for affected conduct rather than a general standard and promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this proposed rule meets the relevant standards of Executive Order 12988.

H. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to assess the effects of a Federal regulatory action on state, local, and tribal governments, and the private sector. The Department has determined that today's regulatory action does not impose a Federal mandate on state, local or tribal governments or on the private sector.

I. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. These proposed guidelines would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

J. Review Under Executive Order 13211

Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (66 FR 28355, May 22, 2001) requires Federal agencies to prepare and submit to the OMB, a Statement of Energy Effects for any proposed significant energy action. A ''significant energy action'' is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that: (1) Is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use. Today's regulatory action would not have a significant adverse effect on the supply, distribution, or use of energy and is therefore not a significant energy action. Accordingly, DOE has not prepared a Statement of Energy Effects.

List of Subjects in 10 CFR Part 300

Administrative practice and procedure, Energy, Gases, Reporting and recordkeeping requirements.

Issued in Washington, DC on November 20, 2003.

Robert G. Card,

Under Secretary for Energy, Science and Environment.

For the reasons set forth in the preamble, DOE proposes to amend Chapter II of Title 10 of the Code of Federal Regulations by adding a new Subchapter B consisting of part 300 to read as follows.

SUBCHAPTER B—CLIMATE CHANGE

PART 300—VOLUNTARY GREENHOUSE GAS REPORTING PROGRAM: GENERAL GUIDELINES

Sec.
300.1 General.
300.2 Definitions.
300.3 Guidance for defining the reporting entity.
300.4 Selecting operational boundaries for reporting.
300.5 Submission of an entity statement.
300.6 Emissions inventories.
300.7 Net entity-wide emission reductions.
300.8 Calculating emission reductions.
300.9 Reporting and recordkeeping requirements.
300.10 Certification of reports.
300.11 Independent verification.
300.12 Acceptance of reports and registration of entity emission reductions.
Appendix A to Part 300—Voluntary Reporting of Greenhouse Gases Under 1605(b) of the Energy Policy Act of 1992: General Guidelines (October 1994).

Authority: 42 U.S.C. 7101, *et seq.*, and 42 U.S.C. 13385(b).

§ 300.1 General.

(a) *Purpose.* These Guidelines govern the Voluntary Reporting of Greenhouse Gases Program authorized by section 1605(b) of the Energy Policy Act of 1992 (42 U.S.C. 13385(b)). The purposes of the Guidelines are to establish the procedures and requirements for filing voluntary reports, and encourage corporations, government agencies, non-profit organizations, households and other private and public entities to submit annual reports of their net

greenhouse gas emissions, emission reductions, and sequestration activities that are complete, reliable and consistent. Over time, it is anticipated that these reports will provide a reliable record of the contributions reporting entities have made to reducing their greenhouse gas emissions.

(b) *Registration and reporting options.* An entity may choose to register or report emissions and emission reductions as follows.

(1) *Registration.* An entity may have entity-wide emissions and emissions reductions registered by conforming to the requirements of this part, including the registration standards set forth in §§ 300.6 and 300.7 of this part.

(2) *Reporting.* If an entity does not choose to report emissions in a manner that conforms to the registration requirements set forth in §§ 300.6 and 300.7 of this part, then the entity may choose to report on any emissions or any emissions reductions by complying with the requirements of this part other than §§ 300.6 and 300.7.

(c) *Forms.* Annual reports of greenhouse gas emissions, emission reductions, and sequestration must be made on forms or software that are available from the Energy Information Administration of the Department of Energy (EIA).

(d) *Status of reports under previous General Guidelines.* EIA will continue to maintain in its Voluntary Reporting of Greenhouse Gases database all reports received pursuant to DOE's October 1994 General Guidelines. For the convenience of the readers, those Guidelines are included as Appendix A to this part 300.

§ 300.2 Definitions.

This section provides definitions for commonly used terms in the Guidelines.

Avoided emissions means the emissions displaced by increases in the generation and sale of electricity, steam, hot water or chilled water produced from energy sources that emit fewer greenhouse gases per unit than other competing sources of these forms of distributed energy.

Carbon stocks are the quantity of carbon stored in biological and physical systems including: Trees, plants and other terrestrial biosphere sinks, soils, oceans, sedimentary and geological sinks, and the atmosphere. [This term is to be further defined in DOE's Technical Guidelines.]

De minimis emissions means emissions from one or more sources and of one or more gases that when summed are less than 3 percent of the total annual CO_2 equivalent emissions of a reporting entity or less than 10,000 metric tons of CO_2 equivalent, whichever is smaller.

DOE or Department means the U.S. Department of Energy and, as appropriate in context, includes the Energy Information Administration.

Direct emissions means greenhouse gas emissions resulting from stationary or mobile sources within the organizational boundary of an entity, including but not limited to emissions resulting from combustion of fossil fuels, process emissions, and fugitive emissions.

Emissions means direct and specified indirect emissions of greenhouse gases from any anthropogenic (human induced) source.

Emissions intensity means emissions per unit of output—usually the quantity of physical output, but sometimes a non-physical indicator of an entity's output activity.

Fugitive emissions means releases to the atmosphere of greenhouse gases from the processing, transmission, and/or transportation of fossil fuels or other materials, such as HFC leaks from refrigeration, SF6 from electrical power distributors, and methane from solid waste landfills, among others, that are not emitted via a pipe(s) or stack(s).

Greenhouse gases means:

(1) *Carbon dioxide:* CO_2

(2) *Methane:* CH_4

(3) *Nitrous oxide:* N_2O

(4) *Hydrofluorocarbons:* HFCs

(5) *Perfluorocarbons:* PFCs

(6) *Sulfur Hexafluoride:* SF_6

(7) Other gases or particles that have been demonstrated to have significant, quantifiable climate forcing effects when released to the atmosphere in significant quantities.

Indirect emissions means greenhouse gas emissions from stationary or mobile sources outside the organizational boundary of an entity, including but not limited to the generation of electricity, steam and hot/chilled water, that are the result of an entity's energy use or other activities.

Natural emissions means emissions that are naturally occurring and produced independent of human actions, including biogenic (produced by biological processes), geologic and potentially other non-anthropogenic sources.

Net emissions or net entity-wide emissions means the total net annual contribution of the greenhouse gases specifically identified in section 300.6(f) to the atmosphere by an entity: total, entity-wide emissions, both direct and indirect, minus entity-wide sequestration.

Net emission reductions or net entity-wide emission reductions means the sum of all annual changes in emissions, carbon stocks and avoided emissions of the greenhouse gases specifically identified in section 300.6(f), determined in conformance with §§ 300.7 and 300.8 of these Guidelines.

Offsets means an emission reduction that meets the requirements of these guidelines, but is achieved by a party other than the entity that reports or registers the reduction.

Sequestration means the removal of atmospheric carbon dioxide, either through biologic processes or physical processes, including capture, long-term separation, isolation, or removal of greenhouse gases from the atmosphere, such as through cropping practices, forest and forest products management or injection into an underground reservoir.

Sink means an identifiable discrete physical process, occurring at a particular location, set of locations or area, by which carbon dioxide or some other greenhouse gas is sequestered.

Source means an identifiable discrete physical process, occurring at a particular location, set of locations, or area, by which a greenhouse gas is emitted.

Sub-entity means a component of any entity, such as a discrete business line, facility, plant, vehicle fleet, or energy using system, which has associated with it emissions of greenhouse gases that: can be distinguished from the emissions of all other components of the same entity; and, when summed with the emissions of all other sub-entities, equal the entity's total emissions.

§ 300.3 Guidance for defining the reporting entity.

A reporting entity must be composed of one or more legally distinct businesses, institutions, organizations or households, although reporters are strongly encouraged to define themselves at the highest level of aggregation appropriate. The legal basis for determining whether a reporting entity or its components are distinct can be derived from any Federal, State or local law or regulation governing the entity, including regulations applicable to corporations, partnerships, cooperatives, government agencies, non-profit organizations, households, or other entities. This legal basis must be described in the entity statement required by § 300.5 of these Guidelines.

§ 300.4 Selecting operational boundaries for reporting.

(a) An entity must determine, document, and maintain its operational boundary for accounting and reporting purposes. Because of the large number

of different operational structures, reporting entities are given some flexibility to set their operational boundaries in a manner that best suits their circumstances. However, all reports submitted should adhere to the following:

(1) To the extent feasible, reporting entities should establish operational boundaries in a manner that is consistent with the entity's existing legal, managerial and financial structure; and

(2) The reporting entity should establish operational boundaries that will result in accurate and comprehensive reports of its greenhouse gas emissions and sequestration.

(b) In general, a reporting entity should select operational boundaries so as to encompass all emissions and sequestration associated with facilities and vehicles that are wholly owned and operated by the named and defined entity. Emissions from facilities or vehicles that are partially owned or leased, or not directly controlled or managed by the entity, may be included at the entity's discretion, provided that the entity has taken reasonable steps to assure that doing so does not result in the double counting of emissions, sequestration or emission reductions.

§ 300.5 Submission of an entity statement.

(a) *Initial entity statement requirements.* When an entity first reports under these Guidelines, the reporting entity must provide the following information in its entity statement:

(1) The name to be used to identify the reporting entity. This should be the name commonly used to represent most of the activities being reported, as long as it is not also used to refer to substantial activities not covered by the entity's reports.

(2) The names of any parent or holding companies the activities of which will *not* be covered comprehensively by the entity's reports;

(3) The names of any large subsidiaries or organizational units that *will* be covered comprehensively by the entity's reports;

(4) A description of the entity and its primary economic activities, such as electricity generation, product manufacturing, service provider, freight transport, or household operation;

(5) A description of the types of operations, facilities, processes, vehicles and other emission sources or sinks covered in the entity's inventories;

(6) The names of the entities that share the ownership or operational control of significant facilities or sources included in the reporting entity's report, and certify that, to the best of the preparer's knowledge, the direct greenhouse gas emissions and sequestrations in the entity's report are not included in the 1605(b) report of any of those other entities for the same calendar year;

(7) Identification of the first year for which the entity will report emissions and the base year or base period from which emission reductions will be calculated.

(b) *Reasons for changing the scope of entity reports.* From time to time, entities may choose to change the scope of activities included within the entity's reports or the level at which the entity wishes to report. An entity may also choose to change its operational boundaries, its base year (or base period) or, since many entities are dynamic by nature, other elements of its Entity Statement or reporting methods. For example, companies buy and sell business units, and equity share arrangements evolve. The dynamic nature of economic activity may pose a challenge for the objective of a comprehensive and accurate documentation of greenhouse gas emissions and sequestrations from year to year. In general, DOE encourages changes in the scope of reporting that expand the coverage of an entity's report and discourages changes that reduce the coverage of such reports unless they are caused by divestitures or plant closures. Any such changes should be reported in amendments to the Entity Statement and major changes may warrant or require changes in the reporting entity's base year or base period. The Technical Guidelines under this part provide more specific guidance on how such changes should be reflected in entity reports and emission reduction calculations.

(c) *Documenting changes in amended entity statements.* A reporter's Entity Statement in subsequent reports should focus primarily on changes since the previous report. Specifically, the subsequent Entity Statement should report the following information:

(1) Significant changes in the entity's organizational (geographic or operational) boundaries. In particular, the entity statement should document:

(i) The acquisition or divestiture of discrete business units, subsidiaries, facilities, and plants;

(ii) The closure or opening of significant facilities;

(iii) The transfer of economic activity to or from specific operations outside the U.S.;

(iv) Significant changes in land holdings (applies to entities reporting on greenhouse gas emissions or sequestration related to land use, land use change, or forestry);

(v) Whether the entity is reporting at a higher level of aggregation than it did in the previous report, and if so, a listing of the subsidiary entities that are now aggregated under a revised conglomerated entity; and

(vi) Changes in its activities or operations (*e.g.*, changes in output, contractual arrangements, equipment and processes, outsourcing or insourcing of significant activities) that are likely to have a significant effect on emissions, together with an explanation of how it believes the changes in economic activity influenced its reported emissions or sequestrations.

(2) If very substantial changes have occurred, then the reporting entity is required to submit a new Entity Statement that provides a complete and current overview of the entity's operations, facilities and emission sources.

§ 300.6 Emissions inventories.

(a) *General.* The objective of the entity-wide reporting standard is to provide a comprehensive inventory of an entity's total net greenhouse gas emissions, including all six greenhouse gases listed in paragraph (f) of this section and all emissions and sequestration associated with changes in terrestrial carbon stocks. The reporting entity should report all of the covered greenhouse gas emissions from within the entity, using the methods specified in the Technical Guidelines (to be issued subsequently). Entity-wide reports are a prerequisite for the registration of emission reductions by entities with average annual emissions of more that 10,000 tons of CO_2 equivalent. Entities that have average annual emissions of less than 10,000 tons of CO_2 equivalent are eligible to register emission reductions associated with specific activities without also reporting an inventory of the total emissions.

(b) *Direct emissions inventories.* (1) Direct greenhouse gas emissions that must be reported are those emissions resulting from stationary or mobile sources within the organizational boundaries of an entity, including but not limited to emissions resulting from combustion of fossil fuels, process emissions, and fugitive emissions. Process emissions should be reported (*e.g.*, PFC emissions from aluminum production) along with fugitive emissions (*e.g.*, leakage of greenhouse gases from equipment).

(2) Entities should separately report emissions of greenhouses gases from combustion of biomass fuels or biomass-

based fuels (*e.g.*, wood waste, landfill gas, ethanol from corn, charcoal). The Technical Guidelines (to be issued subsequently) will specify the applicable list of biomass fuels or biomass-based fuels.

(c) *Inventories of indirect emissions associated with purchased energy.* (1) To provide a clear incentive for the users of electricity and other forms of purchased energy to reduce demand, the consumption of purchased electricity, steam, and hot or chilled water must be included in a reporting entity's inventory as indirect emissions. To avoid double counting among entities, the reporting entity must report all indirect emissions (as defined in § 300.2) separately from its direct emissions. Reporting entities should use the methods for quantifying indirect emissions specified in the Technical Guidelines.

(2) Reporting entities may also choose to report other forms of indirect emissions, such as emissions associated with employee commuting, materials consumed or products produced, although emission reductions associated with such other indirect emissions are not eligible for registration. All such reports of other forms of indirect emissions must be clearly distinguished from reports of indirect emissions associated with purchased energy. The Technical Guidelines also address the reporting of these other types of indirect emissions.

(d) *Entity-level inventories of changes in terrestrial carbon stocks.* Annual changes in terrestrial carbon stocks should be comprehensively assessed and reported across the entity and the net emissions resulting from such changes included in the entity's inventory of its net emissions. In other words, activities that lead to the release of carbon to the atmosphere must be reported along with activities that sequester carbon. This is necessary to provide an accurate entity-wide estimate of net greenhouse gas emissions. Entities should use the methods for estimating changes in terrestrial carbon stocks specified in the Technical Guidelines.

(e) *Treatment of de minimis emissions and sequestration.* Although the goal of the entity-wide reporting Guidelines is to provide an accurate and comprehensive estimate of total entity-wide emissions, there may be small emissions from certain sources that are unreasonably costly or difficult to quantify. A reporting entity may exclude particular sources of emissions or sequestration if the total quantities excluded represent less than 3 percent of the total annual CO_2 equivalent emissions of the entity or less than 10,000 metric tons of CO_2 equivalent, whichever is less. The entity must identify the types of emissions excluded and provide a short justification as to why an estimate was not included in the entity's report.

(f) *Covered gases.* (1) Entity-wide emissions inventories must include all emissions of the following greenhouse gases:
(i) CO_2
(ii) CH_4
(iii) N_2O
(iv) HFCs
(v) PFCs
(vi) SF6

(2) Entities may also choose to report other greenhouse gases, as defined in section 300.2, but such gases are to be reported separately and any emission reductions associated with such other gases are not eligible for registration.

(g) *Units for reporting.* Emissions and sequestration should be reported in terms of the mass (not volume) of each gas, using metric units (*e.g.*, metric tons of methane). Entity-wide and sub-entity summations of emissions and reductions from multiple sources shall be converted into carbon dioxide equivalent units using the global warming potentials for each gas. Entities should specify the units used (*e.g.*, kilograms, or metric tons). Where necessary, reporting entities must use the standard conversion factors specified in the Technical Guidelines to convert existing data into the common units required in the entity-level report. Consumption of purchased electricity must be reported by region (from a list to be provided by DOE in the Technical Guidelines). Consumption of purchased steam or chilled/hot water must be reported according to the type of system and fuel used to generate it (from a list provided by DOE in the Technical Guidelines). Purchased energy will be converted to carbon dioxide equivalents using conversion factors in the Technical Guidelines.

§ 300.7 Net entity-wide emission reductions.

(a) *Assessing entity-wide emission reductions.* (1) Entity-wide reports are a prerequisite for the registration of emission reductions by entities with average annual emissions of more that 10,000 tons of CO2 equivalent. Net annual entity-wide emission reductions must be based, to the maximum extent practicable, on a full assessment and sum total of all changes in an entity's emissions, avoided emissions and sequestration relative to the entity's established base year (or base period), plus any emission offsets. All changes in emissions, avoided emissions, and sequestration must be determined using methods that are consistent with the guidelines described in § 300.8 of this part, and in compliance with all other relevant DOE guidelines.

(2) If it is not practicable to assess the changes in net emissions resulting from certain entity activities using at least one of the methods described in § 300.8 of this part, the reporting entity may exclude them from its estimate of net entity-wide emission reductions. The reporting entity must describe the sources excluded for this reason from the entity's assessment of its net emission reductions, the reasons why it was not practicable to assess the changes that had occurred, and the approximate quantity of emissions or sequestration not assessed.

(3) A reporting entity should also exclude from the entity-wide assessment of changes in emissions, avoided emissions and sequestration any emissions or sequestration that have been excluded from the entity's inventory.

(b) *Assessing the emission reductions of entities with small emissions.* Entities with average annual emissions of less than 10,000 tons of CO2-equivalent emissions are not required to inventory their total emissions or assess all changes in their emissions, avoided emissions and sequestration in order to register their reductions. They may register the emission reductions that have occurred since 2002 and that are associated with certain activities, as long as they perform a complete assessment of the annual emissions and sequestration associated with all of the activities of the same type, determine the changes in the emissions, avoided emissions or sequestration associated with these activities, and certify that the reductions reported were not caused by actions likely to cause increases in emissions elsewhere within the entity's operations. For example, a farmer may report emission reductions associated with tree plantings on a single wood lot, but must assess and report the net sequestration resulting from the farmer's management of all woodlots within the entity's boundaries.

(c) *Net emission reductions achieved by third parties (offsets).* Net emission reductions achieved by third parties may be included in an entity-wide assessment of emission reductions as long as:

(1) The emission reductions reported were calculated using the same method(s) that would have been applicable if the third party that achieved the emission reduction had chosen to report it directly to DOE.

(2) All of the reporting entities or other parties involved certify to DOE that they have agreed that the reporting entity should be recognized as the entity responsible for the reduction.

(d) *Adjusting for year-to-year increases in net emissions.* Net annual emission reductions are calculated normally relative to an entity's base year (or base period). However, if the entity has experienced a net increase (relative to the base year) in emissions for one or more intervening years, these increases must be subtracted from net emission reductions reported in future years.

§ 300.8 Calculating emission reductions.

(a) *Establishing base year (or base period) emissions.* In general, base year or base period emissions are those that occurred over the full year (or average annual emissions over the full multi-year period) immediately preceding the first year of calculated emission reductions. Base year or base period emissions may represent the whole entity, or specific sub-entities, but must be defined so as to correspond to the scope of the chosen emission reduction calculation. To ensure that the summation of entity annual reports accurately represents net, multi-year emission reductions, a specific base year or base period may be used to determine emission reductions in a given future year only if the entity has submitted qualified reports for each intervening year.

(b) *Calculation methods.* Entities must calculate any change in emissions, avoided emissions or sequestration using one or more of the methods described in this section. All changes must be calculated relative to a base year or base period established by the entity, unless the change results from an offset (*see* subsection 300.7(c)). In general, entities are encouraged to use changes in net emissions intensity as the primary basis for calculating changes in net, entity-wide emissions.

(1) *Changes in emissions intensity.* A reporting entity may use reductions in the rate of emissions per unit of output (emissions intensity) as a basis for determining emission reductions as long as the reporting entity demonstrates in its report that the measure(s) of output used in the emissions intensity metric is a reasonable indicator of the physical output or economic value produced by the activity associated with these emissions, and that acquisitions, divestures or changes in products have not contributed significantly to changes in emissions intensity.

(2) *Changes in absolute emissions.* A reporting entity may use changes in the absolute (actual) emissions (direct or indirect) as a basis for determining net emission reductions, as long as the entity demonstrates in its report that any reductions derived from such changes were not achieved as a result of reductions in U.S. output, or major shifts in the types of products or services produced.

(3) *Changes in carbon storage (for actions within entity boundaries).* A reporting entity may use changes in carbon storage as a basis for determining net emission reductions as long as the reporting entity uses estimation and measurement methods that comply with DOE Technical Guidelines, and has included an assessment of the net changes in all sinks included in its inventory.

(4) *Changes in avoided emissions (for actions within entity boundaries).* A reporting entity may use changes in the avoided emissions associated with the sale of electricity, steam, hot water or chilled water generated from non-emitting or low-emitting sources as a basis for determining net emission reductions as long as:

(i) the measurement and calculation methods used comply with DOE Technical Guidelines, and

(ii) the reporting entity certifies that any increased sales were not attributable to the acquisition of a generating facility that had been previously operated, unless the entity utilized base year generation values derived from records of the facility's operation prior to its acquisition.

(5) *Project-based emission reductions (for actions within entity boundaries).* Emission reductions may be determined based on an estimate of the effects on emissions of a specific action, as long as the reporting entity demonstrates that the estimate is based on analysis that:

(i) Uses output, utilization and other factors that are consistent, to the maximum extent practicable, with the action's actual performance in the year for which reductions are being reported;

(ii) Excludes any emission reductions that might have resulted from reduced output or were caused by actions likely to be associated with increases in emissions elsewhere within the entity's operations; and

(iii) Uses methods that are in compliance with DOE Technical Guidelines. Entity-wide reporters should use this project-based approach only if it is not possible to measure accurately emission changes by using one of the methods identified in paragraphs (a)(1) through (a)(4) of this section.

(c) *Summary description of actions taken to reduce emissions.* Each reported emission reduction must be accompanied by an identification of the types of actions that were the likely cause of the reductions achieved.

(d) *Emission reductions associated with plant closings, voluntary actions and government requirements.* Each report of emission reductions shall indicate whether the reported emission reductions were the result, in whole or in part, of plant closings, voluntary actions, or government requirements.

(1) If emission reductions were associated, in whole or part, with plant closings, the report should include an explanation of how such emission reductions did not result from a decline in the U.S. output of the reporting entity.

(2) If the reductions were associated, in whole or part, with government requirements, the report should identify the government requirement involved and describe the type of effect these requirements had on the reported emission reductions.

(e) *Determining the entity responsible for emission reductions.* The entity presumed to be responsible for emission reduction, avoided emission or sequestered carbon is the legal owner of the facility, land or vehicle which generated the affected emissions, generated the energy that was sold so as to avoid other emissions, or was the place where the sequestration action occurred. If ownership is shared, reporting of the associated emission reductions should be determined by agreement between the entities involved in order to avoid double-counting, and this agreement must be reflected in the entity statements filed and in any report of emission reductions. DOE will presume that an entity is not responsible for any emission reductions associated with a facility, property or vehicle excluded from its entity statement.

§ 300.9 Reporting and recordkeeping requirements.

(a) *Starting to report under the revised Guidelines.* (1) Entities may report emissions and sequestration on an annual basis beginning in any year, but no earlier than the base period of 1987–1990 specified in the Energy Policy Act of 1992. To be recognized under these revised Guidelines, all reports must conform to the measurement methods established by the Technical Guidelines. This requirement applies to entities that report to the revised Voluntary Reporting of Greenhouse Gases Program registry for the first time as well as those entities that have previously submitted emissions reports pursuant to section 1605 (b) of the Energy Policy Act of 1992.

(2) Entities may submit initial reports or corrected reports for previous calendar years at any time. For example, an entity may choose to begin reporting in 2005 and may choose, at that time, to submit reports on prior year emissions back to 2002. Also, if a change in the emissions calculation method is made for 2005, an entity may submit revised estimates for its previous reporting years to ensure that a consistent method is used across the whole time-series. Entities may also submit revised reports to reflect agreements with other entities regarding the appropriate entity to designate as the entity responsible for certain registered emission reductions.

(b) *Continuing to report.* Reporting entities are strongly encouraged to report emissions on an annual basis, starting from the first year they submit a report under these revised Guidelines. Annual entity reporting is necessary to ensure that calculated reductions have been sustained over time. If a reporting entity chooses not to submit a report in any given year, the next report made should include reports for intervening years, or the reporting entity must establish a new base year from which to calculate all future emission reductions. Entities that wish to sustain recognition for previously registered emission reductions resulting from sequestration must continue to report annually.

(c) *Definition and deadline for annual reports.* Entities should report emissions on an annual basis, from January 1 to December 31, although DOE may grant exceptions to these dates. To be included in the earliest possible DOE annual report of greenhouse gas emissions reported under section 1605(b), entity reports must be submitted to DOE no later than July 1 for emissions during the previous calendar year.

(d) *Recordkeeping.* Entities must maintain adequate records for at least three years to enable independent verification of all information reported. Such records must include:

(1) A full description of the process and methods used to gather emissions data;

(2) A full description of the process and methods used to calculate emission reductions;

(3) The primary data upon which the data included in the any report to DOE was based; and

(4) A full description of any internal quality control or other verification measures taken to ensure that the data reported was in compliance with all relevant DOE Guidelines and other measurement protocols.

§ 300.10 Certification of reports.

(a) The chief executive officer, agency or household head, or person responsible for the reporting entity's compliance with environmental regulations must, for each report of such entity, certify that:

(1) The information provided to DOE is complete and accurate, in accordance with DOE's revised Guidelines, and is consistent with all prior year reports submitted by that entity (unless otherwise indicated); and

(2) Adequate records will be maintained for at least 3 years to enable independent verification of the information reported.

(b) If the report has been independently verified in accordance with DOE's Guidelines, the certification of the report by the entity reporting should so indicate.

§ 300.11 Independent verification.

(a) Reporting entities are encouraged to have their annual reports verified by independent and qualified auditors.

(1) ''Independent'', as used in this paragraph (a), means that the verifiers must not be owned in whole or part by the reporting entity, nor should they provide any ongoing operational or support services to the entity, except services consistent with independent financial accounting or independent certification of compliance with government or private standards.

(2) ''Qualified'', as used in this paragraph (a), means that verifiers must be certified by independent and nationally-recognized certification programs for the types of professionals needed to determine compliance with DOE's reporting Guidelines, such as the American Institute of Certified Public Accountants, the American National Standards Institute and Registrar Accreditation Board's (ANSI–RAB's) National Accreditation Program, or the Board of Environmental, Health, and Safety Auditor Certification (BEAC).

(b) The independent verifier must provide a written description of the relevant qualifications and professional certifications of the persons that performed the independent verification and must certify that:

(1) The information provided to DOE is complete and accurate, in accordance with DOE's revised Guidelines, and is consistent with all prior year reports submitted by that entity (unless otherwise indicated); and

(2) Adequate records have been maintained by the reporter to enable further independent verification in the future.

§ 300.12 Acceptance of reports and registration of entity emission reductions.

(a) *Acceptance of reports.* Upon receipt, DOE will review all reports to ensure they are consistent with the revised Guidelines. If DOE determines the report follows the definitional, measurement, calculation and certification Guidelines, the report will be accepted.

(b) *Registration of emission reductions.* DOE will review accepted reports to determine any eligible emission reductions that were calculated using the reporting entities' base year emissions (no earlier than 2002) or the average annual emissions of its base period (a period of up to four sequential years ending no earlier than 2002), and to ensure that the reports meet other relevant DOE requirements. DOE will also review its records to verify that the entity has submitted accepted annual reports for each year between the establishment of its base year or base period and the year covered by the current report. DOE will notify entities that the reductions that meet these requirements have been registered.

(c) *EIA database and summary reports.* The Administrator of the Energy Information Administration will establish a publicly accessible database composed of all reports that meet the definitional, measurement, calculation and certification requirements of these Guidelines. A portion of the database will provide summary information on the emissions and registered emission reductions of each reporting entity.

Appendix A to Part 300—Voluntary Reporting of Greenhouse Gases Under Section 1605(b) of the Energy Policy Act of 1992: General Guidelines (October 1994)

Voluntary Reporting and You

This program was designed to help you measure and record the actions you take to reduce greenhouse gas emissions or to increase carbon storage in soil or plants. The voluntary reporting program provides an opportunity for you to gain recognition for the good effects of your actions—recognition from your customers, your shareholders, public officials, and the Federal government. Reporting the results of your actions adds to the public groundswell of efforts to deal with the threat of climate change. Reporting can show that you are part of various initiatives under the President's Climate Change Action Plan. Your reports can also record a baseline from which to measure your future actions. Finally, your reports, along with others, can contribute to the growing body of information on cost-effective actions for controlling greenhouse gases.

We've designed this simple, flexible program to encourage you to accurately record your achievements. The program allows you to define activities you choose to

report and to determine how you will estimate the effects of those activities on greenhouse gas emissions and carbon sequestration.

We recognize that you must balance your efforts to ensure the accuracy of reported data with your goals of keeping costs reasonable in generating the reports.

We are optimistic that the response to this program will show that voluntary programs can do the job. We have been impressed by the level of commitment to the President's initiatives on climate change. This reporting program provides opportunities to report your achievements and to track your progress as you use your ingenuity and creativity in responding to the challenge of climate change.

General Guidelines

Figures

Case Studies

General Guidelines

Because of concerns with the growing threat of global climate change from increasing emissions of greenhouse gases, Congress authorized a voluntary program for the public to report achievements in reducing those gases. This document offers guidance on recording historic and current greenhouse gas emissions, emissions reductions, and carbon sequestration. Under the Energy Policy Act (EPAct) of 1992 Section 1605(b) program, reporters will have the opportunity to highlight specific achievements.

If you have taken actions to lessen the greenhouse gas effect, either by decreasing greenhouse gas emissions or by sequestering carbon, the Department of Energy (DOE) encourages you to report your achievements under this program. The program has two related, but distinct parts. First, the program offers you an opportunity to report your annual emissions of greenhouse gases. Second, the program records your specific projects to reduce greenhouse gas emissions and increase carbon sequestration. Although participants in the program are strongly encouraged to submit reports on both, reports on either annual emissions or emissions reductions and carbon sequestration projects will be accepted.

These guidelines and the supporting technical documents outline the rationale for the program and approaches to analyzing emissions and emissions reduction projects. Your annual emissions and emissions reductions achievements will be reported on forms that are available through the Energy Information Administration (EIA) of the Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585.

GG–1 How Are These Guidelines and Supporting Documents Organized?

In these pages, you will find answers to your questions about who may report, what is involved in reporting, and how to develop a credible project analysis to help you accurately report your achievements. The General Guidelines (GG) illustrate the process for analyzing projects using three hypothetical examples (an industrial cogeneration project, an energy efficiency program, and new electricity generating capacity).

You will also find guidance on such issues as joint reporting (if two or more persons or organizations are responsible for achievements), third-party reporting (through a trade association, for example), international projects, confidentiality, certification, and other elements of the reporting process.

For more specific guidance, you may consult one or more of the supporting documents that discuss sector-specific issues and analytic approaches. The supporting documents, organized in two volumes, contain limited examples of project analysis for the relevant sectors. Supporting documents have been developed as follows:

- Volume I
  —Electricity Supply Sector (Part 1)
  —Residential and Commercial Buildings Sector (Part 2)
  —Industrial Sector (Part 3)
- Volume II
  —Transportation Sector (Part 4)
  —Forestry Sector (Part 5)
  —Agricultural Sector (Part 6).

Each volume includes appendixes that provide conversion tables and default emissions factors (for various fuels and for electricity on a state-by-state basis). You can use these tables and factors for almost any report you submit. The final appendix in each volume presents a list of greenhouse gases for which the Intergovernmental Panel on Climate Change has developed Global Warming Potentials (an index of the relative effects on climate of different gases).

GG–2 Why Report Under This Voluntary Reporting Program?

If you are undertaking activities to reduce greenhouse gas emissions or to sequester carbon, reporting under this program can be valuable to you and to others. It can be valuable to you because it provides a way to present information about your greenhouse gas-related activities to your customers or constituents who are concerned about the issue of global climate change. It can be valuable to others, including the Federal government (to recognize your achievements under various initiatives), decisionmakers and legislative bodies (to inform the public debate on future greenhouse gas policies), and other individuals or organizations (to learn from each other).

You may wish to report under this program for at least three reasons:

- To Record Emissions and Achievements. You may wish to formally record, in a national database, your greenhouse gas emissions and the results of your activities that reduce or avoid these emissions. Reporting may be part of your participation in programs that recognize your contributions to achieving greenhouse gas emissions goals. These programs include national initiatives such as the Climate Change Action Plan and programs such as Climate Challenge, ClimateWise, and Motor Challenge. However, reporting under this voluntary reporting program is not limited to participants in these programs; you may wish to record the emissions reductions benefits from activities pursued independently of formal recognition programs.

• To Inform the Public Debate. You may wish to provide data which will contribute to more informed public debate on national policy on greenhouse gas reductions. Although a database built upon voluntary reports cannot provide a complete picture of national or sectoral emissions, it could provide credible information on emissions reductions and carbon sequestration projects to evaluate their potential for broader application.

• To Participate in Educational Exchanges. Data reported under the voluntary reporting program may provide useful information to others seeking ways to reduce their own emissions. New, innovative, and more economical means of reducing or avoiding emis-sions may be more widely deployed as better information becomes available.

GG–3 May I Report and What Should I Report?

You may report under this program if you initiate, control, or in some other way participate in activities that (1) contribute to greenhouse gas emissions, (2) result in reducing greenhouse gas emissions, or (3) sequester carbon. The activities may be part of your regular operations, pilot studies, prototype projects, or demonstration projects. They may take place in your community, in your workplace, at a location controlled by a third party, or at a foreign location. You must be a legal U.S. entity, that is, any U.S. citizen or resident alien; any company, organization, or group incorporated under or recognized by U.S. law; or any U.S. Federal, state, or local government entity.

DOE encourages you to submit as comprehensive a report as you can. Elements of a comprehensive report include information about both your emissions levels and your emissions reduction projects. Emissions information could include data on the entire organization and all its greenhouse gas activities, including historic baseline emissions data for 1987 through 1990, and annual emissions for subsequent years. Comprehensive information about emissions reduction projects could include both emissions reductions and carbon sequestration projects, emissions factors used to determine reductions, assumptions about the project, and data sources. The extent to which you provide information for each of these elements is determined by your assessment of what is necessary for others to clearly understand your project and its effects. Users of the database will be able to gauge the comprehensiveness of your report relative to these elements.

You may report both *direct* and *indirect* emissions. As the name implies, direct emissions result directly from fuel combustion or other processes that release greenhouse gases on-site.

You produce emissions indirectly when your activities cause emissions to be generated elsewhere. For example, a manufacturer would report as direct emissions the carbon dioxide emitted from the stack of its assembly plant. The same manufacturer could report indirect emissions from the electricity used to light that assembly plant, since the electricity use causes emissions to be generated by an electric utility.

GG–4 What Is Involved in Reporting Emissions?

Section 1605(b) addresses the reporting of annual emissions as well as emissions reductions and carbon sequestration. You are strongly encouraged, but are not required, to report your greenhouse gas emissions (1) for the baseline period of 1987 to 1990 and (2) for subsequent calendar years on an annual basis. You may wish to report this data for all or as much of your organization as possible, particularly if it would be important to the users of your reports.

GG–4.1 Gases and Sources

These guidelines initially provide for reporting four types of greenhouse gases: carbon dioxide, methane, nitrous oxide, and halogenated substances. These are listed below, along with the major activities associated with emissions of these gases. For each gas listed in your emissions report, you should indicate your total emissions; for example, if you report two gases, carbon dioxide and methane, you should report total emissions numbers for both gases.

Greenhouse gases	Related activities
Carbon dioxide (CO_2)	Fossil energy combustion, electricity generation and use, industrial processes, forestry and agriculture.
Methane (CH_4)	Landfill operation, coal mining, oil and gas systems, stationary combustion, animal production.
Nitrous oxide (N_2O) ...	Stationary combustion, adipic acid production, forestry and agriculture.
Halogenated substances (for example, CFCs, HCFCs, PFCs).	Chemical manufacture, use in industrial processes.

The guidelines and supporting documents do not generally discuss other radiatively enhancing gases. However, after the second reporting cycle (that is, after the 1996 cycle), you will be able to report other radiatively enhancing gases, including nitrogen oxides (NO_X), nonmethane volatile organic compounds (NMVOCs), and carbon monoxide (CO). In some cases, the supporting documents contain data such as emissions factors for some of these gases. However, in general, you will have to determine how to evaluate your emissions of these gases. Your report must meet the minimum reporting requirements of the program, as described in Section GG–6.

GG–4.2 Use of Existing Information

Many organizations keep accurate data on projects that involve energy efficiency, fuel switching, conservation, pollution prevention, waste minimization, and/or carbon sequestration. If you keep related data for other purposes, reporting greenhouse gas emissions effects under this program will be especially simple and straightforward.

Many potential reporters under EPAct 1605(b) already gather and report emissions information. If you already report similar information (for example, to comply with the Clean Air Act Amendments or under another air quality program) or can easily derive it (for example, from data you submit to regulatory agencies, from smokestack monitoring technologies, or fuel use data kept for internal purposes), you are encouraged to use such information to the extent practical in reporting emissions and emissions reductions under this program. However, you must report the information in a manner that is consistent with these General Guidelines.

GG–4.3 Scope of Emissions Reporting

You should report on the most comprehensive basis possible to broaden the usefulness of your emissions reports. However, you may define the scope of your emissions reports. In most cases, the needs of your potential audience will dictate the boundaries you draw. If you are able to report emissions for your entire organization, you should consider providing a comprehensive accounting so that your audience can gain a clear understanding of your overall activities. However, reporting total emissions for a single plant or establishment may be more consistent with other elements of your report and may be based on more precise or more readily available data.

Reporting emissions for your entire organization will show the most complete picture of your activities. Entity-level emissions reports can also provide all the data you need to submit reports on emissions reductions at the entity level or can increase the credibility of reports of emissions reductions at an individual project level.

You do not need to report total organization emissions in order to report individual emissions reductions and carbon sequestration projects. In fact, some reporters may not be able to report their organization's or unit's total emissions, because information needed for the baseline years may not be available, or because it is not feasible to estimate their organization's or unit's total emissions even for the current year. Remember, however, that most users of the database will find your reported estimates of emissions reductions more credible if they are accompanied by records of your organization's total emissions for the baseline years 1987 to 1990 and subsequent years.

GG–5 How Should I Analyze Projects I Wish To Report?

Accurate and credible reporting under this program requires sound project analysis. Rigid rules do not exist for such an analysis, and you may define the emissions reductions and carbon sequestration projects that you report. Your project may consist of all emission-producing activities for your organization; several activities, perhaps as parts of an energy efficiency program; or only one activity, undertaken for its projected cost savings (such as a relighting project) or as a pilot project (for example, an experimental industrial process change). Given the broad range of possible types of projects, it is impossible to establish guidance that

provides specific rules and appropriate methods for every type of project. The appropriate procedure for project analysis depends on how clearly you can identify the effects of the project, how credibly you can define a basis for comparing greenhouse gas emissions or carbon sequestration with and without the project, and how well you can measure or estimate the effects of your project.

While the guidelines provide you with as much flexibility as possible, every report must—

- Establish the reference case to use as a basis for comparison with the project;
- Identify the project's effects; and
- Estimate emissions for the reference case and the project.

Figure GG–1 depicts the overall process of project analysis. Each of these steps is discussed below and in more detail for each sector in the supporting documents. Note that these three elements depend on each other. For example, your choice of a reference case will depend upon both the scope of your project's effects and the data you use to measure or estimate emissions.

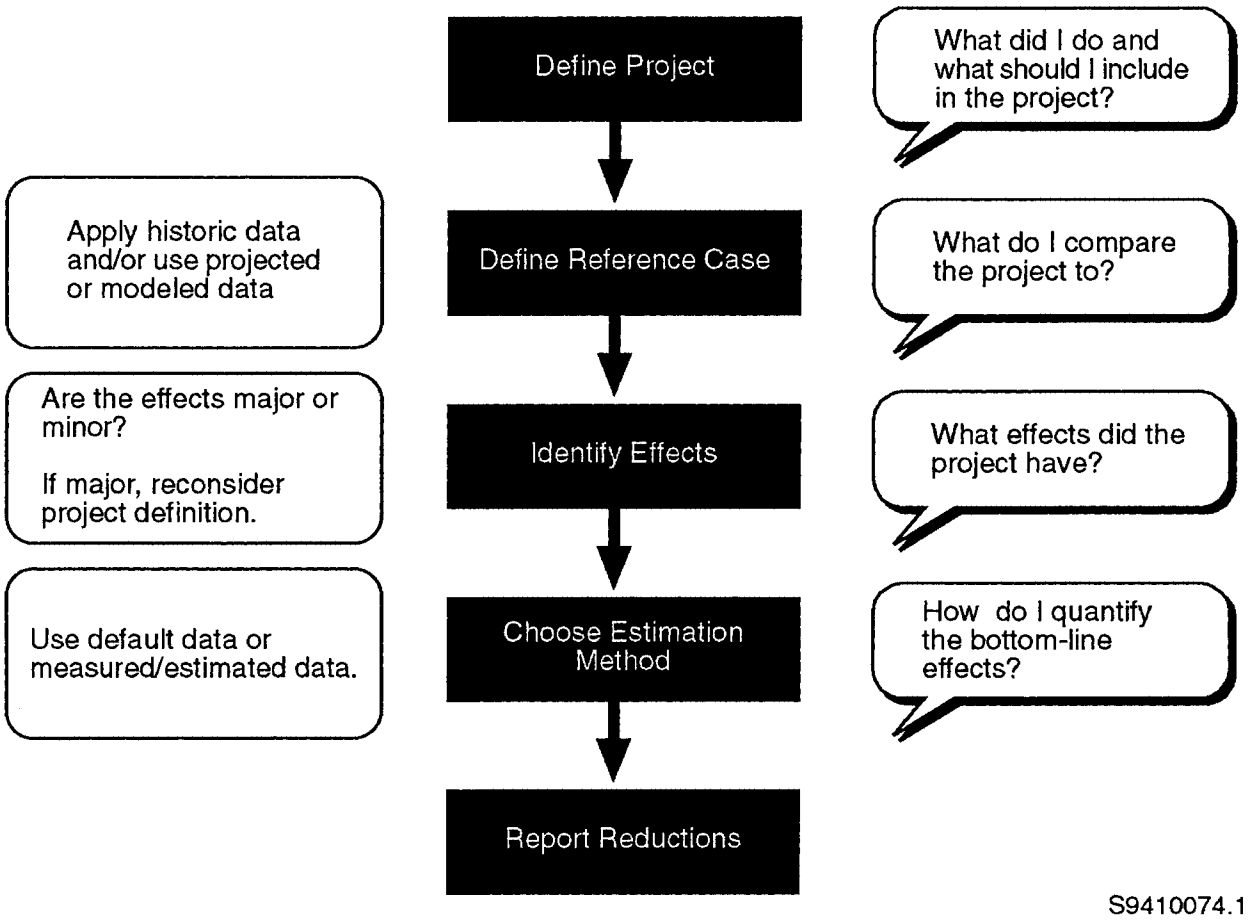


Figure GG-1. Careful Project Analysis Requires that You Consider Several Interrelated Elements.

In determining the extent of your analysis and reporting effort, you need to match your effort to your purpose for reporting. If you wish to establish a clear record of emissions and emissions reductions, you should perform extensive analysis and provide for retention of sufficient records to support your report. In any case, you will need to certify the accuracy of the information provided in your report.

These considerations and others in the project analysis process are illustrated in these General Guidelines with three hypothetical case studies: An industrial cogeneration project, an energy-efficiency project in a large office building complex, and the purchase of new solar-powered electricity generating equipment. The case studies are intended to be illustrative and by no means address all of the information that may be reported. A basic description of the facts involved in each case follows. These cases will be more fully developed as the discussion of the steps in project analysis proceeds.

These cases are intended to illustrate the range of detail and expense that might be entailed in developing reports of emissions and emissions reductions. The first case involves no emissions reporting and very simple emissions reductions analysis. The second case involves reporting emissions levels for recent years only and moderately detailed emissions reductions analysis. The third example illustrates the most comprehensive report, including emissions reporting for the baseline years 1987–1990 and detailed project analysis. Note that in each case the level of effort and detail reflected in the analysis and report is determined by the reporter's expected audience.

Case 1: Rarotonga Coconut Cream, Inc.—Project Description and Emissions Reporting

Note: This example illustrates only one approach to analyzing a project; your analysis, methods, and calculations will vary depending on your particular circumstances, the geographic location of the project, and other factors.

Rarotonga Coconut Cream, Inc. (RCCI) is a small food processing plant in Hawaii. In the past, RCCI purchased its electricity from the local electric utility and produced processing steam from a residual oil-fired boiler. While RCCI's production and energy use have been stable for the past seven years, its energy bills have been growing because of increased electricity rates and oil delivery charges to the company's remote location. Company managers anticipate continued increases in electricity costs as the distribution lines have to be replaced and upgraded over the next five years.

RCCI realized it could cut its energy costs significantly if it installed a cogeneration system to produce its process steam and electricity in a single cogeneration plant fueled by distillate fuel oil. Although the distillate is a higher grade fuel than that currently used, its increased cost is more than offset by the economies realized from the combination of the higher efficiency cogeneration unit and the installation of increased storage capacity, allowing the firm to accept larger, less frequent deliveries. Furthermore, distillate is a cleaner burning fuel oil than residual with lower carbon dioxide emissions per equivalent energy input along with enhanced handling properties. Addition of a backup generator would allow the company to disconnect from the utility transmission and distribution system.

One of RCCI's customers, a grocery wholesaler who was visiting the Rarotonga plant, commented that her company was participating in a Federally sponsored energy-efficiency program and reporting the company's contribution to greenhouse gas emissions reductions through the EPAct Section 1605(b) voluntary reporting program. While RCCI was undertaking its cogeneration project primarily for financial reasons, it was also aware that the project had some beneficial environmental effects, including the reduction of carbon dioxide emissions associated with switching fossil fuel use and electricity production. RCCI decided that, in the interest of sharing its experience with the cogeneration project, the company would report the results to the DOE program.

The first decision RCCI had to make was whether to report its annual emissions of greenhouse gases. As a small business whose primary purpose for participation in the voluntary reporting program was to publicize its experience with using a cogeneration system in a remote location, RCCI was interested in containing its costs of reporting as much as possible. A full entity-wide emissions report would need to account for direct emissions from its oil burner, agricultural operations, and transportation fleet, and indirect emissions from its electricity use. Estimation of emissions from these sources back to 1987 could be costly and time-consuming. RCCI managers decided instead to focus their limited resources solely on an evaluation of emissions reductions associated with their cogeneration project.

Case 2: Rural-Urban Office Managers, Inc.—Project Description and Emissions Reporting

Note: This example illustrates only one approach to analyzing a project; your analysis, methods, and calculations will vary depending on your particular circumstances, the geographic location of the project, and other factors.

In the late 1970s, Rural Office Managers built a complex of offices just outside the city of Metropolis. By the mid-1990s, the city had expanded, and the offices, originally designed for low-density occupation, were now experiencing higher density occupation.

In response to the change in its physical surroundings, the company reincorporated as Rural-Urban Office Managers, Inc. (RUOMI). Company officials also realized they needed to update their facilities, particularly their heating, ventilating, and air conditioning (HVAC), system and their lighting system to accommodate the change in use. Coincidentally, the energy planner for Metropolis contacted RUOMI to explain that the city had enrolled in a new state initiative called Energy Efficient Cities (EEC) that challenges cities to reduce commercial-sector energy consumption by five percent. RUOMI agreed to participate in EEC.

While the emphasis of the EEC program was on reducing energy use, participants were also encouraged to report the indirect effect that their energy conservation activities had on greenhouse gas emissions, that is, the reduction in greenhouse gas emissions at the generating plant resulting from reduced electricity use at RUOMI's offices. When RUOMI managers explored the DOE voluntary greenhouse gas reporting program, they discovered guidance on how to measure both energy savings and associated greenhouse gas emissions. Therefore, as their contractor designed the HVAC and lighting project, RUOMI made sure that the contractor collected all the data RUOMI needed to submit a report.

RUOMI had not preserved a complete set of its energy bills from the late 1980s. Although this information could have been recovered from the Metropolis energy utility, RUOMI managers decided not to attempt to report the company's historic baseline, entity-wide emis-sions because the generating mix for Metropolis' electricity supply had changed dramatically since the end of the last decade. However, using the data provided in the DOE guidelines and supporting documents, they were able to derive the direct emissions from natural gas combustion and the indirect emissions associated with electricity use, for the two calendar years just prior to the commencement of their project. RUOMI reported emissions for those two years and for each year thereafter.

Case 3: Illinois-Ohio Unlimited—Project Description and Emissions Reporting

Note: This example illustrates only one approach to analyzing a project; your analysis, methods, and calculations will vary depending on your particular circumstances, the geographic location of the project, and other factors.

Illinois-Ohio Unlimited (IOU) is an investor-owned utility operating and serving customers in three midwestern states. During a recent integrated resources planning (IRP) effort, it recognized an emerging inability to meet a rising midday peak-load demand, even after pursuing an aggressive peak-shaving, demand-side management program. The IRP identified two alternative responses: purchase additional power from the Indiana Plains Project (IPP), an independent power producer that had excess capacity in its natural gas combined cycle units, or install a large array of photovoltaic cells (PVCs) in southern Illinois and Indiana. PVC electricity production was expected to closely match peak-load demands. While the price of PVCs had decreased dramatically as a result of successful Federal and private research, the second option was still more expensive than the first. However, the public utility commissions (PUCs) in all three of the states in which IOU reported encouraged the utility to install the PVCs. The PUCs reasoned that soon PVCs would be economically competitive and this was IOU's opportunity to gain experience with the technology.

Both IOU and its PUCs were concerned, however, that the utility might be inadvertently penalized if subsequent Federal regulations should mandate reductions of emissions of greenhouse gases but not recognize IOU's early reduction effort. IOU decided to report the PVC projects through DOE's voluntary greenhouse gas reporting program. Because IOU knew that use of its information in connection with the requirements of future policy debates would demand complete and accurate information, it kept careful records, and in each case followed the most rigorous requirements of the voluntary reporting guidelines.

As part of its reporting process, IOU reported its entity-wide greenhouse gas emissions for each of the four baseline years, 1987 to 1990, and for every subsequent calendar year. These reports included estimates of emissions from generating processes, IOU fleet vehicle emissions, and office and building operations.

GG–5.1 What Should the Project Be Compared To?

A crucial consideration in evaluating your project's accomplishments is how well you can establish a reference case—that is, an emissions level against which to measure the effects of your project. Note that, once you construct your reference case for a project, that reference case should remain constant for the life of the project. If you revise your reference case, you will need to revise any previous project reports to reflect the revised reference case.

A reference case is often referred to as the ''but for'' scenario, as in, ''but for this project, emissions would have been * * * .'' Two possible ways to finish this sentence are: (1) ''* * * the same as a previous year'' (the basic, or historic, reference case) or (2) ''* * * different from any previous year'' (the modified reference case, which is adjusted from historic or projected data or based on established standards). Each of these cases is discussed below.

Under this program you may choose between these two approaches. To fulfill your purposes for reporting, you will want your reference case to be clear and understandable. Depending on the nature of and circumstances associated with your operations, a basic reference case (using

historic emissions) may provide a suitable benchmark against which to compare project emissions. In other cases, you may determine that a modified reference case is more appropriate. Even if you choose to use a modified reference case, you still may wish to provide your historic emissions data to enable users of the EPAct 1605(b) database to evaluate the reported emissions reductions efforts with respect to a historic baseline.

Basic. The basic reference case uses only historical data. Emissions from the project or sequestration levels may be compared with the corresponding emissions or sequestration level for some previous year(s), for example, (1) the 1987 to 1990 period, the period that EPAct Section 1605(b)(1)(A) describes as the baseline years for purposes of reporting emissions; (2) the year(s) just prior to commencement of the emissions reductions project; or (3) some intervening year(s) more representative of normal operations. The reference case may be defined as the average annual emissions during some multiyear period or the highest or lowest annual emissions during that time. Alternatively, you could choose a single reporting year (for example, 1990) as the reference case year.

Modified. The modified reference case recognizes that even in the absence of your project, your future emissions levels may differ from past levels. The emissions or sequestration levels in the reference case may differ from historical levels because of gradual, predictable changes or because of abrupt changes. Gradual changes in emissions might occur because of growth or decline in industrial output, slowly changing technologies, or natural processes, such as natural regeneration of clear-cut forests. In the case of expanding output or operations, you might extrapolate the reference case from past trends and external data to determine what emissions would have been in the year in which the project's effects are being measured. This process may involve using models and adjusting for growth over time. You could estimate the reference case emissions using historic or current-year data and adjusting for future growth by multiplying the historic emissions rate (emissions per unit of production) by the units produced in the reporting year.

A modified reference case based on a hypothetical, abrupt, external change presents a greater challenge for the reporter. For example, a reference case for a forest preservation project might be built on the assertion, ''The forest would have been cut if we had not taken actions to preserve it.'' If you use this type of reference case, you should take extra care to document the facts underlying the case and to build a sound explanation about why this is the appropriate reference case to use in developing your analysis.

Reference cases for projects involving new operations or added capacity may lie between the two extremes of abrupt changes and gradual changes. For these activities, you will also need to exercise care in constructing a credible modified reference case. Use of industry standards or alternatives actually considered in the planning stages will build credibility. For example, if in the construction of a new building you exceed existing building standards for energy efficiency, you could justifiably assert that the reference case for that project is a building that just meets the standards.

Case 1: Rarotonga Coconut Cream, Inc.—Reference Case

RCCI decided to use a basic reference case. Managers reasoned that, in the absence of the shift to the distillate oil-fired cogeneration system, they would have continued using the residual oil-fired boiler and purchased electricity. Because its production levels had been constant over the past seven years, RCCI felt no need to modify the historic levels of energy use to reflect expected future trends. Instead, it decided to use an average of its emissions for 1989 and 1990, the earliest two years for which it had energy use records. Consistent with the RCCI project description, the reference case only incorporated the plant's electrical, processing, and steam production systems.

Case 2: Rural-Urban Office Management, Inc.—Reference Case

RUOMI chose to use a basic reference case, averaging its emissions for the years 1993 to 1995. There were several reasons for this decision. Because the use patterns and demands of RUOMI's tenants had changed dramatically from 1980 to 1990, the years 1987 to 1990 (or an average of these years), would not have been an appropriate indicator of expected emissions in the late 1990s. However, by 1992, RUOMI had established many long-term contracts with its tenants. Energy-use patterns had stabilized, and there was no reason to expect significant shifts in the foreseeable future. The company chose to average the years 1993 to 1995 because the first three months of 1994 included unusually cold weather and were not indicative of general energy demands. While its emissions reductions would have appeared larger if RUOMI had used only 1994 as a reference case, company officials were informed by the Metropolis energy planner that the reports could lose credibility if they only compared their project's energy use and emissions levels to a worst-year reference case.

Case 3: Illinois-Ohio, Unlimited—Reference Case

IOU's project was clearly driven by increased demands for its product. This immediately suggested that past emissions levels would not be a good model of what would have been, but for the project. Therefore, the utility chose to use a modified reference case to reflect the growth in peaking demand it was experiencing. However, IOU also recognized that it was operating in an environment where a company's current emissions are often compared to some historic level. Therefore, IOU decided to report both historic 1987 to 1990 emissions levels, and the modified reference case reflecting its changing customer demands.

GG–5.2 What Effects Did the Project Have?

The second major step in project analysis is identifying effects of the project. Your report should address all the effects that you can identify—not just the obvious, intended effects, but also less noticeable, unintended effects. Effects you should consider include activity shifting (moving processes within your organization), outsourcing (purchasing commodities or services you formerly produced), life cycle emissions shifting (upstream and downstream changes in processes or materials used), and market effects (offsets to achievements caused by residual demand).

Example: An electricity conservation project reduces electricity use at an industrial site and associated carbon dioxide emissions at the utility. However, the utility's emissions of other greenhouse gases, such as methane and nitrous oxide, will be reduced as well. In addition, conserving electricity may lead to other effects within the utility's transmission and distribution system. All of these effects should be identified (and quantified, where possible).

Example: Closing an industrial plant will likely reduce on-site emissions. However, if another plant is opened or expanded to meet market demand for the former plant's products, the increase in emissions from the new plant would at least partially offset the decrease in emissions resulting from the closing. To place the overall effects of the closing in context, emissions associated with the replacement production capacity should be identified and quantified to the extent possible.

Example: Shifting an activity to another part of your organization or substituting your production of a commodity with its purchase from others may appear to reduce your emissions. Manufacturing a component at a subsidiary's plant, or the purchase of power by a utility for distribution to customers, however, are some examples in which net emissions may not have changed. The emissions associated with the shifted or substitute production activity should be taken into account, regardless of where it occurs.

Example: Manufacturers can switch from steel to aluminum and claim reductions because working with aluminum results in fewer emissions. However, the production of the aluminum itself creates emissions different from those associated with the production of the steel. Both the on-site changes and the upstream changes should be considered when you analyze whether you have emissions reductions to report under this voluntary reporting program.

Example: Extending the rotation length or completely precluding harvesting at a given forest location increases the carbon storage services at that site. However, the added sequestration may be largely offset if another site is harvested earlier than it otherwise would have been to meet the market demand for timber that was not met by timber from the first site.

Effects you can identify should be reported. These would include any on-site effects resulting from changes in both fuel combustion and electricity use. Off-site effects may be more problematic. In some situations, you may have relationships with customers or suppliers that allow you to both identify and estimate effects that occur outside your organization. If you have or can get such information, you should report it.

Effects you can identify but have no data for should be so noted in your report.

Although quantifying all effects of a project can be difficult, keep in mind that the credibility of your report will depend to some extent on your ability to identify effects. If your targeted audiences can easily identify effects that you have ignored in your analysis, the credibility of the entire report may be in question.

Case 1: Rarotonga Coconut Cream, Inc.—Project Effects

It was easy to identify the obvious effects of the cogeneration project: the reduction of direct emissions as a result of switching from residual oil to distillate as the primary on-site fuel and the reduction of indirect emissions associated with reduced production of electricity by the electric utility. However, after giving the matter some additional thought, RCCI realized that other effects were associated with the project as well. For example, the number of fuel delivery vehicle trips was reduced by half with the switch from residual oil to distillate and the increased storage capacity. Line losses and the indirect emissions associated with the very long distribution of low voltage electricity were deemed to be negligible and beyond RCCI's ability to calculate.

RCCI listed each of the effects it could identify, but decided not to attempt to quantify any but the first two effects.

Project effects	Contribution to reduction	Significance
Reduce emissions associated with utility electricity production	+	Large.
Reduce CO_2 emissions associated with on-site fossil fuel burning (switching from residual to distillate)	+	Medium
Reduce transportation-related services	+	Small-Medium.
Decrease indirect emissions associated with line losses	+	Negligible.

Case 2: Rural-Urban Office Management, Inc.—Project Effects

RUOMI contracted with Environmental Security Consulting Organization (ESCO), a local energy service company, to evaluate the costs and benefits of several alternative technologies. After careful evaluation of the use patterns and tenant needs in RUOMI's office complex, ESCO provided a list of two dozen potential energy efficiency improvements and the energy savings and costs associated with each. They explained to RUOMI's management, however, that simply summing across all technologies would not provide an accurate assessment of expected energy savings. Many of the equipment changes would interact with each other, some having negative effects on energy savings, others having synergistic effects. Further, the type and extent of the interactions would depend upon actual use patterns as well as seasonal variations and weather patterns. Following ESCO's recommendation, RUOMI contracted for 14 of the items on the list.

Because of the complex nature of the energy changes expected from the modifications, ESCO recommended that the resulting effects of the activities be analyzed as one integrated project. This avoided the difficulty of having to sort out the impact of each equipment change. It also made any evaluation for the DOE voluntary reporting program simpler. Since RUOMI was analyzing the projects at the entity level, emissions reductions could be calculated directly from its emissions report. Therefore, separate identification of each project's effects was unnecessary.

Case 3: Illinois-Ohio Unlimited—Project Effects

Identifying all of the effects of IOU's project and reference cases was not a simple exercise. IOU recognized that it needed to consider the effects that its project had (1) on its own operations and emissions, (2) on the emissions of IPP, (3) possibly on the operations of the larger regional power pool, and (4) on the supplier of the PVCs. It was not sure it could accurately estimate all of these effects without incurring unreasonable analysis costs, but it at least wanted to identify them in planning the analysis that would lead to its completed report.

Project effects	Contribution to reduction	Significance
IPP emissions that would have gone up because of additional power purchases are reduced	+	Large.
PVC manufacturer emissions do go up	-	Small.
Power pool emissions might change	?	Unknown.
IOU emissions do go down	+	Small.

GG–5.3 How Do I Estimate Project Accomplishments?

The final major step in project analysis is estimating emissions levels for both the reference case and project case to determine emissions reductions. The guidelines and supporting documents provide you with a wide range of options for obtaining data and defining the methods for estimating your project's effect on greenhouse gas emissions and carbon sequestration.

First, the guidelines and supporting documents recognize three categories of data.

Physical data. This is information that describes the activities involved in your project. For example, how many exit lights were replaced? What was the power requirement of the old and the new lights? How many hectares of trees were planted? What species of trees? How many trees per hectare?

Default data. This is information provided by the supporting documents to assist you in evaluating the emissions or sequestration effects of your project. Using default data increases your ease of reporting (in some cases, allowing you to report when you might not otherwise have enough data). However, using default data may decrease precision and, because the defaults may be conservative, your emissions reductions may appear lower than they actually are. There are two categories of default data:

Emissions factors. These are factors that allow you to convert information about a change in energy use to an estimated change in greenhouse gas emissions. Some emissions factors are rather precise. For example, the change in direct emissions of carbon dioxide from a reduction in methane combustion is essentially constant, regardless of when or where the change took place. Other emissions factors, and particularly those for indirect emissions, are less precise. For example, the supporting documents provide emissions factors for electricity on a state-by-state basis. However, the effect that a change in electricity consumption has on emissions will vary by loca-tion within the state, the time of day, and the season that a change occurs.

Stipulated factors. These are factors that allow you to convert physical data about your project into estimates of changes in energy use, greenhouse gas emissions or carbon sequestration. The guidelines provide this information for a few types of projects where the scope and nature of the project can be clearly defined and where the effects on emissions can be predicted with relative certainty. For example, the supporting document for the forestry sector provides stipulated factors for converting physical data about tree planting into estimates of carbon sequestration. The supporting document for the residential and commercial buildings sector provides stipulated factors for converting information about certain energy-efficiency projects into estimates of fuel savings. These estimates can be combined with default emissions factors to

estimate reductions in greenhouse gas emissions.

Reporter-generated data. This is information that you provide which is used to estimate the effects of your project. There are two categories of reporter-generated data:

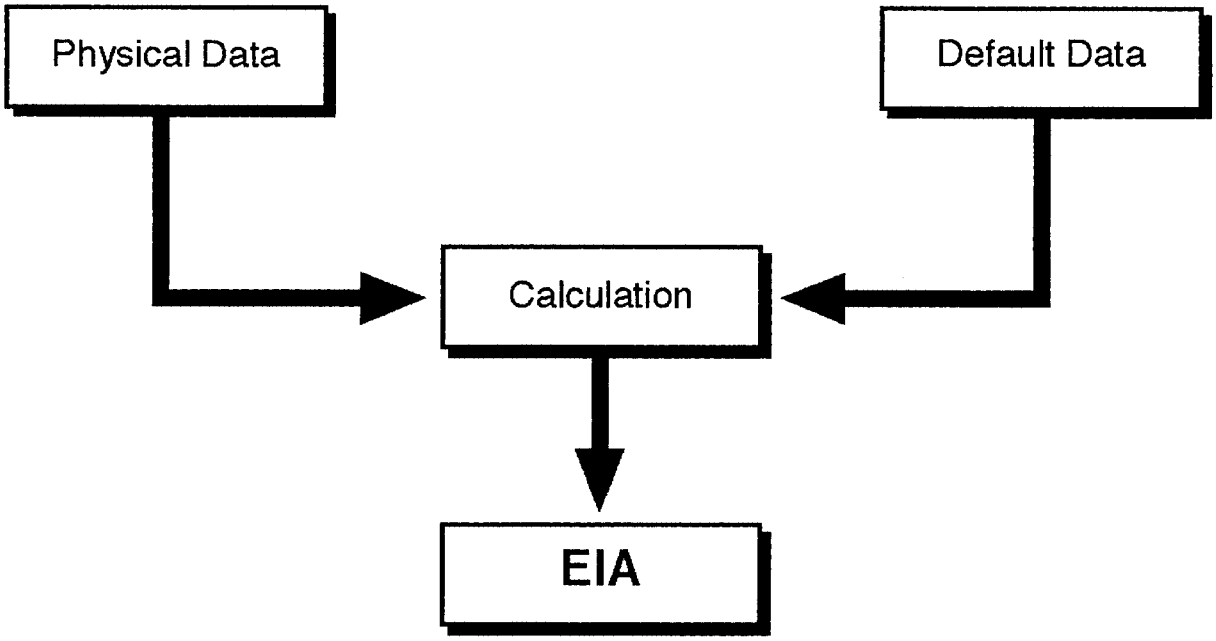
Measured data. These are data, collected directly from the project or a control group, that you use to estimate your project's accomplishments.

Engineering data. These are data that you derive from various sources, such as engineering manuals, manufacturer's equipment specifications, surveys, academic literature, professional judgment, and computer models.

Based on these three categories of data, the guidelines and supporting documents recognize two categories of projects: Standard projects, which rely on physical and default data, and reporter-designed projects, which use measured or engineering data that you develop (as well as appropriate default data). You will need to report the category(ies) of data and projects that you choose to use.

Standard projects. These are projects for which the guidelines and supporting documents provide the procedures and information to estimate the emissions reductions or carbon sequestration. Reports of these projects rely entirely on physical and default data (*see* Figure GG–2).

Not all projects can be described in standard project reports. The supporting documents for each sector delineate, where possible, projects for which emissions factors and stipulated factors are provided, and for which standard project reports can be submitted. You should recognize that default values are often conservative; that is, if you use them, you are likely to underreport your emissions reductions or carbon sequestration. However, if you do not directly measure and monitor or your organization does not have expertise in estimation methods, the default values will allow you to calculate the effects of your activities.

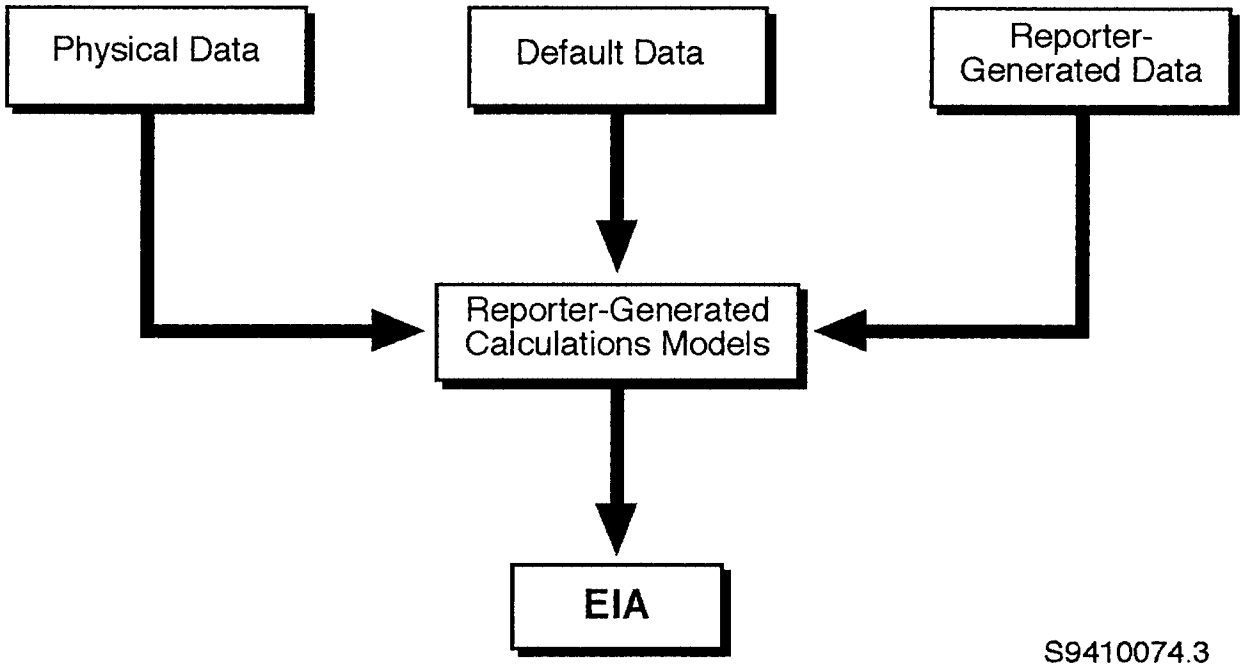


- Figure GG-2. Standard Projects Utilize Physical and Default Data.

Reporter-designed projects. These projects use physical and reporter-generated data, possibly in combination with default data, to estimate their accomplishments (see Figure GG–3). For this type of project, you should be able to indicate the source of all data, and in the case of data you generate, how it was measured or derived. For reporter-designed projects, the supporting documents for each sector provide principles and guidance.

Estimation of the emissions effects of many reporter-designed projects will require that you not only gather measured or estimated data, but that you also manipulate this information to derive the emissions levels of your project and reference case. The data manipulation could involve relatively simple calculations or extremely complex modeling. You should be able to identify the nature of the calculations and/or the type/name of the model you have used. In some instances, it may not be possible to estimate emissions for both the project and the reference case. In these cases, identified in the supporting documents for each sector, you may need to measure the emissions reductions directly.

Finally, the emissions reductions or carbon sequestration of your project is simply the difference between your project emissions/sequestration and your reference case emissions/sequestration.



- **Figure GG-3**. Reporter-Designed Projects Utilize Your Own Measured or Engineering Data Along with Physical and Default Data.

Case 1: Rarotonga Coconut Cream, Inc.—Estimation Methods

RCCI limited its quantitative analysis to the obvious effects; estimation of the annual emissions reductions associated with its project was simple. First, it estimated the annual emissions associated with the project. This was simply its annual distillate oil consumption multiplied by the default emissions factor for distillate oil supplied by the guidelines' supporting documents. Second, for the reference case, RCCI multiplied its reference case annual electricity use by the default electricity emissions factor for its state, multiplied its reference case annual residual oil use by the default residual oil emissions factor, and summed the two to arrive at total emissions for the reference case. Its total reported emissions reductions were the difference between the reference case emissions and the project case emissions.

RCCI was pleased that it was able to do its entire analysis based on data it had readily at hand, that is, its fuel and electricity use records from before and after the project, and the default emissions factors provided by the guidelines.

Case 2: Rural-Urban Office Managers, Inc.—Estimation Methods

ESCO, the contractor for RUOMI, had primary responsibility for preparing the voluntary report for the DOE program. ESCO knew that because of the complexity of the project it could not derive estimates using default data provided in the Guidelines' supporting documents. The project managers turned to the supporting document for the residential and commercial buildings sector to identify the recommended methods for gathering data for their type of project. They found that the recommended methods included approaches very similar to ones they had previously used to measure energy savings in complex projects. After a full year of measuring and monitoring, they summarized the energy-use data, and performed calculations to derive the difference between the project energy use and the reference case energy use.

Applying the natural gas and electricity emissions factors supplied as default data, they converted the estimated energy reductions to estimated emissions reductions.

Case 3: Illinois Ohio Unlimited: Estimation Method

IOU recognized two distinct parts to its emissions reductions estimation process. First, it needed to evaluate the direct electricity system emissions for both its reference case and project case. Second, it wanted to estimate the emissions associated with manufacturing the PVCs. Tackling this latter point first, IOU contacted a prospective PVC supplier for any information on emissions associated with the PVC manufacturing process. The supplier, it turned out, had commissioned a report that estimated not only the direct carbon dioxide emissions associated with the manufacture of PVCs, but also the emissions associated with the supply of raw materials—steel, aluminum, chemicals, and electricity—that were used in PVC fabrication. Had this information not been available, IOU would have had to decide whether or carry out this study itself or not quantify this effect at all, possibly affecting the credibility of its project report.

IOU then turned to the electricity system emissions effects of its project. The project reduced emissions that would have occurred had IOU purchased its electricity from IPP. Additional production from IPP for daytime peaking would have been generated by a natural gas combined cycle unit. IOU developed a single conversion factor for the emissions per kWh that would have occurred for electricity from IPP's system. This meant that as the peak daytime demand grew over time, IOU would be able to estimate that portion of the emissions for the reference case that was attributable to IPP, that is, how much higher IPP emissions would have been had IOU relied on purchased power.

The new PVC system was designed to meet the growth in demand over the next decade. But because the PVCs would be generating at full capacity immediately, they would actually displace some of IOU's current daytime generating capacity. The marginal unit in IOU's generation equipment was an oil-fired turbine generator. IOU developed a conversion factor for the emissions per kWh that would have occurred from that unit, if its production had not been partially displaced by the solar power system.

In summary, the IOU emissions reductions estimation consisted of three major components. First, at the start of the project there was an initial emission of carbon associated with the production of the PVC

units. This effect was reflected only in the first annual report. While some of these emissions had actually taken place as many as two years earlier, IOU believed it was sufficiently realistic to account them all to the first reporting year. Second, the project emissions also showed a sudden drop in emissions for the oil-fired plant due to displacement of daytime oil-fired generation by the PVCs, whose entire capacity was not initially required to meet midday peak demand. However, as expected, the emissions from the oil-fired plant climbed each year as daytime peak demand grew and increasingly the PVC capacity was used to meet that demand. This increase was reflected in IOU's annual reports. Third, under the reference case, IOU reported constant emissions from its own oil-fired plant and annually increasing emissions from IPP's natural gas combined cycle plant. The emissions reduction each year was calculated by subtracting the project emissions from the reference case emissions.

GG–5.4 What if Two or More Organizations Wish To Report the Same Project?

You may report activities undertaken in association with others. If you do so, you must identify other potential reporters of the same activity so that the program can account for multiple reports of the same activities. You may wish to make arrangements for reporting with others involved in your project.

Joint activities generally fall into one of two categories. The first category includes one-time transactions that are large enough to require negotiation before the exchange takes place and generally involve a written contract, such as demand-side management (DSM) programs. The second category comprises transactions that take place repeatedly between manufacturers and consumers where negotiated contracts are generally not involved, such as individual purchases of household appliances.

Three Examples of Joint Activities

Demand-side management programs: When an electric utility undertakes a DSM program, three parties are involved in reducing carbon dioxide emissions: (1) Manufacturers of the energy-efficient equipment, such as improved lighting, refrigeration, and other energy-consuming goods; (2) consumers of electricity (households, commercial operations, and industrial firms); and (3) the utility itself. All three parties may wish to report the reductions in emissions.

High-efficiency automobiles: EPAct section 1605(b) also suggests that the manufacture of high-efficiency automobile fleets be reportable under this program. On the one hand, the purchaser of a high-efficiency car makes the ultimate decision to reduce emissions related to personal transportation. On the other hand, the automobile manufacturers who shifted their fleet composition are enabling the automobile owners to obtain more efficient automobiles.

Tree-planting agreements: Some utilities have entered into agreements with landowners to plant trees. The utilities provide funding for establishing the trees; in return the landowners agree to leave the new trees in place for a specified number of years. Both landowners and utilities have played essential roles in carbon sequestration.

Where contracts are involved, you may make arrangements to assign the ability to report resulting emissions reductions before they are reported under this program. You are not required to do this sorting out before you report, but, depending upon how you believe this information will be used, you may wish to resolve any questions before reporting.

You may also wish to mutually decide reporting capabilities for purchases. If you can most easily aggregate many small reports, for example, as a manufacturer of high-efficiency automobiles or efficient appliances, you may wish to include, as part of the purchase transaction, an agreement with the consumer that you will report the energy-efficiency information, unless consumers notify you that they wish to do so.

However, for some technologies, consumers are in a better position to estimate actual accomplishments. For example, new automobile owners can better estimate annual vehicle miles traveled and, hence, the fuel and emissions savings associated with the purchase of a high-efficiency car. You need to consider the trade-off between the ease of reporting and accuracy of estimating the emissions reductions when deciding who will report the reduction—the manufacturer, the automobile owner, or both. If parties report separately, each should identify the other as potential reporters of the same information.

GG–5.5 May I Report Through My Trade Association or Other Third Parties?

You may wish to explore reporting through another party—for example, through a trade association, civic association, or fraternal organization. Each of the supporting documents discusses third-party reporting as it may apply to particular sectors.

Third-party reporting may be appropriate for a number of reasons. Organizations may be able to provide technical or administrative assistance to you in reporting. Multiple reports may be aggregated to provide a quantity of emissions and reductions which each individual reporter would not choose to report. Furthermore, confidentiality of some data reported may be enhanced by third party reporting.

Third-party reporting may not be appropriate for your purpose in reporting. For example, it does not provide the transparent link to you that is necessary for creating a formal public record of your emissions and achievements for any purpose.

GG–5.6 What Else Will I Be Asked To Report?

As part of your report, you will be asked to choose one of three descriptors of the project(s) whose effects you are reporting. This identification will be limited to those provided in the language in EPAct 1605(b): (1) Voluntary reductions, (2) plant or facility closing, and (3) state or Federal requirements.

Projects may be undertaken for other purposes, for more than one purpose, or may have greenhouse gas impacts that were not the reason for implementing the project. You may wish to, but will not be required to, report more detailed information on why you undertook the project.

GG–5.7 May I Report International Projects?

Considerable interest has been generated regarding the potential for cooperation among parties in different countries. For example, there may be opportunities for U.S. parties to reduce greenhouse gas emissions and increase carbon sequestration outside the United States, perhaps at lower cost than possible through domestic activities.

Under this program, you may report the relevant results of your activities outside the United States, under the same process applicable to similar domestic activities. Note that you may have special difficulty in analyzing international activities: determining an appropriate reference case, defining project boundaries, selecting appropriate measurement or estimation methods, and obtaining credible data. Special attention should be given to all the identifiable effects of your international activities.

Under the United Nations Framework Convention on Climate Change, nations that are parties to the Convention will determine how cooperative efforts between member nations and their respective citizens (''joint implementation'') will be counted toward meeting each country's commitments under that treaty. The President's Climate Change Action Plan, announced in October 1993, includes a pilot program called the United States Initiative on Joint Implementation (USIJI) designed to help establish an empirical basis for considering approaches to joint implementation. The USIJI program has developed evaluation criteria and will develop emissions measurement and verification methods for international projects accepted into the pilot program.

If you are reporting the results of any international project to this program, you will also indicate whether it has been accepted under the USIJI or under the Convention as an accountable joint implementation project. Reporting the results of an international activity under the EPAct 1605(b) program alone does not bring it under the umbrella of formal joint implementation.

GG–5.8 May I Report Prospective Emissions Reductions?

Many projects that reduce greenhouse gas emissions or sequester carbon achieve their results over several years, or even decades. For some of these projects, the accomplishments are evaluated by means of computer modeling or engineering estimates, rather than by direct measurement and monitoring of greenhouse gas emissions and flows. In those cases, the estimation process is generally carried out before the project begins.

If you have analyzed your project using a method that estimates effects prospectively, you may choose in the first reporting year to report the expected annual emissions reductions or carbon sequestration for future years. However, that information will be maintained separately from the EPAct 1605(b) database.

To have your project accomplishments recorded in the EPAct 1605(b) database, you must certify each year that the project continues to perform as expected. As you certify each year's accomplishments, EIA will transfer the data from the database of prospective accomplishments to the EPAct 1605(b) database.

You may also modify your estimates of past accomplishments at any time for any of several reasons. For example, if events following the commencement of the project are different than expected, you may wish to modify your model to more closely reflect actual events. Alternatively, you may simply find modeling or engineering estimation methods that you believe to be more accurate than those you initially employed. You may even decide to carry out field measurements where you had not initially anticipated doing so. Whatever your reason, you can modify the existing estimates to reflect your more accurate estimates of both your past accomplishments recorded in the EPAct 1605(b) database and your expected accomplishments recorded in the database of prospective accomplishments. However, you should provide clear documentation of how you derived the revised estimate.

GG–5.9 How Far Back May I Report Projects?

A primary purpose of the program is to record emissions reductions, not to track when projects were initiated. Therefore, you may report new or ongoing projects that have achieved reductions beginning January 1, 1991. However, for any project, you must establish a credible reference case and retain that reference case for all your reports of that project. If you use historic data to construct your reference case, you should not use data earlier than 1987. If you change your reference case, you must amend any previous reports for that project to account for the amended reference case.

Example: You initiated a project in 1991 that reduced emissions from their 1990 levels. This project is reportable.

Example: You initiated a project earlier than 1987 that has decreased emissions every year relative to each previous year. You may establish either a basic or modified reference case based on what emissions would have been without the project (using only data from 1987 on), then report the emissions reductions from the project for 1991 and subsequent years.

Example: You initiated a project earlier than 1987 that reduced emissions to a level that stabilized during (or before) the baseline years 1987–1990. This project would not be reportable, since the reductions were achieved prior to the period covered by the EPAct 1605(b) reporting program.

Example: You have an ongoing DSM program to encourage replacement of appliances or equipment. You would not be able to report achievements before 1991, but any appliances replaced in 1991 or after that year are new reductions and could be reported.

Example: You have been installing windmills every year for 10 years. In order to report emissions reductions for 1991, you would need to demonstrate that the 1991 windmill displaced emissions-producing generation. If the windmill replaced another, the project would not be reportable.

These are relatively straightforward examples when you construct historic reference cases. Your analysis becomes more complex when you wish to construct modified reference cases. In general, you should not use data from years before 1987 except as additional support for your assertion of what modified levels would have been after 1987.

GG–5.10 Must I Take Into Account the Different Effects of Different Greenhouse Gases?

Your reports on emissions and emission reductions will include data on greenhouse gases in tons of each gas emitted; you will not be required to calculate the various effects of different gases on climate for this voluntary reporting program. However, you may wish to perform these calculations for your own purposes. For example, you may wish to evaluate the costs of competing proposed projects in terms of the beneficial effects on climate; in order to do so, you may wish to look at these effects using a common index, such as the equivalent effect in tons of carbon dioxide. You may wish to talk about such equivalencies with various stakeholders or for public relations purposes.

The Intergovernmental Panel on Climate Change has developed an index that compares the impact that each gas has on global warming relative to the effect that carbon dioxide has. Information about this index, called the Global Warming Potential (GWP), is presented in Appendix E, along with GWPs for the types of gases covered by this reporting program. If you wish to use the index, remember that it does not take into account some complexities of atmospheric chemistry and that the underlying science is evolving.

GG–5.11 Is It Necessary To Report Emissions Reductions and Carbon Sequestration Every Year?

This is a voluntary reporting program. You are under no legal obligation to continue reporting. However, you should recognize that the usefulness of your initial reports may be affected by your participation in the program in subsequent years.

If you report emissions reductions for a period of time, and then fail to report thereafter, the user of the database is likely to assume that your project is no longer reducing emissions relative to the reference case. However, this does not negate the value of the reductions accomplished while the project was in place.

Reporting carbon sequestration projects raises a different type of problem. If you report carbon capture for a number of years and then cease reporting, a database user is apt to assume that the carbon that had been captured has been released back to the atmosphere. This not only limits recognition of any accomplishments that may have occurred following cessation of your reports, but largely negates the value of accomplishments already reported.

You or your firm may find that, following successfully reporting to the voluntary reporting program for several years, you miss one or more years of reporting. If you choose to resume reporting, your initial report should contain information not only for the most recent reporting year, but also, if possible, for all of the intervening years during which you did not report. This will ensure that the EPAct 1605(b) database reflects a continuous record of your activities, thereby increasing the credibility of all your reports.

GG–5.12 May I Amend My Previous Years' Reports?

If you have submitted reports under this program but afterwards develop better data (for example through field measurements or utility-specific emissions factors), or better estimation methods (for example, your organization's adoption of standard analytic procedures), you may amend your previous reports. You may also need to amend reports because you have amended your reference case for a particular project. Your amended reports should clearly state your reasons for amendment and the bottom-line difference that results from the amendment. The following case study discusses an instance in which a reporter chose to amend previous reports.

Case 4: Black Forest Cake, Inc.—Long-Term Project Reporting

Note: This example illustrates only one approach to analyzing a project; your analysis, methods, and calculations will vary depending on your particular circumstances, the geographic location of the project, and other factors.

Black Forest Cake, Inc. (BFCI) was a family-owned business that was experiencing extremely rapid growth in demand for its products, which included baked goods produced at 13 sites in five states, catering services at 10 shops in seven states, and equipment rentals at 15 stores in three states. It operated from a total of 23 sites spread across nine states.

The family members and many of their staff were environmentally conscious. While they were delighted with the increased demand for their products, they were concerned to see their energy consumption rising, particularly their natural gas consumption for baking ovens and space heating, and their gasoline use in delivery vehicles. They knew that increased energy use signaled increased greenhouse gas emissions.

Therefore, BFCI decided to voluntarily offset some of the increase in emissions by undertaking a tree-planting (carbon sequestration) project on farmland they owned. They were not interested in receiving official recognition for their effort. They were motivated purely by their interest in environmental protection and a desire to project an image of BFCI as a ''good global citizen.'' They did, however, want to be sure that their project actually reduced net carbon dioxide emissions, not just appear to do so. Therefore, BFCI decided that its project should at least meet the minimum reporting standards used by DOE in the EPAct 1605(b) voluntary greenhouse gas reporting program.

In its first report following the establishment of the tree stand, BFCI

reported that it had planted the trees and reported information consistent with the guidance provided in the forestry sector supporting document. It also reported that it expected the forest to capture carbon at a rate consistent with the stipulated factors provided by the guidelines' supporting document for forestry. Each year thereafter BFCI confirmed in its report that the project appeared to continue to perform as expected.

After eight years of relying on the default stipulated factors, BFCI became engaged in a dialogue with a local environmental group. One consequence of the discussions was that BFCI agreed to measure the standing carbon on its project site in the tenth year to determine whether the project had met the expectations established for the first decade by the stipulated factors. The field measurements, including statistical sampling of both soils and biomass, revealed that the project had actually exceeded expectations by 20 percent. This was attributed to the fact that the original soils were particularly rich in phosphorous and nitrogen.

BFCI amended its previous reports to reflect this new information based on field measurements. The amended reports increased the reported carbon dioxide flows to the forestland by 20 percent in each of the first ten years. BFCI also amended the projected annual carbon capture rates for the second decade to reflect the higher-than-expected performance. BFCI thus transformed its project from a standard project to a reporter-defined project.

GG–6 What Are the Minimum Reporting Requirements?

DOE has not established a minimum size for a reporting entity or for the reported emissions, emissions reduction, or sequestered carbon. For some purposes of reporting, such as the exchange of information on pilot projects, a minimum size requirement would limit participation. Similarly, you are not required to complete a full and comprehensive report as defined earlier. However, you must report a minimum set of information.

Whatever the scope of your report, you are required to certify the accuracy of the data you have provided. You must also meet minimum information requirements:

- If you are reporting greenhouse gas emissions, you must clearly identify the facilities that are covered by your report and, for each greenhouse gas covered by your report, clearly identify the gas, the amount of the emissions (expressed in metric tons of that gas per year), and the year of the emissions.
- If you are reporting emissions reductions or carbon sequestration projects, you must be able to describe your project and provide sufficient physical data to allow users of the database to form a clear understanding of the nature and scope of your project, including the cause of the change in emissions or carbon sequestration. You must also identify the location of the project, the reference case for the project, and the effects of the project.
- Whether you are reporting on a standard project or a reporter-designed project, you must be able to identify the sources of your data, the level of change of emissions or carbon sequestration per year, and the year in which the change took place.
- If you are submitting a reporter-designed project report involving direct monitoring and measuring or engineering estimations, you must also identify the techniques used to gather the data and make the estimates.

GG–7 Can My Data Be Kept Confidential?

The provisions of section 1605(b)(3) stipulate that ''Trade secret and commercial information that is privileged or confidential shall be protected as provided under Section 552(b)(4) of Title 5, United States Code.'' In general, information submitted to the Federal government must be made available to the public. This section prohibits release of certain trade secret and commercial or financial information.

You will enhance both the credibility and usefulness of information you report by making it available for public release. More accurate data will increase the value of emissions reductions estimates in terms of public recognition, and widely available information will help diffuse knowledge about cost-effective emissions reductions opportunities. Thus, you should try to avoid labeling reported information as confidential wherever possible.

While a reporter may believe that some of the data voluntarily submitted under this program is entitled to protection under the exclusion, this protection is neither automatic nor complete. You should be aware that, under DOE regulations (10 CFR 1004.11), DOE will evaluate each claim of confidentiality and determine whether or not to disclose the data to the public. Also, data may be released to another Federal agency under certain circumstances regardless of any claim of confidentiality.

GG–8 What Certification Is Required?

If you report under this program, you will be required to certify through your signature the accuracy of all the information reported. Therefore, the person who signs the report must be authorized to act as a representative of the reporting entity for these purposes. No independent certification is required, and the Federal government does not plan to certify your reports. However, you may wish to indicate if your data have been verified by a third party.

GG–9 What Should I Do Next?

These general guidelines present an overall picture of the reporting process for the voluntary reporting program. You will find more detailed guidance in the sectoral supporting documents for electricity supply, residential and commercial buildings, industry, transportation, forestry, and agriculture. You may have reportable projects in several sectors; you may report them separately or capture and report the total effects on an entity-wide report. If you need the supporting documents, contact United States Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585.

Reporting forms are available at the following address: United States Department of Energy, Energy Information Administration, 1000 Independence Avenue, SW., Washington, DC 20585.

DOE encourages you to report your achievements in reducing greenhouse gas emissions and sequestering carbon under this program. Global climate change is increasingly being recognized as a threat that individuals and organizations can take action against. If you are among those taking action, reporting your projects may lead to recognition for you, motivation for others, and synergistic learning for the global community.

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Corporate Governance and Climate Change: *Making the Connection*

Douglas G. Cogan

A CERES Sustainable Governance Project Report

Prepared by the Investor Responsibility Research Center

CERES

IRRC

June 2003

CERES commissioned this report from the Investor Responsibility Research Center (IRRC). CERES is a coalition of investor, environmental, labor and public interest groups working together to increase corporate environmental responsibility worldwide. IRRC is an independent research firm that is the leading source of high quality, impartial information on corporate governance and social responsibility issues affecting investors and corporations.

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Investor Responsibility Research Center, Inc.
1350 Connecticut Ave., NW
Washington, DC 20036
www.irrc.org

CERES, Inc.
99 Chauncy Street
Boston, MA 02111
www.ceres.org

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Foreword from CERES

Recent corporate scandals point to the high price paid by everyone – investors, employees, pension beneficiaries – for inadequate corporate governance practices. The front pages of newspapers have offered us many arguments for moving away from "business as usual" corporate governance to a new governance framework characterized by long-term vision on the part of corporate directors and CEOs.

Social and environmental issues fall squarely into this new corporate governance context. The evidence is increasingly compelling: companies' performance on social and environmental issues does affect their competitiveness, profitability, and share price performance. And climate change, arguably one of the world's most pressing issues, exemplifies the challenge better than most. A company's response to threats and opportunities of climate change – or their lack of response – can have a material bearing on shareholder value.

In this era of reform, investors, the SEC and Congress alike are pressing companies to address "off-balance sheet" risks that have the potential to affect shareholders' returns. In the face of overwhelming scientific evidence, investor and business leaders are concluding that climate change presents such a risk.

In 2002 CERES, a coalition of investors and public interest groups representing over $300 billion in assets, released the *Value at Risk* report that found climate change poses significant financial risks to a wide range of industry sectors. The report asserted that the failure to address the risks of climate change could represent a breach of fiduciary responsibility.

This year CERES is releasing the *Corporate Governance and Climate Change* report, prepared by the Investor Responsibility Research Center, to understand how 20 of the world's biggest corporate emitters of greenhouse gases are factoring climate change risks and opportunities into their governance practices. Among many new findings, this report identifies several problem areas, including:

- Lack of disclosure in securities filings
- Inadequate board reviews
- Undeveloped strategies to address risks and opportunities, including insufficient action to reduce emissions

This report features a checklist of 14 specific governance actions that companies can take to address climate change. Leadership companies that are implementing these actions show us that approaching climate change strategically can be both pragmatic and profitable.

In addition to the checklist, CERES offers some specific recommendations for investors, corporate boards/CEOs, Congress and the SEC (see box on next page). It is our hope that this report will motivate leaders in the private and public sectors to support climate change policy solutions that achieve real emissions reductions. We encourage all companies worldwide to improve their policies by considering the 14 actions outlined in the "Climate Change Governance Checklist." Some leadership companies reviewed in this report are pursuing each of these actions.

Such measures will be an important step in minimizing the risks posed by climate change and maximizing the investment opportunities that lie ahead. As responsible stewards, we can and must rise to this governance challenge.

Mindy S. Lubber
Executive Director
CERES

Recommendations from CERES

Investors:

- Encourage best practice among portfolio companies, including the 14 actions on the "Climate Change Governance Checklist." (See Executive Summary, pg. 2).
- Seek expert science and policy advice on climate change and discuss climate change risks and opportunities with fund managers and trustees.
- Join in discussions with other investors concerned about climate change risks and opportunities, through CERES, IRRC, and other organizations.
- Support requests for greater disclosure of climate change risks and opportunities by portfolio companies, including taking steps such as: voting proxies in favor of climate change shareholder resolutions and disclosing those votes publicly, communicating with companies and sponsoring shareholder resolutions.
- Undertake a portfolio-wide assessment of climate change risk exposures, and have portfolio managers integrate climate change considerations into investment policies and strategies.
- Identify and pursue clean energy investment opportunities that are advancing the transition to a low-carbon economy.
- Ask stock exchanges to include disclosure of climate change risk in their listing standards.
- Support recommendations for corporate boards/CEOs, Congress, SEC (see below).

Corporate Boards/CEOs:

- Ensure that the board has sufficient expertise and counsel to make informed and responsible decisions regarding climate change.
- Consider taking the 14 actions on the Climate Change Governance Checklist and report to shareholders regularly on company progress.
- Develop, announce and implement an explicit strategy on climate change that is integrated into the company's overall business strategy.
- Support climate change policy solutions.

Policymakers:

- SEC: Enforce regulations that require companies to disclose material financial risks and opportunities related to climate change and regulation of greenhouse gases, and companies' strategies for addressing these risks and opportunities.
- Congress: Develop national policies to limit U.S. greenhouse gas emissions to create certainty for companies and investors, including, among others policies and measures, (1) a national mandatory program that is market-based, with reduction targets and timetables for large-emitting sectors, and (2) a national renewable energy standard requiring an increasing amount of electricity produced from renewable resources such as biomass, geothermal, solar and wind.

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Douglas G. Cogan
Deputy Director, IRRC Social Issues Service
June 2003

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Executive Summary

This report examines how 20 of the world's biggest corporate emitters of greenhouse gases are factoring climate change into their business strategies and governance practices. Significant investment risks and opportunities lie ahead. Nothing short of a new energy and technology revolution will be required to address what may be the greatest environmental challenge humanity has ever faced.

Effective corporate responses to climate change will be built on a foundation of well functioning environmental management systems and properly focused governance practices. Only after this foundation is in place can companies expect to make meaningful progress in controlling their emissions and orienting their businesses for a carbon-constrained world.

All of the companies profiled in this report are taking some governance actions to respond to climate change. But few have adopted comprehensive programs to treat the issue as an imminent financial and environmental threat. American companies, in particular, are pursuing business strategies that discount the threat, leaving them – and their shareholders – especially vulnerable to increased financial risks and missed market opportunities. Consider:

American companies, in particular, are pursuing business strategies that discount the global warming threat, leaving them – and their shareholders – especially vulnerable to increased financial risks and missed market opportunities.

- **American-based petroleum companies are devoting virtually all of their development efforts to finding more oil and gas.** Meanwhile, some European competitors are gaining a foothold in renewable energy technologies, which are building from a small base to become one of the fastest growing sources of energy.
- **American auto companies are depending on sales of big sport utility vehicles that get low gas mileage as their main profit center.** Meanwhile, Japanese competitors, though also competing in this market, have taken the lead in introducing gasoline-electric hybrid vehicles with much-improved fuel economy and comparable engine performance.
- **American electric utilities are investing heavily in refurbishing old, coal-fired power plants as their base source of generation.** Meanwhile, state and federal regulators are moving forward with plans to control more emissions from these plants – including carbon dioxide – which argues in favor of replacing older, heavily polluting plants with new, less carbon-emitting ones.

The divergence in corporate strategies to address climate change is reflected clearly in the findings of this report. It analyzes 20 major corporations and 14 specific governance actions that companies can take to address the issue. The report finds:

- **The world's major oil companies are poles apart.** European-based **BP** and **Royal Dutch/Shell** have pursued all 14 actions identified in the report's Climate Change Governance Checklist. (See **Table 1**.) By contrast, U.S.-based **ChevronTexaco**, **ConocoPhillips** and **ExxonMobil** have pursued only four or five of these actions.
- **The major auto companies are bunched in the middle.** Japanese-based auto manufacturers **Honda** and **Toyota** have pursued nine or 10 of the actions on the checklist. American-based **Ford Motor** and **General Motors** have pursued nine actions. **DaimlerChrysler** has pursued only five.
- **American electric utilities are at the back of the pack.** The analyzed utilities have pursued only seven governance responses to climate change, on average, which is the lowest average among the four industry groups analyzed in the report. (**American Electric Power** is the notable exception; it has taken 10 governance actions.)

- **Other big U.S. companies are spread across the spectrum.** Leaders in five other major industry groups have pursued a wide range of governance responses to climate change, from a low of four actions at **General Electric** to a high of 12 at **Alcoa** and **DuPont**.

Having deployed sophisticated environmental management systems, the profiled companies have the prerequisites in place to make further progress in addressing climate change. Yet without more emphasis on corporate governance programs to address the issue strategically, all of these companies' efforts will fall short of the fundamental goal of achieving emissions reductions. Indeed, as long as leading companies like **BP**, **Shell** and **American Electric Power** continue to derive virtually all of their profits from carbon-emitting fuels, even their work in addressing climate change is just beginning.

The issue now is one of leadership – at the board, CEO and shareowner level – to promote and implement responsible governance strategies to achieve emissions reductions, minimize the financial risks posed by climate change and maximize the investment opportunities that lie ahead.

Climate Change Governance Checklist

This report identifies 14 specific actions that companies are taking to implement governance responses to climate change. All 20 of the profiled companies are implementing at least four of these governance actions, which are divided into five categories. (See **Table 1** for company results.)

Board level:

1. Assign a committee of directors with direct oversight responsibility for environmental affairs.
2. Conduct a formal board-level review of climate change and monitor company response strategies.

Management level:

3. Place the chief environmental officer in a position to report directly to the chief executive officer or the CEO's executive committee.
4. Make attainment of greenhouse gas targets an explicit factor in employee compensation.
5. Have the CEO issue a clear and proactive statement about the company's climate change response and greenhouse gas control strategy.

Reporting:

6. Include a statement on material risks and opportunities posed by climate change in the company's securities filings.
7. Issue a sustainability report based on the Global Reporting Initiative or comparable "triple bottom line" format, which includes a discussion of climate change and a listing of the company's greenhouse gas emissions and trends.

Emissions data:

8. Calculate and register greenhouse gas emissions savings or offsets from company projects.
9. Conduct a system-wide inventory of the company's emissions and report the results directly to shareholders.
10. Establish an emissions baseline (dating back at least 10 years) by which to gauge the company's emissions trends.
11. Make projections of future emissions and set firm, company-wide targets to manage and control them.
12. Hire a third party auditor to certify there are no material misstatements of the company's emissions data.

Other actions:

13. Participate in an external voluntary greenhouse gas emissions trading program.
14. Purchase and/or develop renewable energy sources.

Investors will find the Climate Change Governance Checklist a useful starting point for evaluating companies, and the actions they are taking to respond to global warming. The checklist is by no means exhaustive. Pursuit of its objectives does not guarantee emissions reductions by corporations or financial rewards for investors. However, the checklist does lay the necessary groundwork for achieving these goals in a carbon-constrained world.

Board Oversight

Seventeen of the 20 profiled companies report they have conducted a board-level review of climate change, illustrating the growing importance of this issue.

- Only three companies do not report any board-level activity: **DaimlerChrysler, Southern** and **TXU**.
- The 17 companies that have conducted board-level reviews all have assigned board committees with explicit oversight of environmental affairs.

Because protecting the long-term assets of shareholders is a core fiduciary duty of corporate directors and climate change is a potential liability concern, shareholders are likely to increase calls for regular board-level reviews and management reports on this issue.

Table ES-1. 14-Point Climate Change Governance Checklist

	Board[1]		Management[2]			Report[3]		Emissions Data[4]					Other[5]		Total
COMPANY	COMM	REVIEW	LEVELS	COMP	CEO	10-K	SUST	OFFSET	RECENT	BASE	TARGET	CERT	TRADES	RENEW	Up to 14
BP	✔	✔	1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	14
Royal Dutch/Shell	✔	✔	1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	14
Alcoa	✔	✔	1	✔	✔		✔	✔	✔	✔	✔	✔		✔	12
DuPont	✔	✔	0		✔	✔	✔	✔	✔	✔	✔		✔	✔	12
AEP	✔	✔	1		✔	✔		✔	✔		✔		✔	✔	10
IBM	✔	✔	1				✔	✔	✔	✔	✔	✔		✔	10
Toyota	✔	✔	0		✔	✔	✔		✔	✔	✔			✔	10
Cinergy	✔	✔	1		✔	✔		✔	✔	✔				✔	9
Ford Motor	✔	✔	2		✔	✔	✔	✔	✔				✔	✔	9
General Motors	✔	✔	1				✔	✔	✔	✔			✔	✔	9
Honda	✔	✔	0		✔		✔		✔	✔	✔			✔	9
Int'l Paper	✔	✔	1				✔		✔				✔	✔	7
Southern			1			✔		✔	✔	✔				✔	6
Xcel Energy	✔	✔	1			✔		✔						✔	6
ChevronTexaco	✔	✔	1					✔						✔	5
ConocoPhillips	✔	✔	0			✔		✔							5
DaimlerChrysler			1			✔	✔		✔	✔					5
ExxonMobil	✔	✔	1						✔						4
General Electric	✔	✔	1											✔	4
TXU			1			✔		✔						✔	4
TOTALS (≤ 20)	17	17	19	3	9	12	11	14	15	11	8	4	7	17	—

1. Board issues include the existence of a committee with oversight responsibility for environmental affairs (COMM) and whether the board or board committee has conducted a formal review of the climate issue (REVIEW).
2. Management issues include the number of reporting levels between the top environmental officer and the chairman/CEO, with one or zero levels getting a check (LEVELS); whether attainment of greenhouse gas targets is an explicit factor in employee compensation (COMP); and any recent statement by the chair/CEO calling for a proactive response to climate change and greenhouse gas controls (CEO).
3. Reports include any statement on climate change in the 2001 Form 10-K or 20-F filing with the Securities and Exchange Commission (10-K), and publication of a sustainability report based on the Global Reporting Initiative Sustainability Reporting Guidelines or comparable format (SUST).
4. Emissions data includes registering any project-related savings or offsets (OFFSET), setting a company-wide emissions baseline for a year no later than 1992 (BASE), disclosing recent company-wide emissions data directly to investors (RECENT), setting company-wide emission targets for 2005 or later years (TARGET) and whether the company has employed a third party auditor to certify its greenhouse gas emissions (CERT).
5. Other issues include whether the company is participating in voluntary emissions trading schemes (TRADES) and whether it has installed, manufactured or purchased commercially available renewable energy sources (RENEW).

Disclosure on Climate Change

Though climate change and policies to address it pose material risks for investors, few of the profiled companies – some of the world's biggest greenhouse gas emitters – are making meaningful disclosures about this issue in their securities filings.

- Eight of the profiled companies make no mention of climate change or related issues (such as the Kyoto Protocol) in their 2001 Form 10-K or Form 20-F securities filings: **Alcoa**, **ChevronTexaco**, **ExxonMobil**, **General Electric**, **General Motors**, **Honda**, **IBM** and **International Paper**.
- Eleven of the companies make no mention of climate change in the front section of their 2001 annual reports. (Results are similar for 2002.)
- Climate change information presented in company environmental reports runs the gamut – from mere blurbs to detailed accounts of science, policy and company views.

The lack of disclosure in securities filings about climate change raises serious questions about the adequacy of reporting and enforcement of SEC rules.

The lack of disclosure in securities filings, especially in relation to company statements elsewhere about the risks posed by climate change, raises serious questions about the adequacy of reporting and enforcement of Securities and Exchange Commission rules that compel corporate disclosure of environmental risks to investors.

Executive Compensation

Only three of the profiled companies are making attainment of greenhouse gas emission targets a factor in compensation of their top executives and plant managers.

- These companies are: **Alcoa**, **BP** and **Royal Dutch/Shell**.
- All 20 companies have made other environmental links to compensation for at least some of their employees.

Corporate boards and shareholders can focus more management attention on this issue by urging adoption of compensation plans that tie executive pay to attainment of specific greenhouse gas reduction targets.

Greenhouse Gas Inventories and Reduction Targets

Though virtually all profiled companies are now measuring greenhouse gas emissions from their *facilities*, none have set baselines to control emissions from their *products*. (In the case of the auto industry, for example, 97 percent of emissions come from product use, i.e. driving, while only 3 percent come from manufacturing.) Eight of the companies have set targets to stabilize or reduce their *facility* emissions.

Recent Inventory

- As of 2002, 18 of the profiled 20 companies were tracking their facility emissions of carbon dioxide (and up to five other greenhouse gases listed under the Kyoto Protocol).
- **ExxonMobil** published its first emissions inventory figures in 2002.
- **Chevron Texaco** and **General Electric** will publish their first emissions inventories in 2003.
- **ConocoPhillips** is working out the terms of its first inventory as a combined company. (Conoco published its first inventory in 2001.)

Emissions Baseline and Trends

- Eleven of the 20 companies have set emissions baselines for their operations that date back at least 10 years.
- The companies that have not published such historical emissions data for shareholders are all U.S.-based firms: **American Electric Power, ChevronTexaco**, **ConocoPhillips**, **ExxonMobil**, **Ford Motor**, **General Electric**, **International Paper**, **TXU** and **Xcel Energy**.
- The biggest percentage reductions in greenhouse gas emissions reported since 1990 are by **DuPont** (65 percent reduction as of 2001), **IBM** (31 percent reduction as of 2001) and Alcoa (23.5 percent reduction as of 2002).

Future Targets

- Eight companies have not set any targets or projections for future greenhouse gas emissions: **ChevronTexaco**, **Cinergy**, **ConocoPhillips**, **DaimlerChrysler**, **ExxonMobil**, **General Electric**, **TXU** and **Xcel Energy**.
- Eight companies have set system-wide targets to control and reduce facility emissions, with target dates ranging from 2005 to 2012. These companies are: **Alcoa**, **American Electric Power**, **BP**, **DuPont**, **Honda**, **IBM**, **Royal Dutch/Shell** and **Toyota**. Many of these companies plan to engage in emissions trading to help meet their goals.
- Most companies' targets for reducing emissions are far more modest than goals they have already achieved. One exception is **Alcoa**, which believes it can achieve an additional 25 percent reduction in its greenhouse gas emissions by 2010 with breakthroughs in technology for smelting aluminum.

Numerous opportunities exist for climate change to become a structural element of ongoing corporate governance reform efforts.

New Governance Connections

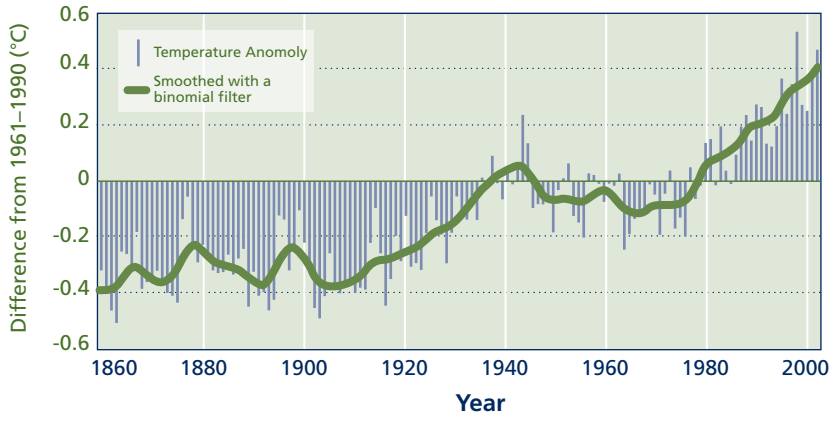
Through a convergence of market-led initiatives, lawsuits, new government requirements and rising shareholder pressure, several important corporate governance reforms are now being implemented. Numerous opportunities exist for climate change to become a structural element of these ongoing efforts. Here is how some of the connections could be made:

- ***Corporate boards:*** The Sarbanes-Oxley bill passed by Congress in 2002 requires more independent directors to serve on corporate boards. This law provides a unique opportunity for shareholders to elect more board candidates who are knowledgeable about global warming and sensitive to the need to address it.
- ***Executive compensation:*** Scrutiny of executive compensation plans is driving efforts to tie pay to long-term performance goals. This expanded time horizon provides an opportunity to make attainment of greenhouse gas reduction targets a component of such compensation plans.
- ***Proxy voting:*** New rules by the Securities and Exchange Commission require mutual funds to begin disclosing their proxy votes, starting in mid-2003. This requirement provides an opportunity for mutual fund investors to urge their fund managers to join other investing institutions that now see it as their fiduciary duty to support greater disclosure and responsible corporate action on climate change.
- ***Investment research:*** A recent legal settlement of banking conflicts of interest is putting greater separation between investment banks' brokerage and underwriting arms. Now equity analysts have more opportunity to ask critical questions and conduct objective analyses of companies' competitive positioning on climate change.

- ***Investor due diligence:*** With increased skepticism of companies' forward-looking statements, investors are attaching less credence to corporate quarterly earnings and putting more emphasis on corporations' fundamental, long-term business plans. Investors now have the basis to seek and demand more information from companies on competitive risks and opportunities posed by strategic issues like climate change.

Climate Change: Recent Developments

Figure ES-1 Global Temperature Trends: 1860–2002
Source: World Meteorological Organization



The 10 warmest years on record have all been in the last 15 years.

- ***2002 global temperature:*** The World Meteorological Organization reports that 2002 was the second warmest year on record, dating back to 1861. At 58.0 degrees Fahrenheit, the global average temperature in 2002 ranked slightly behind 1998, and just ahead of 2001. Globally, all 10 warmest years on record have been since 1987 – nine of them since 1990. The warming trend since 1975 has been at a rate of 3 degrees F per century, and is accelerating.[1]
- ***2002 extreme weather events:*** The cost of natural disasters exceeded $55 billion in 2002. Last year's disasters included the worst European floods in up to 650 years ($18.5 billion in losses), severe drought that struck parts of the United States, India, Africa and Australia (more than $5.6 billion in losses), and Typhoon Rusa that struck the Korean peninsula ($4.5 billion in losses). Insured property losses totaled $11.5 billion.[2]
- ***Rising costs of natural disasters:*** A 2002 report by the United Nations Environment Programme estimates that losses from natural disasters could reach $1.5 trillion over the next decade, up from $1 trillion over the last 15 years.[3] The president of the Reinsurance Association of America now says, "It is clear that global warming could bankrupt the [reinsurance] industry."[4]
- ***EPA report on U.S. effects of climate change:*** In May 2002, the U.S. Environmental Protection Agency issued its third national assessment on climate change. The report supported findings of 2001 reports by the National Academy of Sciences and the Intergovernmental Panel on Climate Change. The EPA report says that 5 to 9 degrees F of warming is likely in the United States in the 21st century. The report predicts that coastal communities, especially in the Southeast, will be at greater risk of storm surges. It also predicts that more rain is likely to fall in heavy downpours, resulting in more flash floods, water quality problems and spread of water-borne infectious viruses.[5]

- ***Progress on the Kyoto Protocol:*** Although President Bush formally withdrew U.S. participation from the Kyoto Protocol in June 2001, more than 170 other nations remain committed to the pact. The agreement seeks to reduce greenhouse gas emissions in industrialized nations by 5.2 percent below 1990 levels by 2012. As of March 2003, 106 countries had ratified the Kyoto Protocol, including nations that account for nearly 44 percent of industrialized country emissions. At the August 2002 United Nations World Summit on Sustainable Development, Russia signaled its intent to ratify the pact, which would bring its entry into force.[6]
- ***Bush administration plan:*** In February 2003, the Bush administration reiterated a voluntary plan to achieve an 18 percent reduction in the greenhouse gas "emissions intensity" of U.S. economic activity over the next 10 years. More than a dozen major U.S. industry groups are backing the White House plan. Critics say the plan amounts to little more than business as usual and would barely slow the prevailing rate of CO_2 emissions growth. While reducing emissions relative to economic output, the plan would allow the nation's overall carbon dioxide emissions to rise by 12 percent over the next 10 years. By 2012, the nation's projected carbon dioxide emissions would be 26.5 percent above 1990 levels. The Kyoto Protocol calls for the United States to achieve a 7 percent cut from 1990 levels by then.[7]
- ***Congressional activity:*** With Republicans taking control of both houses of Congress in the 2002 mid-term elections, prospects for enacting federal climate change legislation are diminished. Nevertheless, legislation has been introduced to "cap and trade" emissions, and congressional support for some form of regulation of greenhouse gases appears to be growing.[8]
- ***State level actions:*** In the absence of a federal mandate, some states are enacting their own legislation to control greenhouse gases. California passed a law in 2002 to control carbon dioxide emissions from the auto sector. New Hampshire and Massachusetts have adopted legislation to control electric utility CO_2 emissions. Thirteen states have adopted renewable portfolio standards to diversify future power supplies.[9]
- ***Surge in shareholder support for resolutions:*** The 2002 global warming campaign saw a tripling in the number of global warming resolutions filed and a doubling in average support for resolutions that came to votes, reaching 18.8 percent. The 2003 shareholder campaign saw another big jump in the number of global warming resolutions filed, to a record 31 proposals.[10]

Russia has signaled its intent to ratify the Kyoto Protocol, which would bring its entry into force.

1. Introduction

Corporate Governance and Climate Change: Making the Connection

When world business and government leaders gathered in Davos, Switzerland, in 2000 for a meeting at the World Economic Forum, they took a straw poll ranking the most pressing issues of the new century. Topping their list was a surprise choice – global warming – followed by a decline in business ethics and ineffective governance systems.[1]

Looking back, all three choices turned out to be prescient ones.

- The years since that meeting have been among the warmest on record.[2]
- A string of corporate misdeeds and accounting scandals has rocked world financial markets.[3]
- Calls for major governance reforms have swept the globe.[4]

Now new concerns about terrorism and international security are topping the headlines. Yet these seemingly unrelated issues share a common theme. They all speak to the need to find safer and more sustainable ways of governing our nations, conducting our business affairs and providing for our families and future generations.

In February 2003, British Prime Minister Tony Blair delivered a major policy address in which he warned that environmental degradation and global warming are "just as devastating in their potential impact" as weapons of mass destruction. "There will be no genuine security if the planet is ravaged," he explained. Blair went on to announce an ambitious new policy to cut the United Kingdom's carbon dioxide emissions by 60 percent over the next half-century.[5]

By contrast, the United States has no plan to reduce its greenhouse gas emissions, and President George W. Bush has pulled America out of an international treaty – the Kyoto Protocol – that would require reductions.

In March 2003, Royal Dutch Shell Chairman Philip Watts came to the United States to deliver his own major policy address on global warming. Watts declared that he had "seen and heard enough" to believe there is a problem coming from the burning of fossil fuels. Shell "stands with those who are prepared to take action to solve that problem now, before it is too late," he said.[6]

Watts added a note of caution, however. "Flying over for this speech, I had the distinct impression that the Atlantic is getting wider. Today the focus of that rift is on Iraq. But differences over environmental issues have hardened attitudes." With a $30 billion footprint in the United States and a similar presence in Europe, Shell has a vested interest in "bridging the differences that divide the U.S. and Europe on this issue," Watts concluded.

Governance Challenges Ahead

The stakes could not be greater. Will nations and multinational companies come together to bridge the policy gap on global warming and lead a new energy and technology revolution? Or will a fragmented and desultory response result in devastating and irreversible damage – not only to the global environment, but also for the world economy?

Fossil fuels have been the driver of economic growth for more than two centuries. A tipping point is coming soon when the world will start to look beyond these fuels to new energy sources like hydrogen and renewables. As this new era begins, the greatest investment opportunities will lie with those seeking fundamental changes in global energy use and production methods. The greatest risks will be with those intending to carry on with business as usual.

The greatest investment opportunities lie with those seeking fundamental changes in global energy use and production methods. The greatest risks are with those intending to carry on with business as usual.

This report focuses on 20 of the world's biggest corporate emitters of greenhouse gases and their efforts to integrate climate change into their business strategies and governance practices. As such, this report offers an early litmus test of how these companies are coming to terms with arguably the biggest governance challenge they face. In order to connect traditional forms of corporate governance and sustainable business practices that factor in climate change, three major hurdles must be overcome.

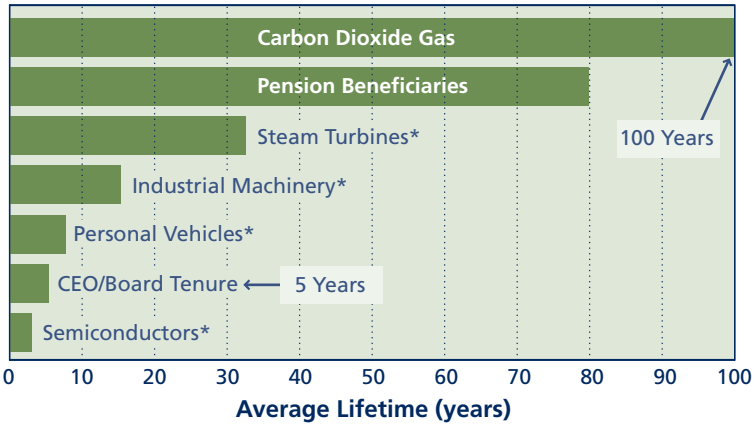
First, corporate emitters must accept the link between their operations and changes happening in the global environment. With an emerging scientific consensus and accumulating real-world evidence of climate change, fewer and fewer companies dispute this link – yet fewer still are taking concerted action to address it.

Second, responsibility must be assigned to control the ubiquitous sources of greenhouse gas emissions. On this vital policy aspect of governance reforms, accountability gaps remain – between product manufacturers and end-use consumers, corporate managers and institutional shareowners, even between developed and developing nations. While addressing global warming is, by necessity, a shared responsibility, it remains to be seen what role each of these players will assume. Mechanisms proposed under the Kyoto Protocol and the creation of related emissions reporting standards are helping to sort through some of these vital accountability issues.

Third, the gap between capital decisionmakers and the lasting global effects of their decisions must be overcome. This constitutes the greatest governance challenge. In almost every instance, chief decisionmakers retire from the scene long before the capital they deploy does. A typical corporate CEO looks out only three to five years when making a big capital investment, or about as long as he or she usually serves in office. The investment planning horizon may extend up to 15 years if the asset is particularly long-lived, like a power plant with a 30-year design life.[7]

Corporate chief executives and corporate directors turn over almost as fast as computer chips and faster than most people trade in their cars.

Figure 1.1 Capital Life Cycles vs. Natural Life Cycles



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

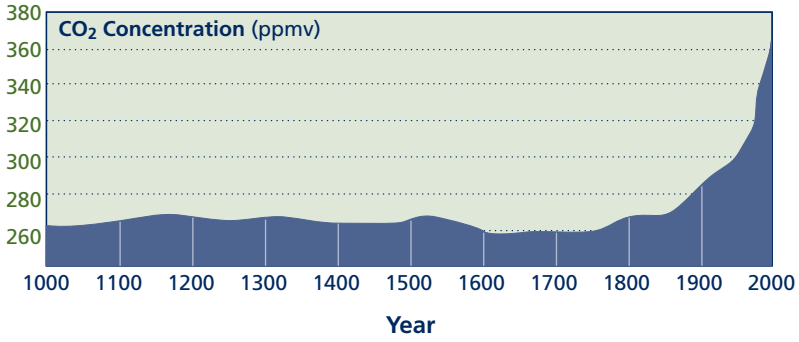
Given the persistence of carbon dioxide and other greenhouse gases in the atmosphere, however, the warming effects far outlast the operating life of the capital itself. **Figure 1.1** illustrates the extent of this gap. Corporate chief executives and corporate directors turn over almost as fast as computer chips and faster than most people trade in their cars. By comparison, the average term of service for a fossil energy plant is eight times longer, and carbon dioxide emissions from that plant last three times longer still – an average of 100 years.

Thus, bridging the governance gap on global warming is about finding intergenerational equity. Much like borrowing from Social Security to finance the government deficit is an extension of intergenerational credit, the carbon budget to which we are now adding emissions constitutes its own form of borrowing. The benefits accrued from current modes of production add to the "carbon burden" of future generations.

How will this intergenerational dilemma be resolved? Who can prevent emissions of past and present generations from causing permanent ecological and economic damage to future generations? The answer, at least in part, is to engage those entrusted with pension, endowment and insurance assets that are designed to last for generations. Such institutional investors have a fiduciary duty to advance governance reforms to ensure the viability of these assets and the world economy over the long term.

Figure 1.2 Atmospheric Levels of Carbon Dioxide over the last 1,000 Years

Source: U.S. Global Change Research Program (2000)



Concentrations of CO_2 in the Earth's atmosphere are higher than at any time in the last 420,000 years.

Climate Math

For business and investment leaders who are looking ahead, it behooves them to run the numbers on climate change, where carbon dioxide is the key indicator. As shown in **Figure 1.2**, the level of carbon dioxide in the atmosphere has risen from 280 parts per million since the start of the Industrial Revolution in 1750 to 371 ppm today – its highest level in at least 420,000 years. More than 1 degree Fahrenheit of warming has been detected in the last 100 years. Signs also are emerging of thinning ice caps, rising oceans, more severe storms and spreading tropical diseases.[8]

If fossil fuels continue as the dominant energy source, and their carbon emissions are not contained, atmospheric CO_2 could surpass 700 ppm by the end of the century – a level not seen in some 50 million years. Climate modelers still can't forecast precisely what might happen to the Earth's climate as CO_2 approaches these higher levels. But the world's leading atmospheric scientists, working under the auspices of the Intergovernmental Panel on Climate Change, estimate that the warming could be as much as 10 degrees in the 21st century – a far more rapid warming than has ever occurred in the history of human civilization.[9] The highest-probability warming forecast goes something like this:[10]

- At 450 ppm, a CO_2 level almost certain to be reached in the next 30 years, ecosystems already in retreat – coral reefs, mountain glaciers and coastal marshes being inundated by the sea – will likely succumb to rising global temperatures.

- At 550 ppm, a level that could be reached in the next 50 years, disruptions would become much more widespread and pronounced. Cycles of drought and torrential rain would likely intensify. Diseases once confined to tropical regions would spread throughout formerly temperate zones. Sea level rise would encroach on low-lying, coastal urban areas. Over a few centuries' time, the giant West Antarctic Ice Sheet could slip into the ocean, raising global sea levels by 15 feet or more.
- At 700 ppm, a level that could be reached in the next 100 years without major changes in the global energy mix, the warmer atmosphere would hold far more water vapor and further accelerate the warming in a positive feedback. Forests unable to migrate fast enough to cooler climes would die back. Vast savannas left in their wake might be too hot and dry to support productive farmland. Some agricultural regions could enter their own life struggle – fighting persistent drought, crop-damaging storms and rampant pest infestation.

The time frame in which to restore the security of long-lived financial assets and the stability of the Earth's climate system is virtually one and the same. The clock is already ticking, and the next 25 years are critical.

Figure 1.3 Estimated Annual Costs of Global Warming by 2050 (in $billions)

COMPANY	United States	European Union	Former Soviet bloc	China	The World
Human casualties and dislocations	-$17.1	-$22.9	-$4.1	-$5.5	-$86.3
Coastal protection, fishery losses	-8.1	-5.3	-2.4	-0.7	-49.7
Water management	-13.7	-14.0	-3.0	-1.6	-46.7
Agriculture and forestry	-8.4	-9.9	-6.8	-7.8	-42.5
Other ecosystems	-7.4	-9.8	-2.3	-2.2	-40.5
Energy industry	-6.9	-7.0	+0.7	-0.7	-23.1
Air pollution	-6.4	-3.5	-2.1	-0.2	-15.4
TOTAL ANNUAL COSTS	-68.0	-72.4	-20.0	-18.7	-304.2
Share of gross domestic product	1.4%	1.6%	0.8%	6.1%	1.5%

Source: Munich Re Geoscience Research Group. Assumes a doubling of atmospheric CO_2 levels by 2050.

As shown in **Figure 1.3**, the financial toll on public health, coastal infrastructure and natural resources is expected to be enormous, rising to perhaps 1.4 percent of U.S. gross domestic product and 1.5 percent of world GDP by the mid-21st century, according to Munich Re, the world's largest reinsurance company.[11] And the damage would be just beginning. Because of the lag time in the Earth's response to rising carbon dioxide levels, the warming would continue for several centuries, even after the atmosphere's CO_2 concentration achieves stabilization.[12]

To fix the problem, there will have to be a quantum shift in global energy use – one at least as large in scale as that which occurred in the 20th century. This technological fix poses investment risks and opportunities that may well be the greatest of this century.

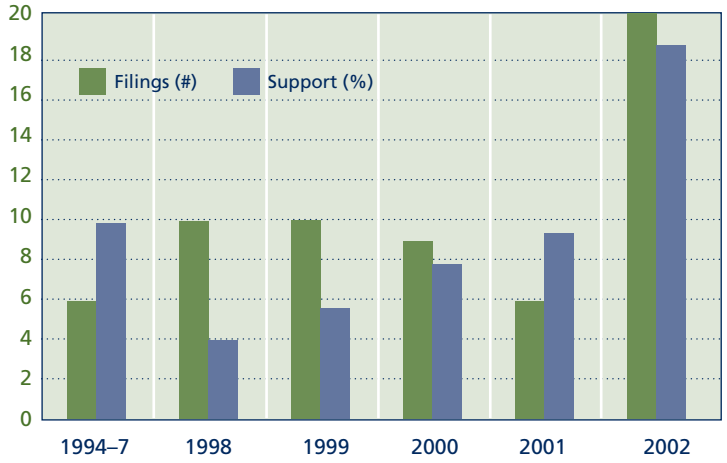
Governance Connection

Most important to institutional investors, the time frame in which to restore the security of long-lived financial assets and the stability of the Earth's climate system is virtually one and the same. The clock is already ticking, and the next 25 years are critical. Actions taken now and in coming years will have tremendous implications for whether these problems are solved or spiral out of control.[13]

Some institutions are already banding together in an effort to place global warming squarely on the corporate governance agenda. More than 35 institutions from Europe and the United States, controlling some $4.5 trillion in investment assets, have signed on to the Carbon Disclosure Project.[14] This project has contacted the world's 500 largest corporations on

behalf of these institutions to sound out their views on the potential business risks and opportunities of global warming, as well as the companies' efforts to quantify and reduce their greenhouse gas emissions. About 80 percent of the corporate respondents acknowledge the financial risks, but only 35 to 40 percent are taking actions to address them, according to the project's recently released findings. Moreover, an analysis of the findings by Innovest Strategic Value Advisors suggests that companies that manage their climate change risks well stand to preserve and even enhance shareholder value, while same-sector competitors that fail to manage these risks stand to lose shareholder value.[15]

Figure 1.4 Rising Support for Global Warming Shareholder Resolutions
Source: Investor Responsibility Research Center



The number of global warming resolutions tripled in 2002 and voting support levels doubled, reaching a record 18.8 percent support.

Institutions' growing interest and concern about global warming is also reflected in the rising level of shareholder proxy activity in the United States. The global warming shareholder campaign already is one of the longest running since the South Africa divestment campaign of the 1970s and 1980s – and has shown a surge in recent support. As shown in **Figure 1.4**, the number of global warming resolutions filed tripled in 2002 and voting support levels doubled, reaching a record 18.8 percent support.[16] A record 31 global warming resolutions (including five in Canada) have been submitted for the 2003 proxy season.[17] (See Appendix 3.) As institutions come to regard global warming as a core issue with potential material effects on the companies they own, more are seeing it as part of their fiduciary duty to seek greater disclosure and responsible actions by corporations.

Through 60 years of activism, institutions' main point of leverage in the governance arena has come from their substantial corporate ownership. Institutions now own more than half of the total equity outstanding in the United States. (Institutional ownership abroad is even higher – 80 percent in the United Kingdom, for example.) The proxy ballot is an embodiment of this shareholder power that commands the attention of corporate directors and top executives.

Shareholders' guiding principle has always been to align the interests of boards, managers and shareowners through the common denominator of raising share price value. As investing institutions have expanded their holdings and beneficiary base to represent a broad cross-section of the economy, however, they increasingly have become "universal owners."[18] Now the fate of their investments depends as much on the health of the overall economy as on the individual companies that make up their portfolios. Global warming takes this alignment of interests to a new level, linking investors' holdings to the well-being of the planet as a whole.

Longstanding corporate governance reforms have sought to keep corporate managers from becoming too insular in their thinking and protected from outside forces. High-profile proxy battles have focused on fundamental shareholder rights issues, such as:[19]

- Repeal of corporate takeover defenses.
- Replacement of classified boards with annually elected directors.
- More board representation and leadership by independent directors who are not tied to management.
- More compensation of top executives and directors in company stock and options rather than in cash.

Past efforts to align shareowner, board and management interests must be recast with longer-term goals. This provides a genuine opening to make climate change a core element of the emerging governance agenda.

The effect of these reform efforts has been to make the pursuit of shareholder value more of a common bond.

Yet as the events of the last few years have shown, such reforms have not always succeeded in reining in the propensity of managers to find short-term fixes and paper over structural problems. Sometimes there has been an unintended consequence of putting managers on a tighter leash and linking their pay to short-term share price performance. Facing pressure to produce immediate results, managers may abandon longer-term strategies intended to build shareholder value over time.

Global warming compounds this governance dilemma. One need only think of a car company with a large unfunded pension liability that is trying to stay profitable in a fiercely competitive industry. Though new fuel economy and carbon dioxide emissions controls may be just around the corner, the focus now is on expanding lines of high-profit, low-gas mileage sport utility vehicles. Sometimes, the need to survive in the short term trumps the desire to build positions to benefit the company and its shareholders over the long term. Balancing such short- and long-term priorities is a major part of the governance challenge posed by global warming.

Achieving Sustainable Governance

Achieving sustainable governance reforms will come by building on the momentum of the still-evolving corporate governance movement. New organizations are forming to advance corporate governance globally. The most influential of these is the International Corporate Governance Network, whose investing institutions collectively control about $12 trillion in global equities. Its objective is clear: to make securities markets and corporations more transparent and accountable for their actions in order to put the world economy on a more stable financial footing.[20] Such investing institutions recognize that past efforts to align shareowner, board and management interests must be recast with longer-term goals. This provides a genuine opening to make climate change a core component of the emerging governance agenda.

Through a convergence of market-led initiatives, lawsuits, new government requirements and rising shareholder pressure, important governance reforms are being instituted. The next step will be to make climate change a structural element of these ongoing efforts. Here is how some of the connections could be made:

- ***Board structure:*** The Sarbanes-Oxley bill passed by Congress in 2002 requires corporations to seek more independent (non-executive) directors to serve on their boards.[21] This provides a unique opportunity for shareholders to elect board candidates who are knowledgeable about global warming and sensitive to the need to take responsible actions to address it.

- ***Executive compensation:*** Intense media and shareholder scrutiny of executive compensation plans is driving efforts to tie pay to performance over longer vesting periods. Attainment of greenhouse gas targets could be made a component of such long-term compensation plans (as is the case already for several companies profiled in this report).
- ***Proxy voting:*** Under new rules issued by the Securities and Exchange Commission, mutual funds must begin to disclose their proxy votes for the first time in mid-2003.[22] Such disclosure will be put added pressure on mutual funds to join others in supporting global warming shareholder resolutions. Evaluation of how these funds vote will reveal whether they are satisfied with companies' expressed positions on climate change or whether they want more disclosure and more proactive responses.
- ***Investment research:*** As part of a legal settlement with the SEC and New York Attorney General Elliot Spitzer, investment banks are erecting greater barriers to avoid conflicts of interest between their brokerage and underwriting arms.[23] This greater separation of banking units gives equity analysts more leeway to ask critical questions and conduct objective analyses of companies' positioning on global warming – an issue they have barely broached thus far.
- ***Investor due diligence:*** Rising skepticism of companies' forward-looking statements is causing investors to put less credence in corporate quarterly results and forecasts and more emphasis on companies' fundamental, long-term business plans.[24] In securities filings, shareholder reports, analyst briefings and face-to-face meetings with corporate executives, investors now have the basis to seek and demand more information from companies on the competitive risks and opportunities posed by strategic issues like climate change.

Investors must recognize that addressing climate change is part of their fiduciary duty to protect the long-term value of their assets.

Will these corporate governance actions alone be enough to solve global warming? Given the magnitude and complexity of the problem, the answer is almost certainly not. National governments and intergovernmental bodies must provide the right operative framework for achieving market solutions – a sentiment expressed by many companies profiled in this report. In any event, investors must play their own governance role, recognizing that addressing climate change is part of their fiduciary duty to protect the long-term value of their assets.

The overarching goal is to instill forward-looking business practices and governance reforms that account for emerging global priorities while meeting current societal needs. This evolving process is sure to identify many new investment opportunities, uncover hidden costs and identify corporate winners and losers in the coming carbon-constrained world.

The one constant will be the desire to find the right mix of investments and governance strategies to ensure that assets are as safe, secure and wealth producing in the future as they have been in the past. Done right, this pursuit will also make the world safer, more secure and more sustainable in its wealth-producing capabilities – for the benefit of present and future generations. This is the essence of this sustainable governance challenge. Its application to corporate responses to climate change is described in detail in the findings of this report.

2. Report Overview

This report examines how 20 of the world's biggest corporate emitters of greenhouse gases are factoring climate change into their business strategies and governance practices. The 20 companies selected are among the largest publicly traded companies in the world. If the problem of global warming is to be solved, it will necessarily involve these companies. How they position themselves will have enormous implications not only for their shareholders and customers, but also for society at large. (See **Box 1** for more on the IRRC Profiled Companies.)

As leaders in their industries, these companies are being counted on to help set terms of responsible corporate action on climate change, and to be technological innovators to sustain high living standards in a carbon-constrained world. If they fail in this mission, the suffering and costs will be broad-based, as climate risk now is embedded in the economy and in virtually every investment portfolio. Failure to respond could affect these companies' very survival.

The 20 companies profiled have the greatest market capitalization and revenues in their industries, making them core holdings in most institutional investment portfolios.

At the moment, most of these companies – and especially those based in the United States – are not acting as if global warming poses an imminent financial and environmental threat. Though most have basic governance structures in place to guide their environmental management practices, few have adopted comprehensive governance reforms to address this issue strategically. Nevertheless, global warming is a problem these companies can help solve if they marshal their efforts. They are fortunate to have tremendous access to capital and human resources. These companies attract some of the world's most capable and highly skilled employees. They are guided by boards of directors who are at the top of their professions in business, government and academia.

Effective corporate responses to climate change will be built on a foundation of properly focused governance practices and well functioning environmental management systems. Only after this foundation is in place – at the board and management level – can companies expect to make meaningful progress in controlling their emissions and orienting their businesses for the future. This report focuses on the implementation of corporate governance practices to build a foundation for sustainable growth in a world facing new limits, new challenges and new investment opportunities.

About this report

The 20 companies analyzed in this report are market leaders. They have the greatest market capitalization and revenues in their respective industries, making them core holdings in institutional investment portfolios. Most have multinational enterprises. Fifteen of the companies are based in the United States, three are based in Europe and two are based in Japan. All companies but one (Toyota) reviewed and commented on the profiles presented in this report. ***(See pp. 22–24 for key findings of this report.)***

The Report Findings (starting on p. 25) focus in depth on the four main elements of corporate governance responses to climate change:

A. ***Board structure and environmental oversight,*** with a focus on climate policy and goals setting.

B. ***Management accountability and environmental auditing,*** with a focus on chain of command, compensation and CEO leadership.

C. ***Disclosure on climate change,*** with a focus on securities filings, annual reports and environmental reports.

D. ***Inventories of greenhouse gas emissions,*** with a focus on setting baselines and emissions targets.

The accompanying Company Profiles address each of these governance elements in detail. The profiles also summarize the companies' alternative energy product development efforts. (Such efforts include hybrid and fuel cell engines for vehicles, renewable power generation and research on hydrogen fuels.) The main purpose of this report is not to evaluate such development efforts, however, but to study the governance mechanisms that guide them.

The Climate Change Governance Checklist (see Table 1) identifies 14 specific governance actions that companies can take to address global warming, and which of these actions are being pursued at the profiled companies. Some of the more proactive statements, actions and goals by profiled companies are highlighted in boxes interspersed in this overview. (Not mentioned are some of the more recalcitrant statements that some companies have made.)

Investors will find the Climate Change Governance Checklist a useful starting point for evaluating companies and the actions they are taking to respond to global warming. The checklist is by no means exhaustive. Pursuit of these objectives does not guarantee emissions reductions by corporations or financial rewards for investors. However, the checklist items do lay necessary groundwork for achieving each of these goals in a carbon-constrained world.

Investors will find the Climate Change Governance Checklist a useful starting point for evaluating companies and the actions they are taking to respond to global warming.

Climate Change Governance Checklist

This report identifies actions that companies are taking to implement governance responses to climate change. All of the profiled companies are taking at least four of these actions. The 14 action items are divided into five categories:

Board level

1. Assign a committee of directors with direct oversight responsibility for environmental affairs.
2. Conduct a formal board-level review of climate change and monitor company response strategies.

Management level

3. Place the chief environmental officer in a position to report directly to the chief executive officer or the CEO's executive committee.
4. Make attainment of greenhouse gas targets an explicit factor in employee compensation.
5. Have the CEO issue a clear and proactive statement about the company's climate change response and greenhouse gas control strategy.

Reporting

6. Include a statement on material risks and opportunities posed by climate change in the company's securities filings.
7. Issue a sustainability report based on the Global Reporting Initiative or comparable "triple bottom line" format that includes a discussion of climate change and a listing of the company's greenhouse gas emissions and trends.

Emissions data

8. Calculate and register greenhouse gas emissions savings or offsets from company projects.
9. Conduct a system-wide inventory of the company's emissions and report the results directly to shareholders.

10. Establish an emissions baseline (dating back at least 10 years) by which to gauge the company's emissions trends.
11. Make projections of future emissions and set company-wide, firm targets and timetables to manage and control them. (Emissions intensity targets are not included.)
12. Hire a third party auditor to certify there are no material misstatements of the company's emissions data.

Other actions

13. Participate in an external voluntary greenhouse gas emissions trading program.
14. Purchase and/or develop renewable energy sources.

Without more emphasis on reducing emissions at the product level, companies may win the battle to lower the 'emissions intensity' of production and still lose the larger war on cutting greenhouse gas emissions.

Checklist Results:

Table 1 provides a summary of the actions that each of the 20 profiled companies is taking on the Climate Change Governance Checklist. (The data reflects securities filings, activities and reports issued in 2002.):

- **4 actions:** ExxonMobil, General Electric and TXU.
- **5 – 7 actions:** ChevronTexaco, ConocoPhillips, DaimlerChrysler, International Paper, Southern and Xcel Energy.
- **9 actions:** Cinergy, Ford Motor, General Motors and Honda.
- **10 – 12 actions:** Alcoa, American Electric Power, DuPont, IBM and Toyota.
- **All 14 actions:** BP and Royal Dutch/Shell.

As the distribution of results shows, there is a wide disparity in companies' governance responses to climate change, with corporate boards and top executives at select firms more proactively engaged on this issue than the rest. While some companies are moving well along the path of adopting these governance practices to address climate change, many others are still near the beginning of this path.

Areas in which most companies are making progress are in measuring and managing greenhouse gas emissions at their facilities (especially in relation to rates of production). In several industry sectors, however, the lion's share of emissions comes *after* manufacturing and during product use. In the auto industry, for example, manufacturing emissions represent only 3 percent of total carbon emissions over the life of a vehicle. (The other 97 percent come from driving.)[1] Similarly, in the petroleum industry, production and refining emissions equal only about 15 percent of carbon emissions from customer use of petroleum products.[2] Hence, end-use applications for fossil fuels – to power vehicles, electronic devices and the like – have a much greater bearing on overall greenhouse gas emissions than emissions from manufacturing.

With effective deployment of environmental management systems, the profiled companies have the prerequisites in place to make further progress. But without more emphasis on corporate governance actions to address this issue strategically, especially at the product level, companies may win the battle to reduce the "emissions intensity" of production and still lose the larger war on reducing greenhouse gas emissions overall. President Bush's climate action plan as much as concedes this point by allowing a 12 percent rise in the nation's projected carbon dioxide emissions over the next 10 years.[3]

Table 1. Climate Change Governance Checklist

	Board[1]		Management[2]			Report[3]		Emissions Data[4]					Other[5]		Total
COMPANY	COMM	REVIEW	LEVELS	COMP	CEO	10-K	SUST	OFFSET	RECENT	BASE	TARGET	CERT	TRADES	RENEW	Up to 14
BP	✔	✔	1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	14
Royal Dutch/Shell	✔	✔	1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	14
Alcoa	✔	✔	1	✔	✔		✔	✔	✔	✔	✔	✔		✔	12
DuPont	✔	✔	0		✔	✔	✔	✔	✔	✔	✔		✔	✔	12
AEP	✔	✔	1		✔	✔		✔	✔		✔		✔	✔	10
IBM	✔	✔	1				✔	✔	✔	✔	✔	✔		✔	10
Toyota	✔	✔	0		✔	✔	✔		✔	✔	✔			✔	10
Cinergy	✔	✔	1		✔	✔		✔	✔	✔				✔	9
Ford Motor	✔	✔	2		✔	✔	✔	✔	✔				✔	✔	9
General Motors	✔	✔	1				✔	✔	✔	✔			✔	✔	9
Honda	✔	✔	0		✔		✔		✔	✔	✔			✔	9
Int'l Paper	✔	✔	1				✔		✔				✔	✔	7
Southern			1			✔		✔	✔	✔				✔	6
Xcel Energy	✔	✔	1			✔		✔						✔	6
ChevronTexaco	✔	✔	1					✔						✔	5
ConocoPhillips	✔	✔	0			✔		✔							5
DaimlerChrysler			1			✔	✔		✔	✔					5
ExxonMobil	✔	✔	1						✔						4
General Electric	✔	✔	1											✔	4
TXU			1			✔		✔						✔	4
TOTALS (≤ 20)	17	17	19	3	9	12	11	14	15	11	8	4	7	17	—

1. Board issues include the existence of a committee with oversight responsibility for environmental affairs (COMM) and whether the board or board committee has conducted a formal review of the climate issue (REVIEW).
2. Management issues include the number of reporting levels between the top environmental officer and the chairman/CEO, with one or zero levels getting a check (LEVELS); whether attainment of greenhouse gas targets is an explicit factor in employee compensation (COMP); and any recent statement by the chair/CEO calling for a proactive response to climate change and greenhouse gas controls (CEO).
3. Reports include any statement on climate change in the 2001 Form 10-K or 20-F filing with the Securities and Exchange Commission (10-K), and publication of a sustainability report based on the Global Reporting Initiative Sustainability Reporting Guidelines or comparable format (SUST).
4. Emissions data includes registering any project-related savings or offsets (OFFSET), setting a company-wide emissions baseline for a year no later than 1992 (BASE), disclosing recent company-wide emissions data directly to investors (RECENT), setting company-wide emission targets for 2005 or later years (TARGET) and whether the company has employed a third party auditor to certify its greenhouse gas emissions (CERT).
5. Other issues include whether the company is participating in voluntary emissions trading schemes (TRADES) and whether it has installed, manufactured or purchased commercially available renewable energy sources (RENEW).

The Climate Change Governance Checklist above is by no means all encompassing of the governance measures that companies can employ to address global warming. (For example, it does not include participation in collaborations with environmental groups, which many companies are pursuing.) Moreover, this checklist sets a low threshold to register company responses to certain actions. (For example, it gives credit to *any* mention of climate change in a company's security filings and *any* efforts to register emissions savings or offsets.) Pursuit of these actions does not ensure that a company will achieve effective responses to climate change – no more than a well-implemented environmental management system guarantees reductions in environmental impacts and liabilities. What the Climate Change Governance Checklist does show, however, is that companies establishing reputations as leaders on this issue have done so in part through the governance programs they have implemented.

1. Selection of IRRC Profiled Companies

The 20 companies selected for analysis in this report are generally very large emitters of greenhouse gases. Virtually all are leaders in their industries, based on revenues, and most have multinational enterprises.

With respect to greenhouse gas emissions, 15 of the 20 profiled companies are the largest U.S. emitters of carbon dioxide in three major carbon-emitting industries:

- **Five largest-emitting auto companies,** based on U.S. sales of cars and light-duty trucks: **General Motors, Ford Motor, DaimlerChrysler, Toyota and Honda**.[4]
- **Five largest-emitting investor-owned electric utilities**, based on their 2000 power plant emissions: **American Electric Power, Southern, TXU, Xcel Energy and Cinergy**.[5]
- **Five largest-emitting oil and gas companies,** based on U.S. sales and global production: **ExxonMobil, Royal Dutch/Shell, BP, ChevronTexaco and ConocoPhillips**.[6]

Five other large manufacturing companies have been selected for analysis. These selections are based more on their size and market capitalization than for the amount of greenhouse gas emissions they produce (though in some cases their emissions are substantial). These companies are: **Alcoa** (metals), **DuPont** (chemicals), **General Electric** (diversified manufacturing), **IBM** (information technology) and **International Paper** (forest products).

As shown in **Table 2**, the IRRC Profiled Companies had combined revenues of $1.7 trillion in 2001, and as of May 2002 they had a combined market capitalization of $1.8 trillion. All but one of the profiled companies rank among the 500 largest publicly traded corporations in the world, based on the Financial Times Global 500 Index. Four of the companies rank in the top 10 of the FT Global 500 index; 11 rank in the top 100. All 15 U.S.-based companies are part of the Standard & Poor's 500 index of large capitalization companies. Reported emissions figures in Table 2 are expressed in million metric tons (MMT) of carbon dioxide equivalent and are global emissions figures from company operations, unless otherwise noted. Product emissions are not included in these totals.

Table 2. IRRC Profiled Companies

COMPANY	FT 500 Global Ranking	2000 Facility Emissions (CO_2 MMT)	2001 Revnues[1] ($millions)	2001 Income[2] ($millions)	May 2002 Market Cap ($ millions)
General Electric Corp.	1	Not reported	125,913	13,684	372,089
Exxon Mobil Corp.	3	122.9	191,581	15,320	299,820
BP PLC	8	83.7	174,218	8,010	200,794
Royal Dutch/Shell Group	10	101.0	135,211	10,852	189,913
IBM Corp.	12	3.1	85,866	7,723	179,213
Toyota Motor Corp.	28	5.5	107,443	4,177	106,367
ChevronTexaco Corp.	32	Not reported	99,699	3,288	96,345
DuPont Corp.	79	36.3	25,370	4,339	47,068
DaimlerChrysler AG	81	7.5	136,256	(590)	46,022
ConocoPhillips Corp.[3]	95	Not reported	56,984	3,563	42,281
Honda Motor Co.	98	0.5 (Japan)	55,253	2,722	41,405
General Motors Corp.	127	10.1 (U.S)	177,260	601	33,817
Alcoa Corp.	140	43.0	22,859	908	31,988
Ford Motor Co.	158	9.3	162,412	(5,453)	28,663
International Paper Co.	209	13.1	26,363	1,204	20,762
Southern Co.	232	128.0	10,155	1,262	18,545
American Electric Power	298	168.0	61,257	971	14,859
TXU Corp.	306	66.7	27,927	677	14,506
Xcel Energy Corp.	499	93.5	15,028	795	9,370
Cinergy Corp.	Not ranked	63.3	12,922	422	5,958

1. 2001 revenue figures are as reported by Fortune magazine for its annual Fortune 500 rankings.
2. 2001 income figures are as reported by Hoover's Inc. online information service.
3. ConocoPhillips figures are aggregated from 2001 results of Conoco and Phillips Petroleum. The merger of the two companies took place in August 2002.

2. Comparing Companies' Greenhouse Gas Emissions

For perspective on the relative size of greenhouse gas emissions among the 20 companies profiled in this report, the following comparisons and observations are made, drawing on data from the second column of **Table 2**.

Electric utilities – The two biggest profiled emitters are the largest coal-burning U.S electric utilities:

- **American Electric Power** and **Southern** had combined carbon dioxide emissions of 296 million metric tons (MMT) in 2000, more than 25 percent of all estimated facility emissions among the profiled companies.
- The three other profiled electric utilities, **Cinergy**, **TXU** and **Xcel Energy**, had combined CO_2 emissions of nearly 224 MMT in 2000.
- **As a group, these five utilities accounted for nearly half of the facility emissions among the profiled companies – and about 8 percent of total U.S. CO_2 emissions in 2000.**

Oil and gas companies – The next two largest emitters among the profiled companies are two of the world's largest oil and gas companies:

- **ExxonMobil** and **Royal Dutch/Shell** had combined emissions from their global facilities totaling 224 MMT in 2000.
- As a group, facility emissions from the five oil and gas companies accounted for more than one third of the facility emissions among profiled companies – and about 2 percent of global CO_2 emissions in 2000. This does not include emissions from their products sold, which are roughly eight times higher than emissions from their facilities.

Other large emitters in 2000 were:

- **Alcoa** with 43 MMT of emissions.
- **DuPont** with 36 MMT.
- **International Paper** with 13.1 MMT (although much of its emissions are offset by forest growing plantations).

Auto companies – The automakers have smaller facility emissions than most other profiled companies (although emissions from their vehicles eclipse virtually all other sources, as described below):

- **General Motors** reported 10.1 MMT of emissions from its U.S. facilities in 2000.
- **Ford Motor** reported 9.3 MMT of emissions from its global facilities in 2000.
- **DaimlerChrysler** reported 7.5 MMT from its global facilities in 2000.
- The Japanese automakers reported the least emissions from their facilities. **Toyota** reported only 1.7 MMT from its global operations in 2000 (or 5.5 MMT when including emissions from 55 affiliated companies). **Honda** had 0.5 MMT in emissions from its facilities in Japan. (It has not made a comparable estimate for its global facilities.)

Facility emissions tell only a small part of the story for the world's leading automakers, however. Tailpipe emissions of carbon dioxide from the vehicles they manufacture are a far greater source of emissions. In its *2000 Corporate Citizenship Report*, **Ford Motor** made a calculation of combined annual emissions from its facilities as well as estimated emissions from the vehicles sold to customers around the world. Considering that each gallon of gasoline consumed releases 19.4 pounds of carbon dioxide into the atmosphere, Ford concluded that its on-the-road vehicle fleet accounted for 97 percent of total emissions from its global operations in 2000 – some 400 MMT of annual carbon dioxide emissions in all.[7] To put Ford's automotive emissions in perspective, they are equal to more than twice as much as the power plant emissions from **American Electric Power**, whose fleet of coal-fired generating facilities makes it the largest utility source of CO_2. Emissions from **General Motors'** on-the-road vehicle fleet are larger still, but the company has not quantified them on a global basis.

Key Findings of this Report

1. GENERAL: Most profiled companies have adopted basic governance reforms to guide their environmental management practices, but few have developed comprehensive, proactive governance response strategies to address the financial risks and opportunities posed by climate change.

The basic governance reforms that most profiled companies have adopted are as follows:

- ***Accountability:*** Seventeen corporate boards have charged committees of directors with explicit oversight of the company's environmental affairs. At the management level, 15 chief environmental officers report directly to members of the company's executive committee; four report right to the chairman and/or CEO.
- ***Compensation:*** All profiled companies include broad measures of environmental performance as a factor in compensation of their facility managers; most include it as a factor in compensation of top executives as well.
- ***Audit programs:*** All profiled companies have longstanding environmental audit programs. Nearly all have begun tracking their facility greenhouse gas emissions.
- ***Emissions reporting:*** Eighteen companies are now disclosing their facility greenhouse gas emissions. A growing number are using industry protocols and engaging outside parties to provide for consistent and verifiable emissions disclosure.

Seventeen of the 20 profiled companies report that they have conducted a board-level review of global warming.

In sum, important prerequisites are in place to establish effective corporate programs to manage and control greenhouse gas emissions. The issue now is more one of leadership – at the board, CEO and shareowner level – to implement and promote responsible governance strategies to achieve actual emissions reductions, minimize the financial risks and maximize the business opportunities posed by climate change.

2. BOARD STRUCTURE AND ENVIRONMENTAL OVERSIGHT: Seventeen of the 20 profiled companies report that they have conducted a board-level review of global warming. Each of these companies has a board committee charged with oversight of the company's environmental affairs.

- Three companies do not report any board-level review: **DaimlerChrysler**, **Southern** and **TXU**. These companies do not have board-level environmental committees.
- The extent of board-level engagement at the other 17 companies varies greatly. Some boards are involved in drafting and affirming climate change policy statements and monitoring progress towards emissions-related goals. Others merely receive inventory data as part of the board audit function.
- Shareholder resolutions seeking board-level reviews and reports on climate change have surged in recent years, with a record 31 proposals filed in 2003 (including five in Canada). In 2002, voting support for such resolutions doubled, reaching a record 18.8 percent.

Because protecting the long-term assets of shareholders is a core fiduciary duty of corporate directors and climate change is a potential liability concern, shareholders are expected to increase their calls for annual board-level reviews and management reports on this issue.

3. MANAGEMENT ACCOUNTABILITY AND ENVIRONMENTAL AUDITING: **Only three of the profiled companies are making attainment of greenhouse gas emission targets a factor in compensation of their top executives and plant managers,** even though all 20 companies have other environmental links to compensation for at least some of their employees.

- Three companies have linked attainment of greenhouse gas emission reduction targets to employee compensation: **Alcoa**, **BP** and **Royal Dutch/Shell**.
- Virtually all of the companies have chief environmental officers in high-ranking positions that enable them to participate in executive compensation plans and contribute to top management discussions. The chief environmental officer at 19 of the 20 companies is no more than one reporting level below the CEO. At four companies, the chief environmental officer reports directly to the chairman and/or CEO: **ConocoPhillips**, **DuPont**, **Honda** and **Toyota**.

As responding to climate change becomes more of an urgent business priority, the environmental function will be integrated further into top management echelons, and chief environmental officers will have more direct access to CEOs. Shareholders can promote this process by calling for adoption of compensation plans that tie executive pay to attainment of greenhouse gas reduction targets that are quantifiable and verifiable.

4. DISCLOSURE ON CLIMATE CHANGE: Though climate change and policies to address it pose material risks, few of the profiled companies make meaningful disclosures in their securities filings. This lack of disclosure, especially in relation to company statements in other venues, raises serious questions about the adequacy of environmental risk statements appearing in securities filings.

Though climate change and policies to address it pose material risks, few of the profiled companies make meaningful disclosures in their securities filings.

- Eight of the profiled companies make no mention of climate change or related issues (such as the Kyoto Protocol) in their 2001 Form 10-K or Form 20-F securities filings: **Alcoa**, **ChevronTexaco**, **ExxonMobil**, **General Electric**, **General Motors**, **Honda**, **IBM** and **International Paper**.
- Eleven of the profiled companies make no mention of climate change in the front section of their 2001 annual reports. (Two of these companies make brief references to the issue in the Management Discussion & Analysis section at the back of these reports.)
- The most consistent place to find management presentations on climate change is in corporate environmental and sustainability reports, issued by nearly all of the profiled companies. In these reports, management often makes declarations about the serious risks posed by climate change. However, the scale of information runs the gamut, from mere blurbs to detailed accounts of science, policy and company views.

The disparity in how companies communicate the risks of climate change in environmental reports relative to securities filings (where little or no mention is the norm) provides fodder to those who want the Securities and Exchange Commission to better enforce rules that compel corporate disclosure of environmental risks.

5. INVENTORIES OF GREENHOUSE GAS EMISSIONS: Though virtually all profiled companies are now measuring greenhouse gas emissions from their *facilities*, none have set baselines to control emissions from their *products*. Only eight have set firm targets to stabilize or reduce their facility emissions.

RECENT INVENTORY

- As of 2002, 18 of the 20 companies were tracking operational emissions of carbon dioxide and up to five other greenhouse gases listed under the Kyoto Protocol.
- **ExxonMobil** published its first emissions inventory figures in 2002.
- **ChevronTexaco** and **General Electric** will publish their first emissions inventories in 2003.
- **ConocoPhillips** is working out the terms of its first inventory as a combined company. (Conoco published its first inventory in 2001.)

European-based oil companies are pursuing all 14 actions, while U.S.-based oil companies to date have pursued only four or five actions.

EMISSIONS BASELINE AND TRENDS

- Eleven of the 20 companies have set emissions baselines for their operations that date back at least 10 years. (None have for their products.)
- The companies that have not published such historical emissions figures for shareholders are all U.S.-based firms: **American Electric Power**, **ChevronTexaco**, **ConocoPhillips**, **ExxonMobil**, **Ford Motor**, **General Electric**, **International Paper**, **TXU** and **Xcel Energy**.
- The biggest percentage reductions in greenhouse gas emissions reported since 1990 are by **DuPont** (65 percent reduction as of 2001), IBM (31 percent reduction as of 2001) and **Alcoa** (23.5 percent reduction as of 2002).

FUTURE TARGETS

- Eight companies have not made any targets or projections for future emissions: **ChevronTexaco**, **Cinergy**, **ConocoPhillips**, **DaimlerChrysler**, **ExxonMobil**, **General Electric**, **TXU** and **Xcel Energy**.
- Eight companies have set system-wide targets to reduce and control future emissions, with target dates ranging from 2005 to 2012. These companies are: **Alcoa**, **American Electric Power**, **BP**, **DuPont**, **Honda**, **IBM**, **Royal Dutch/Shell** and **Toyota**. Many of these companies plan to engage in emissions trading to help meet their reduction goals.
- Most companies' future targets for reducing emissions are far more modest than goals they have already achieved. One exception is **Alcoa**, which believes it can achieve an additional 25 percent reduction in its greenhouse gas emissions by 2010 with breakthroughs in inert anode technology for smelting aluminum.

6. CLIMATE CHANGE GOVERNANCE CHECKLIST: The distribution of results shows a wide disparity in companies' governance responses to climate change. Most striking is that European-based oil companies are pursuing all 14 actions on the checklist, while U.S.-based oil companies to date have pursued only four or five actions. One should not assume that companies taking all 14 actions have reached the end of this governance process, however. On the contrary, as long as leading companies like BP and Shell derive virtually all of their profits from the sale of carbon-emitting fuels, even their work in addressing climate change is just beginning. More than anything, the checklist suggests the degree to which corporate directors and executives are engaged on this issue and their willingness to be transparent about their companies' emerging response strategies to climate change.

Report Findings

The Report Findings are divided into four sections, addressing the main elements of corporate governance responses to climate change:

A. ***Board structure and environmental oversight,*** with a focus on climate policy and goals setting.

B. ***Management accountability and environmental auditing,*** with a focus on chain of command, compensation and CEO leadership.

C. ***Disclosure on climate change,*** with a focus on securities filings, annual reports and environmental reports.

D. ***Inventories of greenhouse gas emissions,*** with a focus on setting baselines and emissions targets.

Each section of the Report Findings identifies specific governance actions that companies can take – and in many cases *are* taking – as components of the **Climate Change Governance Checklist**. Here, in detail, are the results.

Global warming presents a new risk management and disclosure challenge for corporate directors.

A. Board Structure and Environmental Oversight

The board of directors is the governing body of a corporation. It sets the company's strategic direction and tracks its progress. It selects, compensates, monitors and evaluates the CEO and the senior management team. It has a fiduciary duty to protect the assets of shareholders by managing long-term risks and opportunities. Global warming presents a new risk management challenge for corporate directors.[8]

Corporate directors have a duty to ensure the integrity and clarity of company reporting to key stakeholders, in accordance with generally accepted accounting principles. Thus, global warming presents a new disclosure challenge as well. Ultimately, corporate directors are accountable to the shareholders that elect them. For U.S.-based corporations, shareholders elect a combination of company officers and outside (non-employee) directors. In Europe, a portion of board seats typically is reserved for union representatives. In Japan, virtually all directors are company employees.[9]

The board structure of companies profiled in this report is representative of those adopted by most large corporations based in these geographic regions, according to corporate data collected on 1,500 companies by IRRC's Corporate Governance Service.[10] As shown in **Table 3**:

- Twelve of the 20 companies, or 60 percent, elect their directors annually. The others have classified boards, elected to serve either two- or three-year terms.
- All but one of the U.S. firms (**General Electric**) have a majority of independent directors serving on their boards (using a definition of independent directors by IRRC's Corporate Governance Service).[11]
- Fourteen of the profiled companies have boards consisting of at least two-thirds independent directors. Board members with allegiance to energy-intensive industries are common among the independent directors represented.
- The average age of board members is 59.5 years old, and the average board tenure is nearly 7.5 years (which is about two years longer than the average for U.S. publicly traded companies).
- Board members have a range of professional experience (in descending frequency) as corporate chief executives and officers (including retired company executives), financial advisors, consultants (including former government officials), academics and attorneys.

Table 3. Board Structure and Environmental Oversight

COMPANY	Board Elections	Board Independence	Board Avg. Age/Tenure	Board Environmental Oversight Committee	Climate Review
Alcoa	3-yr. term	9 out of 10	61/6	Public Issues	Yes
AEP	Annual	11 out of 13	60/5	Policy	Yes
BP	3-yr. term	11 out of 15	60/8	Ethics/Env. Assurance	Yes
ChevronTexaco	Annual	11 out of 15	63/8	Public Policy	Yes
Cinergy	3-yr. term	8 out of 9	57/8	Public Policy	Yes
ConocoPhillips	3-yr. term	14 out of 16	60/6	Public Policy	Yes
DaimlerChrysler	Annual	See Note 1.	55/8	None assigned	No
DuPont	Annual	11 out of 13	59/8	Environmental Policy	Yes
ExxonMobil	Annual	10 out of 12	64/10	Public Issues	Yes
Ford Motor	Annual	8 out of 14	59/11	Env. & Public Policy	Yes
General Electric	Annual	6 out 16	58/5	Public Responsibilities	Yes
General Motors	Annual	7 out of 12	58/4.5	Public Policy	Yes
Honda	Annual	1 out of 36	56/6	World Environment	Yes
IBM	Annual	11 out of 14	61/8	Directors & Corp. Gov.	Yes
Int'l Paper	3-yr. term	9 out of 11	63/9	Env. & Public Policy	Yes
Royal Dutch Shell	Staggered	17 out of 22	61/4	Social Responsibility	Yes
Southern	Annual	6 out of 9	57/7	None assigned	No
Toyota	2-yr. term	0 out of 57	56/6	Environmental	Yes
TXU	Annual	6 out of 9	66/14	None assigned	No
Xcel Energy	3-yr. term	11 out of 12	57/7	Operations & Nuclear	Yes

1. DaimlerChrysler has a 20-member board of supervisors and a 13-member board of management. Shareholders elect 10 members of the board of supervisors; employees select the other 10.

- All of the companies have board audit committees or similar oversight functions. With the exception of DaimlerChrysler, Honda and Toyota, all have board nominating and compensation committees as well.

Climate Change Governance Checklist Item 1 – Board environmental oversight

Given the heavily industrialized nature of these companies, environmental issues figure prominently in their board structure. A high percentage has committees with explicit oversight responsibility for environmental affairs.

- Seventeen of the 20 profiled companies, or 85 percent, have board committees with explicitly defined environmental oversight functions, compared to less than 20 percent of the S&P 500 universe, according to IRRC's Corporate Governance Service.
- Nine of the profiled companies have "Public Policy" or "Public Issues" committees that address environmental matters among a range of social issues.
- Six of the companies have oversight committees where "Environment" is listed explicitly in the board committee's title.

Environmental board committees are relatively new to the governance scene. Except for **General Motors**, which set up its Public Policy Committee in 1970, and **International Paper,** which created its Environment and Public Policy Committee in 1985, the inception date for all of these committees has been since 1989. The Exxon Valdez oil spill in 1989 and the launch

3. Examples of Board Committee Activity on Climate Change

- ***Alcoa*** – ***The Public Issues Committee*** (created in 2002) oversees the company's climate change policy. In 2000, Alcoa adopted greenhouse gas reduction targets as part of an expanded commitment to sustainable development. Chairman and CEO Alain Belda announced expansion of the targets in 2002, with major new goals set for 2010.
- ***BP*** – ***The Ethics and Environment Assurance Committee*** (created in 1997) affirmed BP's climate change policy in 1998 and amended it in 2002. BP benchmarks its greenhouse gas emissions against other oil companies and conducts a cost-benefit analysis of its actions. For 1999-2001, BP estimated a lifetime net benefit of $650 million from its greenhouse gas reduction efforts.
- ***ChevronTexaco*** – ***The Public Policy Committee*** (created by Chevron in 1989) as well as Chairman and CEO David O'Reilly reviewed the company's climate change policy in 2002. By 2005, ChevronTexaco plans to incorporate greenhouse gas assessments into all capital projects and strategic business planning.
- ***ConocoPhillips*** – ***Conoco's Board Audit and Compliance Committee*** reviewed Conoco's newly drafted climate change policy in 2001 (a year before its merger with Phillips Petroleum). Management heralded the policy, along with a new verifiable greenhouse gas inventory system, as the company's most important environmental achievement of 2001. (ConocoPhillips is now formulating its own climate change policy.)
- ***DuPont*** – ***The Environmental Policy Committee*** (created in 1992) is kept apprised of significant developments regarding climate change and greenhouse gas emissions, energy efficiency, renewable energy and biotechnology. Business heads set annual waste and emissions reduction goals. DuPont implements the most cost-effective projects, seeking to achieve 80 percent of potential emissions reductions for 20 percent of the cost of all proposed projects. DuPont issued its first climate change policy statement in 1994.
- ***IBM*** – ***The Directors and Corporate Governance Committee*** (created in 1993) has conducted a formal evaluation of climate change and related energy issues. The committee reviews emissions and energy data annually. For 1990–2001, IBM's energy efficiency programs saved more than $660 million in energy costs.
- ***Royal Dutch/Shell*** – ***The Social Responsibility Committee*** (created in 1997) has reviewed Shell's climate change policy; the Committee of Managing Directors oversees its implementation. Shell has been factoring carbon costs in all of its major projects since 2000 "for optimal profitability in a carbon-constrained world."

of the CERES Principles in 1990 were among the catalysts that spurred the creation of new board environmental committees. Such committees strive for greater legal compliance on environmental matters, but increasingly also seek to tie this function to broader corporate goals and reputation.

Climate Change Governance Checklist Item 2 – Board climate review

Climate change presents a key test for corporate boards – and particularly board environmental and public policy committees. A growing number of U.S. states and foreign governments are passing laws to regulate carbon dioxide and other greenhouse gas emissions.[12] Accordingly, some boards now regard this as a compliance-driven issue that merits compulsory review. Board evaluations of climate change also can be forward-looking, however, to anticipate not only new government policies, but also consumer and investment trends that could affect the company over time. Accordingly, such overarching reviews are far more demanding of directors and consequential to the prospects of the company. Fundamentally, these reviews are about assessing competitive and financial risks and building strategies to exploit new business opportunities while minimizing potential costs of climate change.

Given the stakes involved with climate change, it is not surprising that most of the profiled companies have had their full boards or designated board committees conduct a review of the issue. In fact, IRRC has been able to confirm that 17 of the 20 companies have done so.[13] Three companies indicate that their boards have not taken up the issue in any capacity. As shown in **Table 3**:

- The three companies that indicate that no members of their boards have held formal discussions on climate change are the same ones that lack any board-level environmental or public policy committee – **DaimlerChrysler, Southern** and **TXU**.
- Of the 17 companies with environmental or public policy board committees, all have conducted full board or board committee reviews of the climate change issue.
- The extent of board-level engagement at these 17 companies varies greatly. Some boards are involved in drafting and affirming climate change policy statements and monitoring progress toward emissions-related goals. (See **Box 3**.) Others merely receive inventory data as part of the board audit function.
- Some companies take their lead on this issue from chairmen and CEOs who are extensively involved in the ongoing policy debate. (See **Box 6** on p. 36 for examples.)

Swiss Re recently began asking companies to characterize their formal responses to climate change in renewal forms for directors and officers liability insurance.

Given that a core fiduciary duty of corporate boards is to protect the long-term assets of shareholders and that climate change is a potential liability concern, shareholders are requesting more board-level reviews and reports on this issue. In fact, such requests have become a major focus of shareholder activity in recent years. (See **Box 4** and **Table 4**.) Elements of comprehensive board reviews can include briefings by outside technical experts, evaluations of the company's strategic risks and opportunities, benchmark assessments against industry competitors and best practice in other industries, and creation of formal lines of management accountability to monitor and report on company progress in addressing the issue.

In support of such board activity, Swiss Re, the world's second largest reinsurance provider, recently began asking companies to characterize their formal responses to climate change in renewal forms for directors and officers liability insurance.[14]

4. Global Warming Shareholder Resolutions

In 2003, for the tenth consecutive year, concerned shareholders are asking companies for information about their plans to address global warming and their assessment of risks and opportunities posed by emerging government efforts to limit greenhouse gas emissions. Proponents have filed a record 31 climate change resolutions, up from 20 filings in 2002. (See Appendix 3.) The shareholder campaign is one of the longest running since the South Africa divestment campaign of the 1970s and 1980s – and is fast becoming one of the most widely supported as well.[15]

Properly submitted shareholder resolutions appear in company proxy statements, which are circulated to all shareowners in advance of a company's annual meeting.[16] Though such resolutions are not binding, they prompt top executives and board members to draft and approve statements in response (and almost always in opposition) to these proposals. **For some companies, such proxy statements provide the most detailed and current assessment from management on the global warming issue.**

Shareholder proponents sometimes achieve their greatest victories by agreeing to withdraw their resolutions before they come to votes. In these instances, management agrees to pursue a course of action favored by the shareholder proponents or to carry on constructive dialogue. Shareholder proponents achieved a significant victory in 2000, when **Ford Motor**, then a new endorser of the CERES Principles, agreed to their request that it pull out of the Global Climate Coalition. (The GCC was then the leading industry lobbying group opposed to the Kyoto Protocol and government controls on greenhouse gas emissions.) After Ford's pullout, **DaimlerChrysler** and **General Motors** quickly withdrew their memberships from the GCC as well, as did **Southern** and **Texaco**. (Except for DaimlerChrysler, these companies also were facing global warming shareholder resolutions that were subsequently withdrawn.) Within three months of Ford's announcement, the GCC ended its corporate memberships program – and in 2002 the GCC disbanded altogether.[17]

As shown in **Table 4**, ten of the 20 companies profiled in this report have received shareholder proposals addressing global warming-related issues, and eight of these companies have brought such resolutions to votes. Table 4 summarizes proxy activity on global warming (and the related issue of renewable energy development) dating back to 1994, when this shareholder campaign began.

- **A total of 62 resolutions on global warming issues were filed in 1994 – 2002, of which 26 came to votes.** Twenty-eight of the resolutions were withdrawn. The Securities and Exchange Commission omitted eight others from company proxy statements on technical grounds.
- Fifteen resolutions on related energy issues were filed in 2000 – 2002, of which 12 came to votes.
- **The average support level for the global warming resolutions has more than doubled over the period**, rising to a record 18.8 percent support level in 2002. This ranks as the highest support level ever for a shareholder campaign addressing an environmental topic.
- **The 2003 proxy season will be a record year for shareholder activity on climate change**, with 31 resolutions filed at 28 companies. Company targets include eight oil companies, six electric utilities, four vehicle and engine manufacturers, and ten other companies in a range of industries.

Three primary reasons for the recent rise in filings and support levels for global warming resolutions are as follows:

- **More institutions have adopted formal proxy voting guidelines on global warming**, recognizing that the science is now well established, the risks are tangible and being raised as a proxy issue at a growing number of companies' annual meetings.[18]
- **The ranks of campaign proponents have swelled** and now include some state and municipal pension funds as well as longtime corporate governance shareholder activists, such as Robert A.G. Monks.[19]
- **Some proxy advisory services that once urged votes against these resolutions have changed their recommendations in favor of these proposals**, which was an important factor in the jump in support levels in 2002.[20]

These trends suggest that more institutions are coming to see global warming as an issue that could have a material impact on the companies they own, and increasingly they feel they have a fiduciary duty to support more disclosure from management on this issue. The trend toward rising numbers of resolutions and voting support levels seems likely to continue.

In 2003, a record 31 global warming and renewable energy resolutions have been filed. (See Appendix 3.)

Table 4. Checklist of Global Warming & Renewable Energy Proposals

Year and Company	Outcome
1994	
Allegheny Energy	16.6% support
General Public Utilities	5.3
Niagara Mohawk Power	19.4
1995	
Allegheny Energy	Withdrawn
Niagara Mohawk Power	12.1
1996	
General Public Utilities	9.0
1997	
General Public Utilities	4.9
Southern	Withdrawn
Texas Utilities	Withdrawn
1998	
Allstate	Omitted
AIG	Omitted
Chubb	Omitted
Cigna	Omitted
DuPont	Withdrawn
Exxon	4.6
Ford Motor	3.0
General Motors	4.6
General Re	Omitted
Hartford Financial	Omitted
1999	
Allegheny Energy	7.4
Amoco	Meeting not held
Chevron	7.4
Exxon	5.3
Ford Motor	2.3
General Motors	4.6
Mobil	5.2
Reynolds Metals	7.0
Southern	Withdrawn
Texaco	Withdrawn
2000	
Allegheny Energy	8.8
Chevron	8.8
Cinergy	Withdrawn
CSX	Withdrawn
Duke Energy	Withdrawn
Eastman Chemical	7.0
ExxonMobil (renewables)	6.1
Ford Motor (CAFÉ)	Withdrawn
General Motors (CAFÉ)	Withdrawn
Goodyear	Omitted
Norfolk Southern	6.8
Texaco	Withdrawn

Year and Company	Outcome
2001	
Allegheny Energy	12.4% support
Chevron	9.6
Constellation (renewables)	5.8
CSX	Withdrawn
Duke Energy (renewables)	4.2
Eastman Chemical	7.9
Exelon (renewables)	Omitted
ExxonMobil (renewables)	8.9
Norfolk Southern	7.9
Progress Energy (renewables)	6.3
Southern (renewables)	9.5
Union Pacific	Withdrawn
2002	
AES	Withdrawn
Allegheny Energy	8.3
American Electric Power	Withdrawn
American Standard	29.6
Bristol-Myers Squibb	Withdrawn
Campbell Soup	Withdrawn
Caterpillar	Withdrawn
ChevronTexaco	Withdrawn
CSX	Withdrawn
Dominion (renewables)	5.8
Duke Energy (renewables)	4.3
Eastman Chemical	29.4
Exelon	Withdrawn
Exelon (renewables)	6.6
ExxonMobil (renewables)	20.2
General Electric	19.2
General Mills	Withdrawn
General Motors	Omitted
Occidental Petroleum	18.9
Pinnacle West (assess risk)	6.5
Southern (renewables)	9.2
Southern	Withdrawn
Sprint	7.3
United Technologies	Withdrawn
Unocal	Withdrawn
Wisconsin Energy	Withdrawn

SUMMARY

Year	No. Filed	No. Voted	Support
1994–99	**29 climate**	**16**	**7.4%**
2000	**9 climate**	**4**	**7.8**
	3 energy	**1**	**6.1**
2001	**6 climate**	**4**	**9.4**
	6 energy	**5**	**6.9**
2002	**20 climate**	**6**	**18.8**
	6 energy	**6**	**8.8**

B. Management Accountability and Environmental Auditing

Corporate managers are responsible for conducting the daily affairs of a corporation and pursuing activities to raise shareholder value. Top company officers are accountable to the board of directors, who act as shareholders' agents. Within this corporate hierarchy, environmental protection traditionally has played a supporting engineering and compliance-driven role. But that role is changing as evidence mounts that pollution control and waste minimization efforts can lead to greater efficiency, productivity and corporate profitability. Global warming expands the environmental dimension still further, as increased energy efficiency and resource utilization become keys to growth in a carbon-constrained world.

The combination of new, more stringent government regulations and emerging business opportunities is elevating the environmental function within most large companies, and the trend will likely continue as addressing global warming becomes more of an urgent business priority. The ascension of environmentally focused executives merges important concepts of corporate governance and sustainable development, with the idea that corporations' prime responsibility is to manage natural and financial resources to protect the environment and promote economic development for present and future generations.[21]

As environmental issues – and climate change in particular – become more of a strategic focus for corporations, the environmental function is likely to become integral to the oversight duties of the executive committee.

While corporate environmental positions are gaining in stature, there is not one set way that companies manage their environmental affairs. The profiled companies employ many different management techniques.[22]

- Nine of the companies profiled, including the five oil companies, combine management responsibility for the environment with health and safety.
- By contrast, the five utility companies and four of the five auto companies keep the environmental function separate from health and safety.
- The electric utilities tend to couple environment affairs with regulatory compliance, while the auto companies tend to couple it with powertrain development and vehicle assembly.
- Companies also apportion their environmental personnel differently between corporate headquarters and operating facilities. Generally speaking, the top environmental official at the profiled firms oversees a corporate staff of a few dozen to a few hundred employees – with five to 10 times as many environmental, health and safety professionals employed at dispersed company facilities.

Climate Change Governance Checklist Item 3 – Chain of command

From a policymaking standpoint, what matters most is not the number of personnel working beneath the chief environmental officer, but the number of reporting levels above in the chain of command. Though companies need flexibility in how they set up their management hierarchy, it stands to reason that environmental issues will be heard more often and resonate more clearly when the chief environmental officer reports directly to the company's CEO or members of his top management team. That is, in fact, how the chain of command is structured at nearly all of the profiled companies. As shown in **Table 5**:

- Four of the 20 companies have their top environmental officer reporting directly to the chairman and/or chief executive officer. These include **Honda** and **Toyota**, whose top environmental officers also serve on their employee-led board of directors. The other two companies are **ConocoPhillips** and **DuPont**.
- Fifteen companies have just one reporting level between their top environmental officer and the chairman and/or CEO. (The intermediary typically holds the title of executive or senior vice president.)

Protection of the environment is one of the compensation-based objectives for at least some employees at all of the companies profiled.

Table 5. Management Accountability & Environmental Auditing

COMPANY	Report Levels to CEO	Environmental Link to Compensation	Current Audits Began	ISO 14001 Program	CEO Statements/ Activities
Alcoa	1	All levels[2]	1990	Yes	Set new target in 2001
AEP	1	Plant managers	1992	No	Heads BRT task force[1]
BP	1	All levels[2]	1995	Yes	First CEO to warn of risk
ChevronTexaco	1	All levels	1981	Equivalent	API Chairman[3]
Cinergy	1	Top execs, mgrs	1988	No	Wants CO_2 legislation
ConocoPhillips	Direct	All levels	1990s	Equivalent	Set new policy in 2001[4]
DaimlerChrysler	1	All levels	1995	Yes	None identified
DuPont	Direct	All levels	1989	Some sites	Wants credit for action
ExxonMobil	1	All levels	1992	Equivalent	Skeptic of science, policy
Ford Motor	2	Top execs, mgrs	1973	Yes	Autos part of problem
General Electric	1	All levels	1990s	No	None identified
General Motors	1	All levels	1972	Yes	None identified
Honda	Direct	Not disclosed	ND	Yes	Zero emissions goals
IBM	1	Mgrs, other emp	1990	Yes	None identified
Int'l Paper	1	All levels	1990	Yes	None identified
Royal Dutch Shell	1	All levels[2]	1978	No	Invest in renewables
Southern	1	All levels	1992	No	None identified
Toyota	Direct	Not disclosed	1963	Yes	Technology innovation
TXU	1	All levels	1987	Equivalent	None identified
Xcel Energy	1	All levels	1989	Some sites	None identified

1. Linn Draper heads the Business Roundtable Environment, Technology and the Economy Task Force.
2. BP and Royal Dutch/Shell have greenhouse gas targets as a factor in compensation of top executives and operating managers. Alcoa has targets for employees in its Primary Metals Group.
3. David O'Reilly is Chairman of the Board of the American Petroleum Institute.
4. Conoco statement prior to merger with Phillips Petroleum.

- **Ford Motor**'s top environmental officer is two reporting levels below the chairman/CEO.

As environmental issues – and climate change in particular – become more of a strategic focus for corporations, the environmental function is likely to become more integral to the oversight duties of the executive committee, with the chief environmental officers serving as a committee member and reporting directly to the CEO and/or chairman of the board.

Climate Change Governance Checklist Item 4 – Environmental link to compensation

Employee compensation typically seeks to connect the performance of top executives and other key personnel to achievement of prime business objectives. In well-structured plans, the performance objectives are clearly stated, with explanations of how employees' compensation will move up or down in relation to attainment of these goals.[23] Protection of the environment is one of the compensation-based objectives for at least some employees at all of the companies profiled in this report. (It is beyond the scope of this report to distinguish

5. Examples of Corporate Management Practices on Climate Change

- ***Alcoa*** formally linked environmental accountability with performance expectations and compensation in 2000. Its Primary Metals Group has linked compensation to reductions in perfluorocarbon emissions. It has hired third parties to verify its emissions baseline and annual inventory of greenhouse gases. Alcoa is exploring internal trading mechanisms to enhance its greenhouse gas reduction strategies.
- ***DuPont*** created a senior management level Environmental Leadership Council in the early 1990s. Business heads use a Corporate Environmental Planning database to aid in the selection of waste- and emissions-reducing projects that meet defined cost-benefit criteria. The Vice President of Safety, Health and Environment evaluates the performance of each business unit towards achieving corporate environmental commitments and goals.
- ***Ford Motor*** has a Strategy and Business Governance Committee comprised of senior managers. This committee is charged with setting the company's overall strategy on climate change, including analyzing potential targets and product scenarios for achieving emissions reductions.
- ***Honda*** established a World Environment Committee in 1995 to implement three-year action plans set by its Executive Committee. This "Plan, Do, Check, Action" process is carried out by regional environmental committees and individual departments. Honda launched its "Green Factory" planning concept in 1997 to promote environmentally sound manufacturing practices, including conserving energy and reducing carbon dioxide emissions. Its goal is to achieve "zero load on the environment" through recycling and use of renewable resources.
- ***International Paper*** launched a senior-level climate change task force in 2002. The task force submits annual emissions data (including CO2 emissions) to the board of directors for review. International Paper has conducted an extensive analysis of the carbon cycle as it relates to the manufacture of forest products.
- ***Toyota*** formed a "Global Warming Prevention Council" in 1998, made up of 25 Toyota group companies and affiliates to meet the CO2 emission targets set by the Kyoto Protocol. Toyota intends to meet the goal by raising production efficiency throughout the company and its affiliates. An intranet Environmental Information Network System was developed in 2001 to evaluate environmental actions and promote performance improvements at some 60 companies subject to Toyota's consolidated environmental management.

between quantifiable performance-based measurement criteria and other more subjective factors in determining the environmental component of compensation.) As shown in **Table 5**:

- All 20 companies report that environmental performance is a factor in setting compensation of their plant managers.
- Fourteen of the companies say the environment is a factor in setting compensation for other employees as well, including top executives and environmental, health and safety personnel. In some instances, the compensation link to the environment is made to all employees.
- **BP** and **Royal Dutch/Shell** are two companies that make attainment of greenhouse gas emission reduction targets a factor in compensation of their top executives and plant managers. In addition, **Alcoa** has linked compensation of its employees in its Primary Metals Group with reductions in perfluorocarbon (PFC) emissions in its smelting operations. (PFCs are a potent greenhouse gas.)

In the future, more companies may seek – or be asked by their shareholders – to tie the compensation of top executives and plant managers to the attainment of greenhouse gas performance targets that are quantifiable, verifiable and integral to broader corporate performance measures and goals.

Environmental audits and management systems

As the environmental function gains stature within corporations, environmental audits have become an increasingly vital means of assuring compliance with government regulations and measuring performance against company goals. Such audits are a necessary component of employee compensation schemes that factor in environmental performance. Increasingly, audits play a role outside of the company as well.

All of the profiled companies have well-established environmental audit programs. The automakers led this effort with programs launched up to 40 years ago, in the case of **Toyota**. Many U.S. companies launched formal environmental audit programs with passage of major environmental legislation, such as the Clean Air Act of 1970 and the Clean Water Act of 1972. (Note: Some of the original audit inception dates listed in **Table 5** predate those listed for current audit programs.)

Sometimes the clearest indication of a corporation's views and commitments on climate change comes from statements made by the CEO.

Historically, environmental audits have been compliance-based, with monitoring by the company's legal department and by the board audit committee (unless another committee has been assigned oversight responsibility). Because of the legal nature of these audits, very few companies have made these audit results public. The audit function is evolving, however, as a growing number of companies want to be able benchmark their environmental performance in ways that are accessible to shareholders and other stakeholders – customers, suppliers, community members and the like. To be credible in such attestations, companies typically invite input from outside groups. More companies are turning to third parties to review and certify environmental audit results.[24]

ISO 14001: Third party certification is becoming especially popular for corporations' environmental management systems. The ISO 14001 standard, introduced in 1996 by the International Organization for Standardization, based in Geneva, Switzerland, has consolidated leading industry standards and practices into universally applicable environmental quality standards. Under the guiding principle that "the system is the solution," companies can use the ISO 14001 process to certify that they have effective systems to manage and control their impacts on the environment.[25] (In the United States, third-party certification of ISO 14001 is voluntary; companies can "self-register" if they wish.) At present, an ISO working group is working on a new management standard for reporting greenhouse gas emissions.[26] As shown in **Table 5**:

- Eleven of the 20 profiled companies are certifying their production facilities (and sometimes those of their suppliers) according to the ISO 14001 environmental management standard. These include the five auto companies profiled.
- Three oil companies and one electric utility are implementing environmental management programs that have been certified as being consistent with the ISO 14001 standard, but are not seeking ISO 14001 certification. The American Petroleum Institute has developed a Compendium of Emissions Inventory Methodologies that companies can use to implement energy and greenhouse gas emissions inventory systems.[27]

As discussed in Section D of the Report Findings, third-party certification programs will be helpful – if not essential – to companies that wish to document their progress in controlling greenhouse gas emissions.

Climate Change Governance Checklist Item 5 – CEO statements on climate change

Sometimes the clearest indication of a corporation's views and commitments on climate change come from statements made by top company officers, especially by the board chairman and chief executive officer. Though public silence by such officials is not always an indication of a lack of company attention (as quiet discussions can go on behind closed doors), public pronouncements in speeches and reports tend to illuminate management's basic approach to the issue. **Box 6** features statements from CEOs of five profiled companies that have taken leadership stands on the climate change issue. Further context for remarks by four of these CEOs is provided below:

- **BP**'s Lord John Browne was the first oil industry CEO to break ranks with his oil industry brethren. In 1997, Browne delivered a major policy address at Stanford University in which he acknowledged the threat posed by global warming and pledged to achieve reductions in his company's greehouse gas emissions. Browne returned to Stanford University in 2002 to provide an update on BP's progress and announce goals for the next 10 years.[28]
- **Ford Motor**'s William Clay Ford Jr. took a similar step in the auto industry in 2000, shortly after assuming the role of company chairman. In Ford's 2000 *Corporate Citizenship Report*, he acknowledged the role that automobiles play in global warming and pledged to raise the fuel economy standards of sport utility vehicles, whose contribution to carbon dioxide emissions has been growing fast.[29] Also like Browne, Ford took his company out of the Global Climate Coalition (GCC), a leading industry group opposed to greenhouse gas controls. Within months, General Motors and DaimlerChrysler made similar pledges about their SUVs and also withdrew from the GCC.
- **Cinergy**'s James Rogers has distanced himself from many other utility industry CEOs by calling for federal legislation that recognizes carbon dioxide as an emissions control source. Rogers testified before Congress in 2001 about the inadequacy of proposed legislation that fails to address CO_2, and has reiterated his statements in several company reports to shareholders.[30]
- **DuPont**'s Charles (Chad) Holliday is remaking the image of this 200-year old chemical giant by casting it as a "sustainable growth" company. Along with Philip Watts, chairman of **Royal Dutch/Shell**, Holliday is co-author of a book on sustainable development, called *Walking the Talk*, written in conjunction with the World Business Council on Sustainable Development. The book argues that solving environmental and social problems is a prerequisite to future economic growth and globalization.[31]

Some other CEOs of companies profiled in this report have been active on the climate change issue, especially in capacities involving industry trade associations. For example:

- **ChevronTexaco**'s David O'Reilly is the current chairman of the American Petroleum Institute. In 2001, the institute launched a reporting protocol that oil and gas companies can use to implement energy and greenhouse gas emissions inventory systems. ChevronTexaco has become a strong advocate of this reporting system.[32]
- **American Electric Power**'s E. Linn Draper heads the Business Roundtable's Environment, Technology and the Economy Task Force. (The Business Roundtable is comprised of CEOs from 150 leading U.S. corporations.) In February 2003, Draper's task force announced "Climate RESOLVE" as a new cross-sector initiative for companies to control greenhouse gas emissions voluntarily and publicly report on their progress.[33]

6. Examples of Progressive Statements by CEOs on Climate Change

- ***BP:*** "What was the logic of the position we adopted [in 1997]? First, it was clear that reputable science cannot be ignored. The science wasn't complete – but science is never complete. Scientific knowledge is always partial and as Karl Popper said, its conclusions are always provisional. No one could say definitively that they knew the precise causes and consequences of climate change. But they knew enough to say that there were long-term risks and that precautionary action was necessary if we were to avoid a greater risk – of the evidence mounting to the point where draconian action was unavoidable. In 1997, we accepted that logic." – **Lord John Browne, Chairman, Stanford University speech, March 2002**
- ***Cinergy:*** "Most coal companies and many utilities are saying CO2 legislation will be the death of coal. But CEO Jim Rogers says, without it, coal's future is bleak. 'Who will make a decision to invest a billion dollars in a new coal plant if you can only guess about future regulations?'…. [A] new power plant bill that fails to address CO2 will be as dated in five years as current law is today." – **James Rogers, Chairman and CEO, 2001 Environmental Progress Report**
- ***DuPont:*** "Our goal… is to become a sustainable growth company – one that creates shareholder and societal value while decreasing our environmental footprint along the value chains in which we operate. As part of our transformation we have worked hard on reducing our environmental impacts and have set aggressive targets to be attained by 2010 in the areas of energy use, greenhouse gas reductions and the use of renewable energy and feedstocks." – **Charles Holliday, Chairman and CEO, Sustainable Growth 2002 Progress Report**
- ***Ford Motor:*** "There is emerging consensus around climate change. This stands out from other environmental issues because of its potentially serious consequences and its direct relationship to our industry. The global temperature is rising and the evidence suggests that the shift is being affected by human activity, including emissions related to fossil fuels used for transportation. While uncertainties remain…, We believe it is time to take appropriate action." – **William Clay Ford, Jr., Chairman, 2000 Corporate Citizenship Report**
- ***Toyota:*** "Pressing environmental issues that could easily jeopardize global motorization, such as gas emissions from automobiles and global warming caused by carbon dioxide, are spurring the car industry to urgently seek technological innovation…. We will continue to lead the auto industry in the 21st century by focusing our efforts on next-generation technologies particularly in the field of environmental technology. Our hybrid technology has already established its leading status in the automobile industry…. We also intend to steadily advance our independent development of fuel cells…." – **Hiroshi Okuda, Chairman, 2002 Annual Report**

Of course, not all company CEOs are asserting themselves in ways to hasten controls on greenhouse gas emissions. On the contrary, some CEOs still question the science underpinning global warming and are concerned that a rush to take action might cause more economic harm than good. Perhaps no CEO has been more outspoken in expressing this view than **ExxonMobil**'s Lee Raymond. Raymond has steadfastly maintained that natural variability in the Earth's climate could overwhelm any human factors that might be causing global warming, and that renewable technologies will not make meaningful contributions to the world's energy supply for decades. Raymond's blunt remarks have been a lightening rod for criticism. Investment and activist groups organized Campaign ExxonMobil in 2000 to put pressure on the company to modify its public statements on global warming and its views on renewable energy development. The campaign has coordinated the filing of a half-dozen shareholder resolutions at the company in recent years.[34]

Initially, Raymond seemed unfazed, telling shareholders at the company's 2001 annual meeting that ExxonMobil favors "additional scientific research on climate change" and that it would be 30 to 40 years before renewable energy infrastructure "could be built up from its current level and start contributing significantly to our energy supplies." Raymond went on to

say, "We think the best path forward is through attention to longer-range technological approaches and economically justified voluntary actions, as well as a strong program of climate science."[35] But after support for Campaign ExxonMobil's renewable energy resolution jumped to 20 percent support in 2002, Raymond softened his stance on at least one key issue. He announced in February 2003 that ExxonMobil now supports mandatory reporting of carbon dioxide emissions – based on reliable, effective procedures – as an essential precondition to policies that set emission controls.[36]

C. Disclosure on Climate Change

For investors, the most essential form of corporate disclosure is in securities filings that assess material risk. While voluntary reporting initiatives and CEO statements on climate change are welcome, they do not necessarily speak to the issue that matters most to investors – how will global warming and policies to address it affect valuations in these companies? Among the securities filings analyzed for this report, disclosure on climate change remains scant.

The lack of risk disclosure on climate change ranks as the greatest common failing among the profiled companies.

In the United States, the U.S. Securities and Exchange Commission is responsible for enforcing tenets of generally accepted accounting principles (or GAAP) for companies traded on U.S. exchanges. In securities filings, publicly traded companies are required to provide information to shareholders and prospective investors about their financial condition, business outlook and competitive risks they face. Regulation S-K lays out the framework for company disclosure.[37]

With respect to disclosure of material events and uncertainties – such as those posed by climate change – Item 303 of Regulation S-K provides guidance for inclusion of information in the Management Discussion and Analysis section of company financial reports. Item 303 requires companies to disclose instances where "a trend, demand, commitment, event or uncertainty is both presently known to management and reasonably likely to have material effects on the registrant's financial condition or results of operation."[38] The materiality threshold is discretionary, but as a rule of thumb it generally compels reporting of events and uncertainties that have the potential to change financial results by 5 percent or more of annual earnings or 10 percent or more of annual capital expenditures.[39]

Climate change and policies to address it raise the specter of such material risk, especially for large, energy-intensive companies like those profiled in this report. The risk comes in many forms – from exposure to physical changes caused by global warming, changing market conditions, new sources of competition and, perhaps most important, government regulation that constrains future greenhouse gas emissions – potentially affecting energy use and modes of production. Because the Kyoto Protocol has not yet entered into force, however, and there is no corresponding U.S. federal legislation, some companies say they lack the basis to provide meaningful estimates about the material risks posed by climate change. Yet the issue clearly is a "known uncertainty" to these companies, to use the parlance of Regulation S-K. Indeed, it is one of the greatest material uncertainties many of these companies face.[40]

The paucity of disclosure cuts across the spectrum of companies, from those that are taking many governance actions on climate change to those doing relatively little. This lack of disclosure ranks as the greatest common failing among the profiled companies. It also provides fodder for those who have led an extended campaign at the U.S. Securities and Exchange Commission for greater enforcement of Regulation S-K to compel more corporate disclosure of environmental risks.[41]

Table 6. Company Positions on Climate Change

COMPANY	Science Merits Action?	Voluntary Measures Sufficient?	Supports Kyoto Protocol?	Climate Leaders Program?[1]
Alcoa	Yes	No	Neutral	Yes
AEP	Yes	Unlikely	No	No
BP	Yes	Unlikely	Yes	Yes
ChevronTexaco	Yes	Unclear	Partial	No
Cinergy	Yes	Yes	No	Yes
ConocoPhillips	Unclear	Yes	No	No
DaimlerChrysler	Yes	Unclear	Unclear	No
DuPont	Yes	No	Neutral	No
ExxonMobil	Yes	Yes	No	No
Ford Motor	Yes	Unclear	No	No
General Electric	Unclear	Yes	No	No
General Motors	Yes	Yes	No	Yes
Honda	Yes	No	Yes	No
IBM	Yes	Unlikely	Unclear	Yes
Int'l Paper	Yes	Unclear	Unclear	Yes
Royal Dutch Shell	Yes	Unclear	Unclear	No
Southern	Unclear	Unclear	No	No
Toyota	Yes	Unclear	Unclear	No
TXU	Unclear	Unclear	Unclear	No
Xcel Energy	Unclear	Yes	No	No

1. Climate Leaders is an initiative by the Bush administration that encourages companies to measure greenhouse gas emissions and set voluntary targets to reduce them.

7. Examples of Company Position Statements on Climate Change[42]

- ***ChevronTexaco*** sees "increasing public and government concerns about global climate change" and has a four-fold action plan: (1) reduce greenhouse gas emissions and increase energy efficiency, (2) invest in R&D and improved technology, (3) pursue business opportunities in promising innovative technologies, and (4) support flexible and economically sound policies and mechanisms to protect the environment.
- ***DaimlerChrysler:*** "One of our most important concerns is to reduce fuel consumption and with it emissions of [CO2]. [E]ven if ultimate scientific proof… has yet to be provided, we must still take precautionary measures."
- ***IBM:*** "We at IBM have long thought that the most constructive approach… is to apply our technical and engineering expertise to reducing emissions in our own extensive operations and to creating products which are increasingly energy efficient…. We support the global objective of stabilizing the emissions of greenhouse gases… through market driven, flexible and technology-incented, cost-effective mechanisms. Such solutions are the most workable and sustainable over time, and sustainability is critical."
- ***International Paper*** supports: (1) equal weight for economic, environmental and social considerations in any climate change solution; (2) accredited tracking and reporting of greenhouse gas emissions worldwide; (3) practical and verifiable carbon sequestration accounting methods; (4) an international trading system for greenhouse gas emissions and carbon sequestration credits; and, (5) incentives to promote use of biomass fuels.
- ***Royal Dutch/Shell***: "We believe action is required now to lay the foundation for eventually stabilizing greenhouse gas emissions in the atmosphere in an equitable and economically responsible way. It is time to pursue stable, market-based policies that help energy users and suppliers pursue innovative energy solutions."
- ***TXU***: "We will continue to take prudent steps to voluntarily reduce our emissions of greenhouse gases and to promote carbon sequestration programs." TXU has set "challenging sustainability targets in the medium and long term" that include increased use of renewable fuels, reducing greenhouse gas emissions through more efficient electricity production and use, assisting carbon sequestration through reforestation and other technologies, and actively promoting conservation and load management programs.

8. Company Positions on Climate Science and the Kyoto Protocol[43]

After reading securities filings, annual reports, proxy statements, corporate environmental reports and CEO speeches, one might expect to gain a clear picture of where companies stand on some key climate-related policy questions, such as:

- **Is scientific evidence sufficient to warrant corporate action now on climate change**, or should such action await further scientific proof?
- **Is voluntary corporate action sufficient to address climate change**, or is some form of government intervention required?
- **Should the Kyoto Protocol go into effect?** (The Kyoto Protocol would require industrialized nations to reduce their carbon dioxide emissions an average of 5.2% below 1990 levels by 2012.)

Companies' answers to these questions can be direct and to the point. Sometimes they are elusive.

Scientific evidence: If anything approaching a consensus can be found on these questions, it is that companies should not sit idly by while scientists continue to refine their climate models. As shown in **Table 6**:

- **Fifteen of the 20 profiled companies agree that they should take action now to manage greenhouse gas emissions**, despite remaining scientific uncertainties about global warming.
- **Five companies are more equivocal on this point**, saying that global warming concerns should not be a driver of emissions-reducing activities, because of remaining gaps in climate science. Nevertheless, these companies are still pursuing some programs that result in greenhouse gas reductions.

Voluntary action: More telling than what companies are saying about the science of global warming is how they are feeling about collective action to address it. Companies may be all for curbing greenhouse gas emissions as cost-effective opportunities arise. But do they think such voluntary, market-driven actions will be enough to address the risks of climate change? On this question, corporate opinion shows more divergence.

- **Six profiled companies believe voluntary actions are sufficient to address the threat posed by global warming.**
- **Six other companies believe voluntary actions alone will be unlikely or unable to address the threat.**
- **Eight companies have not given clear or conclusive statements.** A common refrain heard from these companies is that solutions to climate change must be "flexible and market-based." Left unsaid is whether the government needs to play a role in creating the market framework to manage greenhouse gas emissions. A "cap and trade" system is flexible and market-based, for example, but needs government intervention to compel participation by a large number of players.

Kyoto Protocol: As the question becomes whether to support a specific form of government intervention – adoption of the Kyoto Protocol – opinion is again divided, but mainly opposed. While no company believes the Kyoto Protocol offers a perfect solution to the climate change problem, some can live with it. More would rather live without it.

- **Nine of the profiled companies are on record as opposing the Kyoto Protocol**; all are based in the United States. They are: **ConocoPhillips**, **ExxonMobil**, **Ford**, **General Electric**, **General Motors** and four of the five electric utilities – **AEP**, **Cinergy**, **Southern** and **Xcel Energy**. (The fifth utility, **TXU**, has not stated a public position on the Kyoto Protocol, but presumably is opposed.) Another U.S. oil company, **ChevronTexaco**, says it supports some elements of the pact, but not others.
- **Six of the profiled companies have not stated a clear position on the Kyoto Protocol.** Several of these companies have simply not commented – and likely are opposed. Others appear to have divided loyalties. **DaimlerChrysler** and **Toyota** say, for example, they support the treaty mandates in Europe and Japan, but are concerned that similar mandates in the United States would be costly and limit product options. (**Ford** and **General Motors** make similar regional distinctions in their securities filings, but are on record as opposing Kyoto.)
- **Alcoa** and **DuPont** state for the record that they are "neutral" on Kyoto Protocol.
- **Only three of the profiled companies express any genuine support for the Kyoto Protocol.**
  - **BP** says it "provides a useful framework" and "represents a step forward in a continuing process."
  - **Honda** cites the agreement as the means to promote greenhouse gas emissions reduction efforts.
  - **Royal Dutch/Shell** says it "signifies an important change in… attitude… and shows [nations] are serious" in addressing climate change.

Climate Change Governance Checklist Item 6 – Disclose material risks of climate change

Form 10-K disclosure: Each year, companies traded on U.S. exchanges must file reports with the Securities and Exchange Commission, including the annual Form 10-K (or 20-F equivalent for non-U.S. companies). For this report, the profiled companies' 10-K and 20-F filings issued in 2002 were reviewed for any mention of climate change or related statements concerning greenhouse gas emissions controls. As shown in **Table 7**:

Even some companies that are leaders in governance responses to climate change have offered relatively few insights in their securities filings.

- **Eight of the profiled companies make no mention of climate change or related issues (such as the Kyoto Protocol) in their filings.** These include two oil companies, **ChevronTexaco** and **ExxonMobil**, and two auto companies, **General Motors** and **Honda**. The others are: **Alcoa**, **General Electric**, **IBM** and **International Paper**.
- **Among the 12 companies that do mention climate change in their securities filings, the disclosure tends not to be very informative.** Consider these offerings from electric utilities in 2002:
  - ***American Electric Power*** says it is a "significant emitter" of carbon dioxide and could be "materially adversely affected" by CO_2 controls. (AEP is in fact the largest CO_2 emitter in North America.) It says CO_2 controls could impose "substantial costs on industry and society and erode the economic base" that AEP serves. (This represents one of the more complete disclosures among the profiled companies.)
  - ***Southern***, which ranks second behind AEP in utility CO_2 emissions, lists climate change and electromagnetic fields together as two issues where legislation "could significantly affect" the company.
  - ***Xcel Energy***, which ranks fourth in investor-owned utility CO_2 emissions, mentions a single power plant in Massachusetts that may not be able to comply with CO_2 regulations enacted in that state.
  - ***TXU***, which ranks fifth in investor-owned utility CO_2 emissions, says it is "[Unable] to predict the impact, if any, of the [Bush] Administration proposal or related legislation" on climate change.
- **Even some companies that in most respects are leaders in their governance responses to climate change have offered relatively few insights in their securities filings.**
  - ***DuPont*** states in its Form 10-K, "While well ahead of the target/timetable contemplated by the [Kyoto] Protocol on a global basis, it faces prospects of country-specific restrictions where major reductions have not yet been achieved."
  - ***Royal Dutch/Shell*** makes one passing reference that the "perceived threat of global warming" and heightened concerns about energy security could lead to greater interest in its hydrogen fuel business. (This is one of the few positive references to a business opportunity posed by climate change.)
  - ***Toyota Motor*** provides a rather detailed explanation of emissions reductions pending in Japan and Europe as well as measures being considered in the United States. While expressing confidence that it will meet the mandates in Japan and Europe, Toyota says – without offering further explanation – that CO_2 emission controls in the United States "would be costly" and "could significantly restrict the products it is able to offer in the U.S." (**DaimlerChrysler** and **Ford Motor** have made similar remarks in their securities filings.)

Annual reports: If securities filings are not a particularly helpful place to find detailed information on companies' outlook and positioning on climate change, reading company annual reports is usually an even less productive exercise. As shown in **Table 7**:

- **Eleven of the profiled companies make no mention of climate change in the front section of their 2001 annual reports.** (Two of these companies repeat statements from their Form 10-K filings in the Management Discussion and Analysis section, which appears at the back of the annual report.)
- **Five companies make only passing reference to the climate change issue**, mainly to highlight selected projects where they have been successful in controlling greenhouse gas emissions.
- **Four companies – BP, Cinergy, Conoco (in 2001) and Toyota – use the chairman's letter to shareholders to highlight their companies' evolving commitments and policies on climate change.** Such references in the chairman's letter tend to signify important "leadership from the top" on this issue.

Climate change information in company environmental reports runs the gamut, from mere blurbs to detailed accounts of science, policy and company positions.

Table 7. Disclosure on Climate Change

COMPANY	Form 10-K Disclosure	Annual Report Disclosure	Shareholder Resolutions[1]	Global Reporting Initiative Report
Alcoa	No	No	No	Yes
AEP	Yes	No	Yes	CERES[2]
BP	Yes	Yes	Yes	Yes
ChevronTexaco	No	No	Yes	No
Cinergy	Yes	Yes	Yes	No
ConocoPhillips	Yes	Conoco	No	No
DaimlerChrysler	Yes	Yes	No	No
DuPont	Yes	MD&A[3]	No	Yes
ExxonMobil	No	Yes	Yes	No
Ford Motor	Yes	No	Yes	Yes
General Electric	No	No	Yes	No
General Motors	No	No	Yes	Yes
Honda	No	Yes	No	No
IBM	No	No	No	Yes
Int'l Paper	No	No	No	Yes
Royal Dutch Shell	Yes	Yes	No	Yes
Southern	Yes	Yes	Yes	No
Toyota	Yes	Yes	No	No
TXU	Yes	No	Yes	No
Xcel Energy	Yes	MD&A[3]	No	No

1. This column indicates whether company has received any shareholder resolutions addressing global warming or renewable energy issues in 1994–2002.
2. American Electric Power has adopted the CERES Electric Utilities Report Form to present corporate environmental information, but is not an endorser of the CERES Principles.
3. Management Discussion & Analysis section repeats statement appearing in Annual Form 10-K.

Climate Change Governance Checklist Item 7 – Issue a sustainability report

The most consistent and reliable place to find management discussion of climate change continues to be in corporate environmental and sustainability reports. Though not all companies produce such reports, most large industrial companies publish them at least on a semi-annual basis; virtually all include pertinent information or post the entire reports on their corporate Internet sites as well. (The profiles in this report include web address links to company environmental reports and/or related climate change information.)

As in other forms of corporate disclosure, climate change information presented in company environmental reports runs the gamut, from mere blurbs to detailed accounts of science, policy and company positions. The wide-ranging accounts are indicative of the lack of industry reporting standards and varying degrees of attention that companies are paying to this issue. In the 20 company environmental reports and/or corporate websites analyzed for this report, IRRC found:

Eight of the profiled companies have issued sustainability reports based on the Global Reporting Initiative (GRI) Sustainability Reporting Guidelines.

- **The oil companies tend to provide the most comprehensive coverage of the topic,** including broad discussions of climate change science and related policy issues.
- **The auto companies tend to focus more on technological research and development** as it relates to their industry.
- **The electric utilities generally have the least to say on either climate-related science or technology issues,** perhaps reflecting their domestic focus and slow rate of capital turnover. (Among electric utilities, **American Electric Power** is the exception in terms of the extent of its reporting.)

CERES and the Global Reporting Initiative: The lack of consistent reporting on climate change has been symptomatic of a larger problem with corporate environmental reports: there is no standard by which to assure that information is presented in a consistent, comprehensive and verifiable manner. The CERES Principles, launched in 1989, was a groundbreaking effort to get companies to prepare environmental reports addressing common themes and specific sets of questions.[44] In 1997, CERES and the United Nations Environment Programme launched a new initiative that has become the most widely accepted standard for reporting on the "triple bottom line" of corporate, social and environmental performance. Well over 200 companies worldwide have agreed to adhere to the GRI Sustainability Reporting Guidelines.[45] The guidelines include environmental performance indicators on greenhouse gas emissions. Many other companies refer to these guidelines in setting the framework for their own sustainability reports. Several companies profiled in this report have adopted the GRI reporting guidelines. As shown in **Table 7**:

- Eight of the profiled companies have issued sustainability reports in a manner consistent with the Global Reporting Initiative – **Alcoa**, **BP**, **DuPont**, **Ford Motor**, **General Motors**, **IBM**, **International Paper** and **Royal Dutch/Shell**.
- In addition, three non-U.S. auto companies – **DaimlerChrysler**, **Honda** and **Toyota** – have issued sustainability reports that do not make explicit reference to the GRI reporting format, but address many common issues, including greenhouse gas emissions and global climate change.
- **American Electric Power** has issued an environmental report based on the CERES Electric Utilities Report Form.

D. Inventories of Greenhouse Gas Emissions

A fundamental accountability issue with respect to climate change is corporate tracking of greenhouse gas emissions. To make progress in addressing this issue, corporations must be able to measure carbon dioxide and possibly other greenhouse gas emissions from energy use and other industrial sources. Only after this process has started is it possible to assess companies' emissions trends and to set meaningful targets for controlling future emissions.

For most companies, greenhouse gas emissions reporting remains a voluntary undertaking rather than a government mandate. In the United States, the only government requirement for disclosing emissions of carbon dioxide (the principal greenhouse gas) concerns electric utilities. Under the Clean Air Act Amendments of 1990, owners of 900 large fossil energy plants must collect hourly emissions data on carbon dioxide and two sources of acid rain and smog (nitrogen oxides and sulfur dioxide). The power plant emissions data are recorded in a database maintained by the U.S. Environmental Protection Agency.[46]

A key question is whether companies registering emissions savings will be eligible to receive credits to bank against mandatory emissions reductions later on.

Greenhouse Gas Protocol: In terms of voluntary reporting, an internationally recognized standard has been developed by the World Resources Institute and the World Business Council for Sustainable Development.[47] The Greenhouse Gas Protocol, introduced in the fall of 2001, has been a multi-stakeholder effort. Early "road testers" included several companies profiled in this report – **BP**, **DuPont**, **Ford**, **General Motors**, **IBM** and the **Shell Canada** division of **Royal Dutch/Shell**. While still a broad framework, with more details that need to be filled in by specific industries, the Greenhouse Gas Protocol has won some important endorsements. Its use is recommended in the Global Reporting Initiative Sustainability Reporting Guidelines. It also has been endorsed for use by the Bush administration's Climate Leaders program (which encourages companies to report and reduce their greenhouse gas emissions relative to rates of production).

Section 1605(b) registry: In addition, the 1992 Energy Policy Act set up a voluntary federal registry for recording greenhouse gas emissions and related savings and offsets.[48] The U.S. Department of Energy's Energy Information Administration maintains this registry.[49] Under Section 1605(b) of this law, entities can record project-specific or system-wide greenhouse gas emissions data. To date, companies have used the registry mainly to highlight selected projects or initiatives that have reduced, captured or offset certain greenhouse gas emissions. Because wide discretion is given to reporting entities in defining and accounting for such savings and offsets, the Section 1605(b) program has not been promoted as a global reporting standard.

For companies that have registered emissions savings and offsets with the Section 1605(b) registry (or with state registries like ones established in California, New Hampshire and Wisconsin), a key question is whether they will be eligible to receive emissions credits to bank against any mandatory reductions that the government may impose later on. Several bills have been introduced in Congress to establish such credit provisions, but none has become law. Significantly, President Bush's climate change action plan does calls for "base line protection and credit" for new emissions savings registered with the Department of Energy, lending further impetus to participate in this registry.[50]

Table 8. Voluntary Reporting of Greenhouse Gas Emissions

COMPANY	Greenhouse Gas Protocol[1]	DOE 1605(b) Registry	Recent Inventory	1990 Baseline	Future Target
Alcoa	✓	✓	✓	✓	✓
AEP		✓	✓		✓
BP	✓	✓	✓	✓	✓
ChevronTexaco		✓	2002		
Cinergy		✓	✓	✓	
ConocoPhillips		✓	Conoco		
DaimlerChrysler			✓	1992	
DuPont	✓	✓	✓	✓	✓
ExxonMobil			✓		
Ford Motor	✓	✓	✓		See Note 3
General Electric			2003		
General Motors	✓	✓	✓	✓	See Note 3
Honda			✓	✓	✓
IBM	✓	✓	✓	✓	✓
Int'l Paper	✓		✓		See Note 3
Royal Dutch Shell	✓	✓	✓	✓	✓
Southern		✓	✓	✓	See Note 4
Toyota			✓	✓	✓
TXU		✓	See Note 2		
Xcel Energy		✓	See Note 2		

1. A checkmark in this column indicates that the company was an early "road tester" of the Greenhouse Gas Protocol and/or has adopted the GRI Sustainability Reporting Guidelines, which recommend use of the Greenhouse Gas Protocol to disclose data on emissions.
2. Like the other electric utilities profiled in this report, TXU and Xcel Energy are required to report carbon dioxide emissions data from their fossil energy plants to the U.S. Environmental Protection Agency. These companies have not reproduced this information in their own reports to shareholders or in ways that are more readily accessible to their stakeholders.
3. Ford Motor, General Motors and International Paper have set targets for energy use and/or region-specific greenhouse gas emissions, but have not set company-wide targets to reduce their facility emissions.
4. Southern has made emissions projections out to 2020, but has not set targets to control these emissions.

Through the combination of government reporting standards and voluntary disclosure initiatives, companies now have the means, and increasingly the incentive, to track and record their greenhouse gas emissions. Accordingly, there are four concrete steps they can take with respect to emissions reporting. These action items are described below:

- ***Registering project emissions savings and offsets.***
- ***Conducting a system-wide greenhouse gas emissions inventory.***
- ***Measuring greenhouse gas emissions against a baseline.***
- ***Setting future greenhouse gas targets.***

A summary of which of these actions the 20 profiled companies are pursuing appears in **Table 8.**

Climate Change Governance Checklist Item 8 – Register emissions savings/offsets

Companies have a range of options to record emissions savings and offsets savings with the Section 1605(b) registry. They need not conduct a company-wide inventory to register savings for selected projects. By the same token, they are not required to achieve system-wide reductions to register project savings, adding to the attraction of this program.[51] As shown in **Table 8**:

- **Fifteen of the profiled companies are participating in voluntary emissions reductions programs being offered by agencies of the U.S. government.** Fourteen of these companies are recording project-related emissions savings with the Department of Energy's Section 1605(b) registry, making this the most popular voluntary recognition program identified in this report.
- **Each of the profiled electric utilities is participating in the 1605(b) registry. TXU** has amassed nearly 200 million metric tons of carbon dioxide emissions credits over the period 1990–2001, more than any other investor-owned utility participating in the program. Most of its savings are the result of bringing its Comanche Peak nuclear plant on line in the early 1990s. (Such credits for nuclear power generation are available only to utilities that bring new nuclear power plants on line after 1990 or increase power generation from existing plants.)
- **The two U.S.-based automakers also are participating in the registry. General Motors** has registered savings dating back to 1990. **Ford Motor** began registering emissions savings in 2001, with data back to 1998.

Virtually all of the profiled companies are now measuring greenhouse gas emissions from their facilities.

Climate Change Governance Checklist Item 9 – Conduct an emissions inventory

Conducting a company-wide inventory of greenhouse gas emissions is a much bigger undertaking than recording project-related savings and offsets, but it has much more meaning as well. The process requires not only taking measurements from all major emissions sources, but also setting some important criteria by which to calculate them. These criteria include which greenhouse gas emissions to measure (with carbon dioxide being the most common); whether to calculate emissions from indirect sources (such as electricity purchased from third parties); and how to account for emissions from jointly owned facilities. Accounting mechanisms such as the Greenhouse Gas Protocol help companies to work through these issues.[52]

Despite the challenges, virtually all of the profiled companies are now measuring greenhouse gas emissions from their facilities, as shown in **Table 8**:

- **As of 2002, 18 of the 20 companies were tracking facility emissions of carbon dioxide** (and up to five other greenhouse gases listed under the Kyoto Protocol), under varying accounting criteria.
- **ExxonMobil produced its first inventory of facility emissions in 2002** (with data back to 2000). **ChevronTexaco** has not yet released the results of its inventory. (Texaco and Mobil had conducted emission inventories using different methodologies before their mergers with Chevron and Exxon.)
- **Two companies have not tracked facility emissions to date. General Electric** is launching an inventory system in 2003. **ConocoPhillips**, which began operations as the merged entity of Conoco and Phillips Petroleum in August 2002, is working out the terms of its combined emissions inventory system. (Conoco conducted its first emissions inventory in 2001. Phillips Petroleum had not conducted an inventory.)

- **TXU** and **Xcel Energy** have not included carbon dioxide emissions information in company reports that are readily accessible to shareholders, although like other utilities they do report CO_2 emissions from their large fossil energy plants to the Environmental Protection Agency.

Climate Change Governance Checklist Item 10 – Measure emissions from a baseline

To stabilize the atmospheric concentration of carbon dioxide at its current level, the global emissions rate would have to be cut to about 30 percent of what it is now.

Setting a greenhouse gas emissions baseline is the next important step a company can take toward establishing a greenhouse gas management program. With a historical baseline, companies can gain a better understanding of past emissions trends and their possible exposure to future regulatory controls – what some call a "gap analysis." Baselines are typically set for 1990, since that is the base year for targets set by the Kyoto Protocol and the voluntary United Nations Framework Convention on Climate Change. Estimating emissions that far back in time poses special challenges. Not only do the necessary records have to be assembled, but there also has to be accounting for acquisitions and divestitures to provide an accurate reflection of emissions trends since that time.

Eleven of the profiled companies have set historical baselines for facility emissions going back at least 10 years, as shown in **Table 8**.

- **Ten of the 20 companies have calculated their facility emissions for 1990.** This compares with 17 that have calculated facility emissions for 2000 and at least 19 that will do so in 2003.
- **The companies not reporting facility emissions back at least 10 years are all U.S.-based firms**, including three large electric utilities – **American Electric Power**, **TXU** and **Xcel Energy**. (The two utilities that have disclosed carbon dioxide emissions for 1990 and 2000 reported large percentage increases in emissions over the period – 46 percent for **Cinergy** and 25 percent for **Southern**.)
- **The three largest U.S. oil companies have not reported facility emissions data for 1990 – ChevronTexaco**, **ConocoPhillips** and **ExxonMobil**.
- **BP and Royal Dutch/Shell *have* calculated facility emissions for 1990 and *have* reported reductions** in those emissions of 7 percent and 11 percent, respectively, as of 2000.

Table 8 provides a comparison of 1990 and 2000 facility emissions for all profiled companies (where available). In percentage terms, the following companies achieved the biggest emissions reductions:

- **DuPont** achieved a 65 percent reduction in facility emissions between 1990–2001. Half of the savings came through cuts of nitrous oxide emissions in nylon production; nitrous oxide is a potent greenhouse gas.
- **IBM** achieved a 31 percent reduction in facility emissions between 1990–2001 through cuts in energy use.
- **Alcoa** achieved a 23.5 percent reduction in facility emissions between 1990 and 2002. Most of the savings came through a two-thirds cut in smelting emissions of PFCs, another potent greenhouse gas.

Table 9. Facility Emissions Reporting and Projections (million metric tons of CO_2 equivalent)

	Facility Emissions (MMT)		Facility Emissions Projections or Goals		Emissions Reductions, Project Savings or Offsets Achieved to Date	
COMPANY	1990	2000	Goal	Year	% reduction or savings	Period
Alcoa	51.0	43.0	25.5 – 38 MMT	2010	23.5% emissions reduction	1990–2002
AEP	NR	168.0	≤ 160.5 MMT[1]	2006	19.5 MMT project savings	1990–2002
BP	90.1	83.7	≤ 81 MMT	2012	10.7% emissions reduction	1990–2002
ChevronTexaco	NR	NR	Report inventory	2003	17% energy use reduction[2]	1990–2001
Cinergy	42.0	63.3	No projections	—	17 MMT in project savings	1990–2001
ConocoPhillips	NR	15.5[3]	No projections	—	4 MMT in project savings	Annual
DaimlerChrysler	6.5	7.5	No projections	—	23% gain in Europe fuel mpg[4]	1995–2002
DuPont	89.7	36.3	≤ 31.5 MMT	2010	65% emissions reduction	1990–2001
ExxonMobil	NR	123.0	No projections	—	35% energy efficiency gain[5]	1973–2001
Ford Motor	NR	9.3	4% cut in US[6]	2006	13% gain in Europe fuel mpg[4]	1995–2002
General Electric	NR	NR	Begin inventory	2003	1 MMT in project savings[7]	Annual
General Motors	11.7[8]	10.1[8]	10% cut in North America[9]	2005	18.4% emissions reduction[8]	1990–2001
Honda	0.62	0.51	≤ 0.48 MMT	2010	21% emissions reduction	1990–2001
IBM	6.8	3.1	≤ 2.5 MMT	2005	57% emissions reduction[11]	1990–2001
Int'l Paper	NR	13.1	4% cut in US[12]	2006	None reported	—
Royal Dutch Shell	114.0	101.0	≤ 108 MMT	2010	11.4% emissions reduction[13]	1990–2000
Southern	102.0	128.0	148 MMT	2020	55 MMT in project savings	1991–2001
Toyota	1.9	1.7	≤ 1.8 MMT[14]	2005	25% cut in CO_2 intensity	1990–2001
TXU	NR	66.7[15]	No projections	—	196 MMT in project savings	1991–2001
Xcel Energy	NR	93.5[16]	No projections	—	6.3 MMT in project savings	2001

NR = No report.
1. AEP's U.S. target includes possible offsets through CO_2 emissions trading in the Chicago Climate Exchange.
2. Chevron's North American business units. Texaco's refineries have cut energy use 13% since 1990.
3. Conoco reported 15.5 MMT of facility emissions in 2001. Phillips Petroleum had not conducted an inventory.
4. Vehicle fuel economy gains in Europe since 1995 as part of a voluntary industry agreement to cut new vehicle CO_2 emissions by 25% in 1995–2008.
5. ExxonMobil is targeting a 15% additional gain in energy efficiency at its global facilities.
6. Ford is targeting a 4% cut in U.S. facility emissions by 2006 through the Chicago Climate Exchange, and a similar 5% cut in the U.K. through participation in the U.K. Emissions Trading Scheme. It has targeted a 14% cut in global energy use in 2000–2005 on a production-normalized basis.
7. General Electric estimates that its Energy Star appliances introduced in 2000–2002 will emit 1 million less metric tons of CO_2 equivalent annually than the models they are intended to replace.
8. General Motors' U.S. facility emissions only.
9. GM has a goal to cut CO_2 emissions in its North American facilities by 10% in 2000–2005. GM also has a goal to cut global energy use by 10% in 2000–2005.
10. Honda's Japanese facility emissions only.
11. IBM's emissions reductions since 1990 are 31% from energy savings and 26% from consolidation.
12. International Paper is targeting a 4% cut in U.S. facility emissions by 2006 through the Chicago Climate Exchange. It says its European operations are "well positioned" to meet an 8% reduction in CO_2 emissions by 2010 through increased energy efficiency.
13. Shell estimates its 2002 emissions would have been 150 MMT without emissions savings programs.
14. Toyota's facility emissions including 55 affiliated companies were 5.5 MMT in 2000.
15. TXU emission figures are reported to EPA; they are not listed in company reports.
16. Xcel Energy emission figures are reported to EPA; they are not listed in company reports. Excluding NRG Energy, a wholly owned subsidiary, Xcel Energy reported 63.6 MMT of CO_2 emissions in 2000.

9. Examples of Corporate Targets to Control Facility Emissions

There are two common themes among companies that have set future emissions targets. First, their targets tend to focus on emissions from facilities rather than from their products. Second, future targets tend to be far more modest than emissions savings already achieved. The goal of several profiled companies, in fact, is to hold future facility emissions constant, relative to a past-year baseline. The lack of projected additional savings is perhaps to be expected of companies that have already picked the "low-hanging fruit" of available reductions and now must weigh programs with higher costs and longer payback periods. Still, by holding emissions constant while increasing production, these companies will continue to reduce the greenhouse gas intensity of their operations. More substantial savings await as these companies turn their attention to emissions from their products.

Following are some examples of future corporate facility emissions targets, with reference to **Table 9**.

- **Alcoa** – having already virtually achieved its initial target of a 25 percent reduction in greenhouse emissions from 1990 levels by 2010 – now aims to hold facility emissions at that reduced level, or less, through 2010 (despite a 40 percent projected increase in production volume over the period). With breakthroughs in inert anode technology for smelting aluminum, Alcoa believes it can achieve an additional 25 percent reduction in its greenhouse gas emissions by 2010. Such a reduction is by far the most ambitious prospect contemplated by any of the profiled companies.
- **BP** – having already achieved its initial target of a 10 percent reduction in CO_2 emissions from 1990 levels by 2008 – now aims to hold its facility emissions at that reduced level through a period extended to 2012. BP estimates its emissions would have grown by 62 percent over the period without its emissions savings programs. In order to achieve the 2012 target, BP will rely in part on involvement in external emissions trading programs.
- **DuPont** – having already achieved its initial target of a 65 percent reduction in greenhouse gas emissions from 1990 levels by 2010 – now aims to hold its facility emissions at that reduced level through 2010. In order to achieve this target, DuPont hopes to raise its use of renewable fuels from 2 percent to 10 percent of total energy use, while keeping its total energy use constant.
- **Honda** – having already achieved an 18 percent reduction in CO_2 emissions from 1990 levels at its Japanese facilities by 2000 – now aims to cut CO_2 emissions at those facilities by another 6 percent from 2001–2010.
- **IBM** – having already achieved a 31 percent reduction in facility CO_2 emissions from 1990 levels through energy efficiency programs – now aims to cut CO_2 emissions from energy use by another 4 percent per year through 2005.
- **Royal Dutch/Shell** – having already exceeded its initial target of a 10 percent reduction in CO_2 emissions from 1990 levels by 2002 – now aims to hold its facility emissions at least 5 percent below 1990 levels through a period extended to 2010. (This target allows its emissions to increase slightly from 2000 levels to account for increases in production.) In order to achieve this target, Shell plans to end continuous venting of natural gas at facilities in 2003 and end continuous operational flaring by 2008, thereby cutting 30 MMT of annual CO_2 emissions.
- **Toyota** – having already achieved a 10.5 percent reduction in CO_2 emissions from 1990 levels at its global facilities – now aims to hold CO_2 emissions at least 5 percent below 1990 levels through 2005. (This target also allows its facility emissions to increase slightly from 2000 levels to account for increases in production.)

Among auto companies, facility emissions of carbon dioxide in the 1990–2000 period moved in a range of about 15 percent – up or down. The relatively small change in facility emissions came despite a large increase in vehicle production over that time frame. However, the amount of emissions from vehicle manufacturing is small compared to cumulative emissions from driving. The chart below compares CO_2 emissions from auto manufacturing facilities against one year's worth of fleet emissions of CO_2 from U.S. vehicles sold in the 1990 and 2000 model years. In the United States, the estimated increase in fleet emissions between 1990 and 2000 ranged from nearly 12 percent for **General Motors'** fleet to more than 70 percent for **Toyota's** fleet. The fleet emissions increase is largely a function of how many

more vehicles the manufacturer sold in 2000 than 1990, combined with the lower fuel economy of their 2000 fleets, which consist of far more sport utility vehicles, minivans and pickup trucks.[53]

Auto Company	Facility Emissions (MMT of CO_2)			U.S. Model Year Emissions[3] (MMT of CO_2)		
	1990	2000	Change	1990	2000	Change
DaimlerChrysler	6.5	7.5	15.4%	9.2	15.0	63.0%
Ford Motor	No data	9.3	No data	16.5	20.6	24.8%
General Motors[1]	11.7	10.1	-13.7%	22.0	24.6	11.8%
Honda[2]	0.6	0.5	-17.7%	3.8	4.7	22.1%
Toyota	1.9	1.7	-10.5%	4.4	7.5	70.5%

1. U.S. facilities only. 2. Japanese facilities only. 3. As calculated by Environmental Defense.

Nearly half of the profiled companies are projecting future emissions from facilities and setting targets to reduce them.

Climate Change Governance Checklist Item 11 – Set a greenhouse gas emissions target

Regardless of what companies have done previously to measure their greenhouse gas emissions, arguably the most important step is the commitments they make to control them in the future. Absolute reductions in emissions will be necessary to address the threat posed by global warming. In fact, to stabilize the atmospheric concentration of carbon dioxide at its current level, the emissions rate would have to be cut to about 30 percent of what it is now.[54]

The Kyoto Protocol takes a first step by calling for a 5.2 percent reduction in industrialized nations' greenhouse gas emissions from 1990 levels by 2012, with additional cuts expected in future reporting periods. Though President Bush has pulled the United States out of the agreement, more than 170 other nations remain committed to the Kyoto pact, and it will enter into force if and when Russia ratifies the agreement (expected sometime later this year).[55] Accordingly, U.S.-based multinationals with operations in countries that ratify the agreement will have to comply with its terms setting emissions reductions.

A growing number of U.S. states also are taking action to curb greenhouse gas emissions in the absence of a federal mandate. In 2002, California passed a law to reduce carbon dioxide emissions from automobiles by 2008. Massachusetts and New Hampshire have passed laws to control CO_2 emissions from power plants. Thirteen states have passed "renewable portfolio standards" to diversify future power supplies.[56] One of the most vexing questions companies now face is how to achieve these emissions reductions requirements in ways that are economically viable, while not getting too far ahead of the curve of likely future emissions mandates.[57]

To set future emissions targets with any confidence, the prior three checklist actions should be taken – i.e., calculating emissions savings and offsets from past projects, conducting a system-wide emissions inventory and setting a company baseline. Even when that has been done, there still is a necessary element of guesswork in forecasting future emissions trends. Assumptions must be made about the pace of future economic growth, demand for the company's products and changes in the possible mix and pricing of various types of energy. Some companies may be reluctant to publicize such projections out of concern that it would reveal their thinking about the strategic direction of the markets in which they

compete. Nevertheless, more companies will be compelled to provide such forward-looking information as the likelihood of emissions controls and interest among shareholders increases.

As with so many other issues addressed in this report, the profiled companies are split on the issue of projecting future emissions and setting targets to reduce them. As shown in Table 9:

- Eight companies have set company-wide targets for facility greenhouse gas emissions reductions, ranging from 2005 to 2012: **Alcoa**, **American Electric Power**, **BP**, **DuPont**, **Honda**, **IBM**, **Royal Dutch/Shell** and **Toyota**.
- One other company, **Southern**, has provided projections of its emissions (but not set a target) through 2020.
- Three other companies are making projections with respect to energy use or region-specific greenhouse gas emissions, but have not set company-wide greenhouse gas projections or targets: **Ford Motor**, **General Motors** and **International Paper**.
- Eight companies have not made any projections or targets for future emissions: **ChevronTexaco, Cinergy, ConocoPhillips, DaimlerChrysler, ExxonMobil, General Electric, TXU** and **Xcel Energy**.

Certifying emissions through the use of third parties helps companies establish that their inventory processes are complete, credible and accurate.

Climate Change Governance Checklist Item 12 – Certify greenhouse gas emissions

Companies that have gone to great lengths to calculate, track and control their emissions often find value in taking one additional step – hiring a third-party auditing firm to verify their emissions baselines and stated reductions. Though no emissions reporting protocol yet exists that is akin to the accounting principles that financial auditors use, the various means of measuring emissions now are well enough established to allow for credible independent analysis. Certifying emissions through the use of third parties helps companies establish that their inventory processes are complete, credible and accurate. Such certification builds confidence not only among company managers and their employees, but also among other stakeholder groups, including shareholders, customers, government agencies and NGOs. Most important, the certification process may help companies document emissions savings in anticipation of future government requirements and to enter into third-party emissions trading programs.[58]

At least four of the 20 profiled companies have hired auditing firms to certify their annual greenhouse gas emissions and baseline inventories, as shown in Table 10:

- **Alcoa**, **BP**, **IBM** and **Royal Dutch/Shell** have employed outside groups to assure that there is no material misstatement of emissions data.
- The outside groups used by these companies include DNV, KPMG, PricewaterhouseCoopers and the nonprofit Center for Energy & Climate Solutions.

Climate Change Governance Checklist Item 13 – Join emissions trading programs

Almost without exception, companies that support some form of greenhouse gas emissions controls extol the virtues of flexible, market-based programs that allow trading of emissions credits. Indeed, most of the companies profiled in this report have registered and/or certified emissions savings partly in anticipation that they will be able to convert these savings into credits with market value. The Kyoto Protocol envisions a number of emissions trading schemes, among industrialized nations and in conjunction with developing nations.[59] The size of this emissions trading market could soar into the tens of billions of dollars over the next few years and eventually into the trillions of dollars as carbon constraints become

Table 10. Participation in 3rd Party Programs & Renewables

COMPANY	3rd Party Certification	Emissions Trading[1]	Renewable Energy	Climate-related Memberships & Associations[2]: Climate Partners	Climate Savers	Green Power	Pew Center
Alcoa	✓		✓			✓ ✓	
AEP		CCX, IETA	✓				✓
BP	✓	IETA, UKET	✓	✓			✓
ChevronTexaco			✓				
Cinergy			✓				✓
ConocoPhillips							
DaimlerChrysler							
DuPont		CCX	✓	✓		✓ ✓	
ExxonMobil							
Ford Motor		CCX, UKET	✓			✓	
General Electric			✓				
General Motors		UKET	✓			✓	
Honda			✓				
IBM	✓		✓		✓ ✓	✓	
Int'l Paper		CCX	✓				
Royal Dutch Shell	✓	IETA, UKET	✓	✓			✓
Southern			✓				
Toyota			✓				✓
TXU			✓				
Xcel Energy			✓				

1. CCX: Chicago Climate Exchange. IETA: International Emissions Trading Association. UKET: United Kingdom Emissions Trading Scheme.
2. See Box 10 for descriptions of the Climate Partners, Climate Savers and Green Power programs. The Pew Center on Global Climate Change founded the Business Environmental Leadership Council in 1998; it now has 38 corporate members. The BELC considers the Kyoto Protocol "a first step in global efforts to mitigate climate change and supports the development of market-based mechanisms as called for" by the Protocol.

The size of the emissions trading market could soar into the tens of billions of dollars over the next few years and eventually into the trillions of dollars.

more difficult for companies to achieve on their own. **DuPont** has calculated, for example, that annual emissions savings it has amassed since 1990 could have a market value of nearly $500 million, if it were awarded credits and the market price for CO_2 was $10 per metric ton.[60]

To date, an estimated 200 million tons of greenhouse gases have changed hands through voluntary trades. The Kyoto Protocol's entry into force is expected to result in rapid growth in trading volumes, with prices for carbon dioxide emission credits rising above their current selling price of $3 to $8 per metric ton. The United Kingdom introduced the world's first organized greenhouse gas emissions trading system in 2001. Denmark also operates such an exchange. In the United States, emissions trading will begin this summer through the Chicago Climate Exchange.[61] The European Union plans to begin full-scale trading of greenhouse gas emissions in 2005.[62]

Several of the profiled companies are gaining experience with emissions trading, as shown in Table 10.

- **BP** and **Royal Dutch/Shell** launched internal emissions trading programs in the late 1990s to enable their business units to gain experience in identifying potential sources of credits and to assign market values to trade them within their companies. Now BP and Shell will use that experience to enter external trading markets to facilitate their

objectives of holding facility greenhouse gas emissions stable over the next decade. Shell has even established a greenhouse gas emissions trading unit within its Shell Trading business, which buys and sells other commodities. (**Alcoa** is also evaluating internal trading mechanisms to see if such procedures will enhance greenhouse gas reduction strategies.)

- At least three of the profiled companies have entered the United Kingdom Emissions Trading Scheme: **BP**, **Ford Motor** and **Royal Dutch/Shell**. Participants in this exchange are required to achieve a 5 percent cut in their carbon dioxide emissions in the United Kingdom over the period 2002–2007.
- In the United States, **American Electric Power**, **DuPont**, **Ford Motor** and **International Paper** are charter members of the Chicago Climate Exchange. Participants in this exchange are required to achieve a 4 percent cut in their U.S. carbon dioxide emissions relative to a baseline set over the period 1998–2001.

BP and Royal Dutch Shell have become two of the world's largest investors in renewable energy.

Climate Change Governance Checklist Item 14 – Develop renewable energy supplies

One clear path for companies to achieve carbon dioxide emission reductions is to increase purchases of renewable energy. For some companies, renewable energy development presents new market opportunities as well. At present, renewable energy – such as wind power, biomass, geothermal and photovoltaics – provides only a tiny fraction of the world's energy supply (less than 1 percent globally, excluding hydropower). At the same time, however, renewables are among the world's fastest growing energy sources.

Unlike fossil fuels, renewables depend on sources that do not produce excess carbon dioxide emissions. Renewable energy sources also pose geo-political advantages over ones linked to oil-producing regions. Challenges to renewable energy development include the use of intermittent sources (like the wind and sun), land use and siting issues. With the exception of wind power, most renewable energy sources are not yet cost-competitive with market prices for fossil fuels.[63]

For a time, American petroleum companies took a particular interest in photovoltaic (solar) power. Exxon closed its PV operation in 1984, however, and Mobil sold its solar power business in 1995. Between these two companies, they expended more than $500 million on their fledgling renewable energy businesses. "We've been there, done that," **ExxonMobil** Chairman Lee Raymond told the *Financial Times* in a March 2002 interview.[64]

Meanwhile, **BP** and **Royal Dutch/Shell** have become two of the world's largest investors in renewable energy. BP is committed to spend $500 million on its photovoltaics business between 2000 and 2003. Shell says it will invest $500 million to $1 billion in its Shell Renewables and Shell Hydrogen businesses between 2002 and 2007. (Such investments are still only a few percent relative to these companies' expenditures on fossil fuels exploration and development, however.)

Most of the profiled companies are involved in renewable energy development, to varying degrees, as summarized below and noted in Table 10:

- **Alcoa**, **DuPont**, **General Motors** and **IBM** are among 11 corporate members of the Green Power Market Development Group, led by the World Resources Institute and Business for Social Responsibility. The group's goal is to create market demand for 1,000 megawatts of renewable electricity by 2010. As of June 2002, the group had launched projects encompassing 50 different corporate facilities in 12 states generating a total of 15 megawatts of green power – enough energy to power more than 11,000 homes.

- **DuPont** has a particularly ambitious goal to derive 10 percent of its energy from cost-competitive renewable resources by 2010, up from 2 percent in 2002. Its focus mainly is on biomass and wind power. DuPont also created a fuel cell business in 2001.
- **BP** is one of the world's largest makers of photovoltaic products. In 2003, a new BP factory in Madrid, Spain, will be capable of producing 60 MW of PV panels annually, equal to 20 percent of current world demand. In 1999, BP invested approximately $50 million to acquire an 18.5 percent stake in GreenMountain.com, a Texas-based company that specializes in selling "green power" to utilities from environmentally friendly technologies, including wind and solar power, geothermal energy and highly efficient natural gas.
- **Royal Dutch/Shell** reports that its wind and solar power businesses are growing by more than 20 percent a year. It will invest $500 million–$1 billion in its Shell Renewables and Shell Hydrogen businesses in 2002–2007.
- **ChevronTexaco** says it will invest $80 million in wind power and gasification technologies in 2002–2003. In partnership with BP, ChevronTexaco has a 31 percent interest in a 22.5-MW windfarm in The Netherlands. In 2000, Texaco paid $67 million to take a 20-percent equity stake in Energy Conversion Devices, a manufacturer of photovoltaic devices and fuel cell technology. ChevronTexaco now holds this investment.
- **General Electric** bought Enron's wind power business in 2002 for $180 million. GE Wind expects more than $1 billion in sales in 2003 "with solid profitability," and expects the business to pay for itself in two years. GE's 3.6-MW wind turbine is one of the largest such machines in the world. GE Hydro has been a long-time leader in the supply of turbines, generators and related equipment for the hydro industry. GE also supplies geothermal steam turbine generators.
- **International Paper** makes extensive use of wood waste and other biomass energy at its pulp and paper mills. In 2001, 61 percent of its U.S. energy needs came from company-owned biomass plants.
- **American Electric Power** is the nation's third largest wind provider. It has 311 megawatts of owned wind capacity in Texas and has approximately 1,151 MW of renewable capacity altogether.
- **Xcel Energy** will have 790 MW of wind power in service by the end of 2003, making it the second largest supplier of wind power to utility customers in the country. Xcel Energy also runs the largest customer-driven wind energy program in the nation. Customers in three states can purchase wind-generated electricity at a premium price.
- **Honda** has applied some R&D funds for experimental operations at a solar-powered hydrogen production and fueling station. Honda introduced an experimental vehicle powered by fuel cells in late 2002.
- **Ford Motor** is a founding member of the EPA Green Power Partnership. Member companies are committed to secure 2 percent of their energy supply from renewables.

10. Corporate Partnerships with Environmental Groups

Several leading environmental groups are reaching out to the corporate community to find common ground on addressing global warming. These programs are structured as partnerships, whereby corporations obtain technical assistance and recognition for their voluntary programs in exchange for making long-term commitments to track and control their greenhouse gas emissions. Three such partnerships are described below.

World Resources Institute's 'Climate Protection Initiative'

The World Resources Institute forged one of the first partnerships with corporations to identify acceptable policies and business strategies for achieving climate protection goals. WRI's "Climate Protection Initiative" is focusing on policy options that are flexible and market-based and that are sensitive to competitiveness issues within and among nations. As an adjunct to this initiative, WRI has formed a partnership with the World Business Council for Sustainable Development, a coalition of 165 international companies, to develop a uniform tracking system for corporate greenhouse gas emissions – the Greenhouse Gas Protocol.

Corporate members: In August 2000, 10 large companies representing 6.5 percent of U.S. power demand announced they were banding together to support the development of 1,000 megawatts of new renewable energy generating capacity over the next 10 years as part of the Green Power Market Development Group. The member companies now are: **Alcoa**, Cargill Dow, Delphi Automotive, **DuPont**, **General Motors**, **IBM**, Interface, Johnson & Johnson, Kinko's, Pitney Bowes and Staples. Business for Social Responsibility, a broad-based industry coalition based in San Francisco, also is participating in this "green power" initiative. Participants in this group are approaching renewable energy suppliers in an effort to determine the status of different renewable energy technologies and costs of various options. The 1,000-megawatt target set is equal to roughly 8 percent of current U.S. renewable energy capacity (excluding hydropower).

Environmental Defense's 'Partnership for Climate Action'

In October 2000, Environmental Defense announced a partnership with a group of major companies to promote and publicize their commitments to reduce greenhouse gas emissions, and to provide public auditing of their greenhouse gas inventories. These eight "Partnership for Climate Action" companies had annual emissions of 392 million metric tons in 1990, roughly equal to country emissions of Australia or Spain. By 2010, the partnership companies expect to reduce their emissions by 80 million tons – a 22 percent average reduction below 1990 levels.

Corporate members: The participating companies are among the world's largest aluminum, chemical, electricity and oil producers: Alcan, **BP**, **DuPont**, Entergy, Ontario Power Generation, Pechiney, **Shell International** and Suncor. (Alcan of Canada and Pechiney of France are the world's second and third largest aluminum producers, behind Alcoa.) The companies say they are taking these actions to "champion market-based mechanisms of achieving early and credible action on reducing greenhouse gas emissions that is efficient and cost effective." As part of their agreement, the companies will buy and sell emissions credits within their group to gain experience with such a trading system. Several of the companies also have undertaken major tree planting and forest conservation programs to sequester carbon and offset a portion of their greenhouse gas emissions.

World Wildlife Fund's 'Climate Savers' Program

The World Wildlife Fund is partnering with corporations to promote energy efficiency and greenhouse gas emissions reductions. In March 2000, WWF and the Center for Energy and Climate Solutions announced the formation of Climate Savers. This partnership program focuses on ways to integrate such reductions into strategic business plans, with a focus on building systems and design, combined heat and power (cogeneration) systems and renewable energy purchases. It does not involve third-party emissions trading or carbon sequestration programs.

Corporate members: The six business partners in the Climate Savers program are **IBM**, Johnson & Johnson, Polaroid Corporation, Nike, Lafarge (the world's larget cement producer), and The Collins Companies. By working to integrate energy and environmental efficiency into building, product and process design, and optimizing existing manufacturing processes, most of the companies are committed to achieving double-digit reductions in their carbon dioxide emissions by 2010. At the same time, they expect these measures to boost their profits and productivity.

Looking Forward

This report has identified 14 governance actions that companies can take – and in many instances are taking – to address global warming. The Climate Change Governance Checklist (Table 1) lists specific actions that each of the 20 profiled companies has pursued to date. The checklist shows a wide disparity in companies' governance responses to climate change, conveying the sense of urgency – or lack thereof – which corporate boards and executives currently feel about this issue.

Two of the profiled companies, **BP** and **Royal Dutch/Shell**, have pursued each of the 14 governance actions. By contrast, six companies – including the three U.S.-based oil companies – have pursued only five of the identified actions or less. One should not assume that companies taking all actions on the checklist have reached their long-term objectives, however. On the contrary, as long as leading companies like BP and Shell derive virtually all of their profits from the sale of carbon-emitting fuels, their work, too, is only just beginning to address climate change.

The energy transformation in the 21st century is likely to be every bit as monumental as in the century just passed. Huge investment opportunities – and risks – lie ahead.

Fossil fuels with high emissions have been the engine of economic growth since the start of the Industrial Revolution. Carbon dioxide levels in the atmosphere have risen by one-third in the last 250 years. If population growth, energy use and economic expansion stay on their current track – and emissions are not curbed – the atmospheric level of CO_2 may be triple pre-industrial levels by the end of the 21st century. The effects on the planet could be catastrophic, with rising sea levels, more severe storms, droughts and the spread of tropical diseases, among other concerns.

Ultimately, confronting global warming will mean finding ways to strip carbon from fossil fuels, sequestering their emissions or – most likely – using these fuels far more efficiently and switching to entirely new sources of energy. As such, the energy transformation in the 21st century is likely to be every bit as monumental as in the century just passed. Huge investment opportunities – and risks – lie ahead.

At present, the United States is at an impasse on policies to address climate change. In 1992, Congress and the elder President Bush embraced a voluntary goal announced at the Earth Summit in Rio de Janeiro, Brazil, to hold atmospheric carbon dioxide at a level to avoid "dangerous anthropogenic (man-made) interference with the climate system."[65] But the United States has made no progress since that time in stabilizing its emissions, let alone reducing them. Moreover, most U.S. industrial companies have shown little enthusiasm for the Kyoto Protocol, which would require emissions reductions. American industry has expressed general support for the decision by the current President Bush to pull the United States out of the Kyoto agreement.

Now the Bush administration has embarked on a voluntary national program to reduce the "greenhouse gas emissions intensity" of U.S. economic activity. Its Climate VISION plan, laid out in February 2003, calls for an 18 percent reduction in the amount of carbon dioxide emissions produced per unit of gross domestic product by 2012.[66] This is not a goal to cap or reduce U.S. emissions, however, and historical precedent suggests it will not be very hard to achieve. (In the 1990s, the emissions intensity of the U.S. economy fell by 17 percent.) The long-term trend toward greater energy efficiency and more use of cleaner-burning fuels (like natural gas), combined with the growing economic role being played by low-emitting industries like computers and telecommunications, means that the greenhouse gas intensity of the U.S. economy will continue to fall mainly on its own accord.

Thirteen leading U.S. industry groups have pledged their support for the White House's Climate VISION plan. They include the nation's leading emitting industries, such as the Alliance of Automobile Manufacturers, American Chemistry Council, American Petroleum

Institute, American Forest Products Association, Edison Electric Institute, National Mining Association and Business Roundtable. (The Business Roundtable is comprised of 150 CEOs of leading U.S. companies.) Yet many of these associations have qualified their support even for this plan. While the American Chemistry Council says its members should be able to achieve the 18 percent cut in greenhouse gas intensity called for under Climate VISION, most of the other groups say they do not expect to reduce the emissions intensity of their industries by much more than 10 percent by 2012. The Edison Electric Institute expects its electric utility members expect to achieve only a 3 to 5 percent reduction in emissions intensity, given the small turnover in generating plants expected over the period.[67]

Even if all of American industry were to achieve the 18 percent reduction in emissions intensity set by the Bush administration for 2012, the nation's carbon dioxide emissions would still grow by 12 percent.

Even if all of American industry were to achieve the 18 percent reduction in emissions intensity set by the Bush administration for 2012, the result would still be that the nation's carbon dioxide emissions would be projected to grow by 12 percent, according to independent analyses of the White House plan.[68] That emissions increase would be on top of the 14.5 percent increase in the nation's CO_2 emissions during the 1990s, bringing the total increase to 26.5 percent above 1990 levels by 2012. By contrast, the Kyoto Protocol calls for the United States to achieve a 7 percent reduction from 1990 levels by then.

Thus, the United States' inability to meet Kyoto's targets for 2012 now is a foregone conclusion. But avoidance of programs seeking mandatory cuts in greenhouse gas emissions is much less certain. In Congress, Senators John McCain (R-Ariz.) and Joseph Lieberman (D-Conn.) have introduced a bill that would impose greenhouse gas controls on a broad array of U.S. industrial emitters. The bill's "cap-and-trade" system aims to stabilize U.S. carbon dioxide emissions at 2000 levels by 2010, and then reduce them to 1990 levels by 2016.[69] The bill has the support of major environmental groups. Companies like **Alcoa**, **BP**, **DuPont** and **Royal Dutch/Shell**, which already have achieved substantial emissions reductions, have also expressed support for such cap-and-trade mechanisms.[70] Though Republican control of Congress diminishes chances that such legislation will pass in the next two years, the matter of greenhouse gas controls could emerge as a campaign issue in the 2004 elections – including the race for President.

Meanwhile, more than 170 other nations remain committed to the Kyoto Protocol, and many nations now are adopting corresponding national legislation to achieve its aims. With Kyoto's entry into force expected later this year, many U.S. companies operating abroad may soon find themselves at a competitive disadvantage. Any emissions savings they achieve in the United States will not be credited toward emissions targets set by participating countries. Emissions reductions and trades must be within the group of countries that ratify the pact.[71]

In addition, nations participating in the Kyoto Protocol have the option of putting tariffs on U.S.-made products as a means of neutralizing any cost advantage that the United States gains by staying out of the agreement and keeping its energy prices comparatively low (and CO_2 emissions correspondingly high). The General Agreement on Tariffs and Trade allows nations to impose such border tax adjustments, as long as they are applied proportionately to all countries lacking similar policies. Consumer backlash is another potential concern of U.S. companies operating overseas. Ultimately, the United States' go-it-alone strategy might diminish the stature of U.S. companies as nations adopt final rules to implement the terms of the Kyoto Protocol.[72]

In any event, U.S. multinationals soon will be operating under very different sets of rules in the United States and elsewhere around the world. For investors, the concern is not just that any emissions savings these companies achieve in the United States will not count toward reductions required of them abroad. The lack of domestic requirements to achieve such savings may also translate into a lack of strategic focus and experience in dealing with carbon constraints. As the policy rift continues, U.S. companies risk falling behind their international competitors in developing technologies favored in a carbon-constrained world, like renewable energy and low-emission vehicles.

In the end, forward-looking American companies may conclude that consumer and investor attention to global warming is on the rise and that U.S. controls on greenhouse gas emissions are inevitable. Therefore, to the extent the ground is shifting in the global warming debate, it is in favor of companies taking formal steps to integrate this issue into their strategic business plans. The Climate Change Governance Checklist described in this report is one barometer of such corporate commitments. To maintain credibility over time, however, companies will need to translate these commitments into tangible progress in reducing wasteful inefficiencies – especially in their products – and introducing groundbreaking new technologies.

The results of this report suggest that non-U.S. companies – buttressed by their governments' support of the Kyoto Protocol – now have an early lead in adopting sustainable governance reforms to address climate change. But this race is only just beginning and will continue for decades to come. Winners and losers will emerge over time. For the sake of the planet and future generations, all participants must find the motivation to succeed.

The results of this report suggest that non-U.S. companies – buttressed by their governments' support of the Kyoto Protocol – now have an early lead in adopting sustainable governance reforms to address climate change.

Appendix 1: Current State of Science on Climate Change

Two important studies on the science of climate change were issued in 2001. The Intergovernmental Panel on Climate Change (IPCC) published the third in a series of assessment reports (dating back to 1990) addressing scientific, technical and socio-economic issues.[1] The U.S. National Academy of Sciences (NAS) followed with a summary and analysis of the IPCC report – responding to questions posed by the Bush administration.[2] Following is a summary of NAS's answers to some of the Bush administration's questions:

"Greenhouse gases are accumulating in the Earth's atmosphere as a result of human activities, causing… temperatures to rise."
National Academy of Sciences

Do the IPCC summaries and supporting technical papers offer a consistent view on climate change?

- ***Yes.*** "The full IPCC Working Group I report is an admirable summary of research activities in climate science, and the full report is adequately summarized in the Technical Summary. The Summary for Policymakers reflects less emphasis on communicating the basis for uncertainty and stronger emphasis on areas of major concern associated with human-induced climate change."

Is human activity causing global warming?

- ***Almost certainly.*** "Greenhouse gases are accumulating in the Earth's atmosphere as a result of human activities, causing surface air temperatures and subsurface ocean temperatures to rise. Temperatures are, in fact, rising. The changes observed over the last several decades are likely mostly due to human activity, but we cannot rule out that some significant part of these changes is also a reflection of natural variability. Human-induced warming and associated sea level rises are expected to continue through the 21st century."
- "The IPCC's conclusion that most of the observed warming over the last 50 years is likely due to the increase in greenhouse gas concentrations accurately reflects the current thinking of the scientific community on these issues…. Despite the uncertainties, there is general agreement that the observed warming is real and particularly strong within the past 20 years."

What is the recent trend in global warming?

- The IPCC estimates that the rate of warming in the 20th century was 1.1 degrees Fahrenheit in the Northern Hemisphere – and "is likely to have been the largest warming of any century in the past thousand years."
- The rate of warming in the 20th century was uneven. Most of the warming came before 1940 and after 1975.
- A cooling trend observed in the upper atmosphere (which some skeptics cite as evidence contrary to global warming) "is believed to be partially the result of stratospheric ozone depletion and partially the result of the buildup of greenhouse gases, which warm the atmosphere at low levels but cool it at high levels."

How does recent warming compare with natural variability in climate?

- "Evidence suggests global warming rates as large as 3.6 degrees F per millennium may have occurred during the retreat of the glaciers following the most recent ice age." (By comparison, the rate of warming since 1975 has been at a rate of 3 degrees F per *century*.)
- "Temperature variations at local sites have exceeded 18 degrees F in association with the repeated glacial advances and retreats that occurred over the course of the past million years."
- "It is possible that climate could undergo a sudden large change in response to accumulated climate forcing. The paleoclimate record contains examples of sudden large climate changes, at least on regional scales."[3]
- Ice core samples are a primary means of estimating natural temperature variability.

What is the projected rate of warming for the 21st century?

- The IPCC projects a range of warming from 2.5 to 10.4 degrees F, relative to 1990.
- The lower end of the range assumes policies will be put in place to slow the growth of greenhouse gas emissions and uses computer models that are less sensitive to climate variables. The upper end assumes policies will not be put in place to slow emissions growth and uses computer models that are more sensitive to climate variables.
- "Well-documented climate changes during the history of the Earth, especially the changes between the last major ice age (20,000 years ago) and the current warm period, imply that the climate sensitivity is near to the [mid-range] value" of 5.4 degrees, assuming carbon dioxide concentrations rise to double pre-Industrial levels. This temperature increase in the 21st century would be equal to five times the rate of observed warming in the 20th century.[4]
- "Because there is considerable uncertainty in the current understanding of how the climate system varies naturally and reacts to emissions of greenhouse gases and aerosols, current estimates of the magnitude of future warming should be regarded as tentative and subject to future adjustments (upward or downward)."

The IPCC projects a range of warming from 2.5 to 10.4 degrees F in the 21st century.

What are the expected effects of global warming?

- ***General:*** "If global-average temperature increases approach 5.4 degrees F in response to a doubling of carbon dioxide, they are likely to have substantial impacts on human endeavors and natural ecosystems. Given the fact that middle and high latitude regions appear to be more sensitive to climate change than other regions, significant impacts in these regions are likely to occur [even] at lower levels of global warming."
- ***Precipitation and drought:*** "Some models project an increased tendency toward drought over semi-arid regions, such as the U.S. Great Plains. Hydrologic impacts could be significant over the western United States, where much of the water supply is dependent on the amount snow pack and the timing of the spring run-off. Increased rainfall rates could impact pollution run-off and flood control…. The faster recycling of water will lead to higher rainfall rates and an increase in the frequency of heavy precipitation events…. Higher precipitation rates would favor increased intensity of tropical cyclones, which derive their energy from the heat that is released when water vapor condenses."

- ***Sea level rise:*** "With higher sea level, coastal regions could be subject to increased wind and flood damage even if tropical storms do not change in intensity…. Fifty-three percent of the U.S. population lives within coastal regions, along with billions of dollars in associated infrastructure…. [S]ea level rise increases the potential damage to coastal regions even under conditions of current storm intensities and can endanger coastal ecosystems if human systems or other barriers limit the opportunities for migration."
- ***Agriculture and forestry:*** "In the near term, agriculture and forestry are likely to benefit from CO_2 fertilization effects and the increased water efficiency of many plants at higher atmospheric CO_2 concentrations. Many crop distributions will change, thus requiring significant regional adaptations…. These conclusions depend on the climate scenario, with hotter and drier conditions increasing the potential for declines in both agriculture and forestry. In addition, the response of insects and plant diseases to warming is poorly understood. On the regional scale and in the longer term, there is much more uncertainty."
- ***Human health:*** "Climate is one of a number of factors influencing the incidence of infectious disease. Cold-related stress would decline in a warmer climate, while heat stress and smog-induced respiratory illnesses in major urban areas would increase, if no adaptation occurred. Over much of the United States, adverse health outcomes would likely be mitigated by a strong public health system, relatively high levels of public awareness, and a high standard of living."
- ***Longer-term outlook:*** "Although society might conclude that it is practical to live with substantial climate change in coming decades, it is also important to consider further consequences that may occur in later centuries…. Even the mid-range scenarios considered in the IPCC result in temperatures that continue to increase well beyond the end of this century, suggesting that assessments that examine only the next 100 years may well underestimate the magnitude of the eventual impacts. For example, a sustained and progressive drying of the land surface, if it occurred, would lead to the desertification of regions that are now marginally arable, and any substantial melting or breaking up of the Greenland and Antarctic ice caps could cause widespread coastal inundation."

"Assessments that examine only the next 100 years may well underestimate the magnitude of eventual impacts."

National Academy of Sciences

Possible Effects of Climate Change on the United States

The U.S. Environmental Protection Agency issued a comprehensive analysis of possible effects of climate change on the United States in 2002.[5] Its *Climate Action Report* presents findings at the national level that are largely consistent with the 2001 reports issued by the Intergovernmental Panel on Climate Change and the U.S. National Academy of Sciences. Following are some of the key findings of *EPA's Climate Action Report – 2002*:

Projected U.S. warming: Five to 9 degrees F of warming is projected for the 21st century, compared to 1 degree of observed warming in the 20th century. The central tier of the country is likely to inherit a climate more like that now prevailing in the southern tier, and the northern tier is likely to inherit a climate more like that now existing in the central tier.

"Adapting to climate change is inevitable. The question is whether we adapt poorly or well."

U.S. Environmental Protection Agency

Sea level rise: Four to 35 inches of sea level rise is projected for the 21st century, compared to 4 to 8 inches of observed sea level rise in the 20th century. Coastal ecosystems may be especially vulnerable where there are obstructions to landward migration. Coastal communities are likely to be at greater risk of storm surges, especially in the Southeast.

Precipitation: The ongoing trend toward greater annual precipitation is likely to continue. More precipitation is likely to fall as rain, reducing snow pack in the West and causing water storage problems, especially in California. Also, more rain is likely to fall in heavy downpours (continuing an observed trend), resulting in more flash floods, water quality problems and spread of water-borne infectious viruses.

Drought: Computer models differ on the projected extent and frequency of drought in the United States as a result of climate change. One leading model suggests that semi-arid conditions now prevailing in the western Great Plains will intensify and spread eastward. Another leading model suggests that sub-tropical conditions now prevailing in the Southeast will spread northwestward. Government-funded research laboratories are working to resolve this discrepancy in general circulation models of the Earth's climate.

Agriculture and forests: At the national level, crop productivity is likely to increase because of the "fertilization effect" of higher carbon dioxide levels. Gains will not be uniform across the nation, however. Forest productivity also is likely to increase, at least in the near term. Over the longer term, however, changes in large-scale processes such as fire, drought, insects and disease, as well as forest migration, may diminish forest productivity.

Surprises and adaptation: The *Climate Action Report* does not consider climate "surprises" that could have positive or negative impacts.[6] These surprises could be the result of major changes in ocean circulation, cloud distribution, storm patterns or from biological consequences (such as severe pest outbreaks). "Because of momentum in the climate system and natural climate variability, adapting to climate change is inevitable," the EPA report concludes. "The question is whether we adapt poorly or well."

Evidence of Effects and Projected Costs of Climate Change

Precipitation: The National Climatic Data Center estimates that 5 to 10 percent more precipitation is falling in the United States now than at the beginning of the 20th century. Also, more rain is falling in the form of heavy downpours that cause damaging floods.[7] Such an increase in rainfall and rainfall intensity is consistent with global warming trends, since higher temperatures allow the atmosphere to hold – and release – more water vapor. In 2002, torrential rains in France, Germany, Spain, Chile, Jamaica and Nepal dropped the equivalent of a year's worth of precipitation in the course of just one or two days.

"It is clear that global warming could bankrupt the [reinsurance] industry."

Franklin Nutter, Reinsurance Association of America

Severe weather events: The National Weather Service concluded that four of the nation's 15 "worst weather events" of the 20th century took place in the 1990s – Hurricane Andrew (1992), the great Midwestern floods (1993), "El Nino" disruptions (1997 and 1998), and the severe tornado outbreak in Oklahoma and Kansas (1999).[8] The 59 Atlantic hurricanes that formed in 1995 through 2001 constituted the most active period on record; it was 44 percent above the 115-year average of 5.8 Atlantic hurricanes per year, according to the National Hurricane Center.[9] Because hurricanes feed on warm ocean water, rising sea surface temperatures may be a factor in the recent surge in hurricane activity.

Recent weather catastrophes: In 1996–2000, weather-related disasters caused more than $250 billion of economic damage worldwide. In 2002, the cost of natural disasters exceeded $55 billion. Last year's disasters included the worst European floods in up to 650 years ($18.5 billion in losses), severe drought that struck parts of the United States, India, Africa and Australia (more than $5.6 billion in losses), and Typhoon Rusa that struck the Korean peninsula ($4.5 billion in losses). Floods and windstorms accounted for 98 percent of insured property losses in 2002 (totaling $11.5 billion in insured losses).[10]

Trends in natural disasters: The Munich Re reinsurance company has been gathering information on the world's natural disasters for 30 years. It finds that the number of natural disasters in the 1990s rose by a factor of three, compared with the 1960s. In terms of economic losses, the toll from natural disasters rose by a factor of eight – from an average of $7.5 billion a year in the 1960s to more than $65 billion a year in the 1990s (adjusted for inflation). Insured losses rose 17-fold, to $12.3 billion a year in the 1990s.[11] Franklin Nutter, president of the Reinsurance Association of America, now says, "It is clear that global warming could bankrupt the [reinsurance] industry."[12]

Projected future losses: The United Nations Environment Programme estimates that losses from natural disasters are doubling every decade. According to the 2002 UNEP report, "Climate Change and the Financial Services Industry," economic losses could reach $1.5 trillion over the next decade, up from $1 trillion over the last 15 years.[13] A 2001 report by Munich Re estimates that combined effects of global warming – including increases in severe storms, mortality, sea level rise, crop damages and water shortages – could result in $300 billion annually in economic losses by 2050.[14]

Status of International Negotiations to Adopt Greenhouse Gas Controls

The Kyoto Protocol: The Kyoto Protocol is an international agreement that seeks to limit greenhouse gas emissions tied to global warming. More than 170 nations are parties to the agreement drafted in Kyoto, Japan, in December 1997. The protocol will enter into force when 55 countries – including industrialized countries accounting for at least 55 percent of 1990 developed country carbon dioxide emissions – enact corresponding domestic legislation. Targets vary by country, but work out to an average emissions reduction of 5.2 percent below 1990 levels by 2012 for industrialized countries. Developing countries are not subject to emission limits but are given incentives to control emissions as their economies grow.[15]

The Kyoto Protocol's entry into force will affect not only companies based in participating countries, but also U.S. multinationals operating there.

U.S. position on Kyoto: The United States, with just 4 percent of the world's population, is responsible for 25 percent of the world's greenhouse gas emissions. Under the Kyoto Protocol, the United States is subject to a 7 percent emissions reduction below 1990 levels by 2012. President Bush withdrew U.S. support for the pact in June 2001, explaining, "The current uncertainty surrounding climate change implies that a realistic policy should involve a gradual, measured response, not a risky, precipitous one."[16] A voluntary response proposed by the Bush administration would allow the nation's CO_2 emissions to rise an estimated 12 percent above 2000 levels – and 26.5 percent above 1990 levels – by 2012, according to independent estimates.[17]

Ratification status of Kyoto: As of March 20, 2003, 106 countries had ratified the Kyoto Protocol, including nations that account for 43.9 percent of developed country emissions. Because 36 percent of developed country emissions are represented by the United States, the onus now falls on a handful of other industrialized nations in order for the protocol to enter into force. Ratification by Russia would bring the protocol past the threshold, since Russia represents 17 percent of 1990 developed country emissions. Japan as well as the European Union and its member states have already ratified the agreement. Australia is the only industrialized country other than the United States that has stated it is not prepared to join the Kyoto Protocol. But Australia remains committed to the treaty's targets and has not ruled out ratification at a future date.[18]

2002 Johannesburg Summit: The August 2002 United Nations World Summit on Sustainable Development in Johannesburg, South Africa, brought together 60,000 delegates from more than 190 countries. It was the largest gathering of governmental and environmental officials since the Earth Summit in Rio de Janeiro, Brazil, in 1992. President Bush did not attend the meeting, but leaders of many other governments reiterated their support for the Kyoto Protocol at the conference. Most significantly, Russia signaled its intent to ratify the protocol in 2003.[19]

Kyoto Protocol enactment and state legislation: The Kyoto Protocol's entry into force now seems all but certain. It will affect not only companies based in participating countries, but also U.S. multinational companies operating there. Companies with U.S.-only operations may be affected by state and municipal legislation enacted in the absence of a federal mandate. California has passed a law to control carbon dioxide emissions from the auto sector. New Hampshire and Massachusetts have adopted legislation to control electric utility CO_2 emissions. Thirteen states have adopted renewable portfolio standards to diversify future power supplies.[20]

Appendix 2: IRRC Company Profiles

Auto Sector

DaimlerChrysler AG
Ford Motor Co.
General Motors Corp.
Honda Motor Co Inc.
Toyota Motor Corp.

Electric Power Sector

American Electric Power Co.
Cinergy Corp.
Southern Co.
TXU Corp.
Xcel Energy Inc.

Oil & Gas Sector

BP plc
ChevronTexaco Corp.
Conoco Phillips Corp.
Exxon Mobil Corp.
Royal Dutch/Shell Group

Other Industry

Alcoa Corp.
DuPont Corp.
General Electric Corp.
International Business Machines Corp.
International Paper Co.

Profile Methodology

Basic Profile
Auto Sector
Electric Power Sector
Oil & Gas Sector

AUTO SECTOR

Daimler Chrysler AG
Stuttgart, Germany

DaimlerChrysler (DCX) is the world's fourth-largest light duty vehicle manufacturer, formed by the acquisition of Chrysler by Germany's Daimler-Benz in 1998. DCX owns a 37% stake in Mitsubishi Motors and a 10% stake in Hyundai Motor. DCX has manufacturing operations in 37 countries and sells its products in more than 200 countries. In 2001, 53% of DCX's revenues were from U.S. sales. DCX had the largest U.S. fleet increase in CO_2 emissions by any automaker in 1990-2000, according to an independent benchmarking study. The study estimates that DCX's annual fleet emissions rose 5.8 million metric tons over the decade to 15.0 MMT for its 2000 fleet. The resulting 64% increase in estimated U.S. fleet emissions was the combination of a 50% increase in sales (including a doubling of light truck sales) and a slight decline in the average fuel economy of its light trucks. (Fuel economy figures exclude credits for sales of flexible-fueled vehicles.) Nearly two-thirds of DCX's U.S. sales in 2000 were light trucks. DCX's CO_2 emissions per U.S. vehicle sold grew by an estimated 7.9% in 1990–2000. DCX says CO_2 emissions per vehicle sold in Europe fell by 23% in 1995–2001. About 44% of DCX's European fleet have diesel engines. In the U.S., DCX will introduce a diesel Jeep Liberty in the fall of 2004 and a Dodge Ram hybrid pickup truck in the spring of 2004.

U.S. Fleet and Vehicle Carbon Emissions

Sales and Market Share

1990: 1,797,000 (14.2%)

2000: 2,694,000 (16.6%)

Fuel Economy (mpg) and Auto/Truck Sales (%)

1990 Cars: 27.1 (51.6%)
1990 Trucks: 21.5 (48.4%)

2000 Cars: 26.9 (35.7%)
2000 Trucks: 20.4 (64.3%)

Vehicle CO_2 Emissions Rate

1990: 5.16 tons CO_2/year

2000: 5.57 tons CO_2/year

U.S. Fleet Carbon Burden (million metric tons of CO_2 per year) and Share of U.S. Auto Industry Total (%)

1990: 9.2 MMT/yr (14.9%) **2000:** 15.0 MMT/yr (18.3%) **1990 – 2000 running total:** 130.6 MMT/yr (16.8%)

Alternative vehicles: More than 50% of DCX's global research budget is devoted to reducing auto fuel consumption and tailpipe emissions. DCX has been testing fuel cell technology since 1994 in a "New Electric Car," now in its fifth test series. In 2003, DCX will deploy and test 30 buses and 60 Mercedes-Benz A Class cars with fuel cell drives. (DCX owns a 24% stake in Ballard Power Systems, a Canadian fuel cell manufacturer.) Since 1998, DCX has offered a micro compact car in Europe, the smart city-coupe cdi, which gets up to 69 mpg (119,900 manufactured in 2001). Mitsubishi plans to offer a vehicle using the same platform and major parts. DCX is a partner in the Department of Energy's FreedomCAR Program to develop advanced technologies for use in vehicles. DCX's Choren Project is researching ways to produce diesel fuel or methanol from biomass. DCX says it may need to take "additional costly steps, including the sale of ethanol flexible fuel vehicles," to comply with U.S. CAFE standards.

Facility and Product Emissions Disclosure

Emissions inventory: DCX measures CO_2 from all company facilities, including purchased energy.

1992 CO_2 emissions: 6.55 million metric tons.

2000 CO_2 emissions: 7.55 MMT (15.3% increase).

Future CO_2 emissions: Not projected.

Emissions savings: In Europe, DCX has cut new vehicle fuel use and CO_2 emissions by 23% in 1995–2001. In European facilities, engine test rigs have been converted to generate electricity, and water has replaced halogenated refrigerants at five refrigeration plants. In U.S. facilities, DCX has engaged in various fuel switching and energy efficiency projects.

Emissions projections: In 2001, DCX set a goal to cut CO_2 emissions over the entire product life cycle, building on an earlier goal to cut CO_2 emissions from facilities. No numerical targets or timetables are provided.

Emissions targets: In Europe, DCX is part of a voluntary industry agreement to cut vehicle fleet CO_2 emissions by 25% in 1995–2008.

Climate Change Policies

Science merits action?
Yes. *(See policy statement.)*

Voluntary measures sufficient?
Unclear. Says industrialized countries must lead in addressing problem.

Supports Kyoto?
Unclear. DCX says it supports and is achieving treaty mandates in Europe, but says actions in the U.S. would be costly and limit product options.

Policy statement: "One of our most important concerns is to reduce fuel consumption and with it emissions of [CO_2]. Because even if the ultimate scientific proof… has yet to be provided, we must still take precautionary measures." DCX's full 2002 Environmental Report is available at: http://www.daimlerchrysler.com/index_e.htm.

Climate-Related Associations

Global Climate Coalition: Chrysler was a founding member in 1989. DCX withdrew in January 2000.

MIT Joint Program on the Science & Policy of Global Change: Founding member. Joined in 1998.

AUTO SECTOR

Daimler Chrysler AG
Stuttgart, Germany

Board Oversight

Chairman of Supervisory Board: Hilmar Kopper. **Age:** 66.

Chairman of Management: Jürgen E. Schrempp. **Age:** 57

Board of directors: 20 members; 10 elected by shareholders and 10 chosen by employees. Elected annually.

Avg. age: 55 **Avg. tenure:** 8 years

Standing committees: 3 — Presidential, Financial Audit, Mediation.

Environmental oversight: DCX has a 20-member board of supervisors and a 13-member board of management. It has not charged a committee of either board with oversight of the company's environmental affairs. The board of supervisors has not conductal review of climate change. DCX's Global Environmental Council is a cross-divisional executive body coordinating product- and production-related environmental issues, including climate change. The board of management, which includes the heads of DCX's operating and functional divisions, created an Executive Automotive Committee in 2001. The EAC serves as an "effective, efficient and goal-oriented instrument for coordinating our global automotive business." Technology is one of four focus areas. (Environment is not explicitly listed.) DCX says "This detailed coordination will enable us to keep ahead of the competition with our next generation of vehicles."

Selected Director Affiliations

Hilmar Kopper is chairman of the DCX supervisory board and the supervisory board of Deutsche Bank AG. He is also a director of Akzo-Nobel N.V., Bayer AG, Solvay S.A., Xerox Corporation and Unilever N.V.

Erich Klemm is deputy chairman of the DCX supervisory board and employee chairman of the DCX Corporate Works Council.

Earl Graves is chairman and CEO of Earl G. Graves Ltd., publisher of Black Enterprise magazine. He is also a director of Aetna Life and Casualty Co., AMR Corp., Federated Department Stores and Rohm & Haas Corp.

Peter Magowan is the president of San Francisco Giants. He is also a director of Caterpillar Inc. and Safeway Inc.

Manfred Schneider is chairman of the board of management of Bayer AG. He is also a director of Allianz AG, Metro AG, RWE AG and Linde AG.

Lynton Wilson is chairman of CAE Inc. and Nortel Networks Corp. He is also a director of Imperial Oil Ltd., Ontario Power Generation Inc. and Nortel Networks Corp.

Management Accountability

Top Environmental official: Herbert Kohler, Chief Environmental Officer. Also heads DCX's "Body and Powertrain" research unit.

Reports to: Dr. Thomas Weber, deputy member of the board of management for research and technology.

# of reporting levels to CEO: 1.

# of EHS staff: 70

Env. link to compensation: Top execs.: Yes Operating managers: Yes Other staff: Yes

Env. audits: First EMAS validation in 1995. Major facility audits occur at least every 3 years for EMAS and ISO 14001 certification; additional internal audit cycles. DCX will certify all plants in line with ISO 14001 by 2003

Auditors: Corporate staff and staff from other facilities for internal audits. Uses third-party auditors for EMAS and ISO 14001 audits.

Review and disclosure: Division managers review internal audits; summaries are not made public. EMAS validation includes an environmental declaration.

Stakeholder Disclosure

Form 20-F: Three-paragraph discussion of requirements in Europe and proposed in U.S. Says U.S. CO2 emission controls "could be costly to DCX and could significantly restrict the products it is able to offer in the U.S."

Annual report: Brief mention of climate change issue. Says "we will have to continuously lower fuel consumption" in part to address "continuing climatic changes" due to fossil fuels.

EHS report: Issued its first post-merger environmental report in 1999; now issued annually. Report has extensive information on technology innovation, especially fuel cells. Listing of CO2 emissions from various car models, and trends in fuel consumption of German vehicles. Also listing of energy consumption and CO2 trends in vehicle production. Limited discussion of climate change science.

Stakeholder dialogue: In addition to issuing an annual environmental report, DCX has been a charter partner of the United Nations' Global Compact. The U.N. compact is based on collaboration with non-governmental organizations, international trade unions and business enterprises. DCX has published a 15-page brochure about its involvement.

Shareholder Activity

No shareholder resolutions filed on climate change or fuel economy issues.

AUTO SECTOR

Ford Motor Company
Dearborn, Michigan

Ford Motor is the world's second-largest light duty vehicle manufacturer and the largest maker of light-duty trucks. It owns Austin Martin, Jaguar, Volvo, Land Rover and has a 33% stake in Mazda. In the U.S. Ford accounted for 27% of CO_2 emissions from vehicles sold in 1990–2000, according to an independent benchmarking study. Ford raised the fuel economy of its U.S. auto fleet slightly over the period, but that was offset by a decline in the fuel economy of its light trucks—sales of which grew 73%. Overall, Ford's U.S. fleet CO_2 emissions rose an estimated 25% over the period; emissions per U.S. vehicle sold rose 5%. In 2000, Ford reported that its facilities and vehicles emit 400 million metric tons of CO_2 a year, with vehicles accounting for 97% of the total. Ford has set a target to reduce energy use from global operations by 14% in 2000–2005 on a production-normalized basis. Ford is the first automaker to participate in emissions trading schemes in the U.S. and the U.K., and has set targets to reduce facility emissions.

U.S. Fleet and Vehicle Carbon Emissions

Sales and Market Share

1990: 3,182,000 (25.2%)

2000: 3,825,000 (23.6%)

Fuel Economy (mpg) and Auto/Truck Sales (%)

1990 Cars: 26.6 (65.1%)
1990 Trucks: 20.4 (34.9%)

2000 Cars: 27.0 (49.9%)
2000 Trucks: 20.1 (50.1%)

Vehicle CO_2 Emissions Rate

1990: 5.16 tons CO_2/year

2000: 5.40 tons CO_2/year

Fleet Carbon Burden (million metric tons of CO_2 per year) and Share of Industry Total (%)

1990: 16.5 MMT/yr (26.4%) **2000:** 20.6 MMT/yr (25.2%) **1990–2000 running total:** 210.3 MMT/yr (27.1%)

Alternative vehicles and R&D: Ford makes more alternative-fueled vehicles than all other manufacturers combined, including dedicated and bi-fuel vehicles that operate on natural gas, propane, ethanol, or a combination of alternative fuels and gasoline. (These sales yield credits toward CAFE compliance.) In late 2003, Ford will introduce a hybrid SUV, the Escape, that gets 35–40 mpg for city driving, using a hybrid motor from a Japanese supplier. Ford's Sustainability Mobility Group is conducting advanced powertrain R&D of fuel cell vehicles, including testing and demonstration of a Focus fleet. (Ford owns a 20%-stake in Ballard Power Systems, a fuel cell manufacturer based in Canada.) In 2002, Ford suspended efforts to build a battery-powered Th!nk line of cars, suited for driving in urban environments, citing lack of market demand. In 2000, Ford established the Carbon Mitigation Initiative at Princeton University (along with BP) to conduct basic research on carbon capture, storage and conversion to a hydrogen-based economy.

Faciliity and Product Emissions Disclosure

Emissions inventory: Yes. Reports CO_2 from worldwide facilities, including purchased energy.

1990 CO_2 emissions: Not disclosed.

2000 CO_2 emissions: 9.3 million metric tons.

Future CO_2 emissions: Not projected.

Emissions savings: In the U.S., Ford's facilities cut direct CO_2 emissions by 3.4%, to 1.54 MMT, and indirect CO_2 emissions by 1.9%, to 3.46 MMT, in 1998–2001. In Europe, Ford has cut vehicle fuel use and CO_2 emissions by 13% in 1995–2001, toward a 25% target set for 2008.

Energy use projections: Ford has set a target to reduce energy use from global operations by 14% in 2000–2005 on a production-normalized basis. Goals to be achieved through energy savings, fuel switching and other means.

Emissions targets: Ford will cut U.S. facility emissions by 4% in 2003–2006 under the Chicago Climate Exchange, and its U.K. emissions by 5% in 2002–2007 under the U.K. Emissions Trading Scheme.

Climate Change Policies

Science merits action?
Yes. (See policy statement.)

Voluntary measures sufficient?
Supports customer tax incentives for fuel-efficient advanced technologies.

Supports Kyoto?
No. Ford also opposed California legislation to restrict CO_2 emissions in California. Ford supports market-based approaches to limit emissions.

Policy statement: Chairman Bill Ford stated in 2000: "There is emerging consensus around climate change. This stands out from other environmental issues because of its potentially serious consequences and its direct relationship to our industry. The global temperature is rising and the evidence suggests that the shift is being affected by human activity, including emissions related to fossil fuels used for transportation. While uncertainties remain…, We believe it is time to take appropriate action." Ford's Corporate Citizenship Report is available at www.ford.com/go/corpcit.

Climate-Related Associations

Chicago Climate Exchange: Founding member in 2003. First automaker to enter into this voluntary trading program.
CERES Principles: Endorsed in 2000.
EPA Energy Star: Has also registered 1998–2001 U.S. emissions under DoE 1605(b) registry.
EPA Green Power Partnership: Founding member. Committed to secure 2% of energy supply from renewables.
Global Climate Coalition: First U.S. automaker to drop out of the GCC in December 1999.
UK Emissions Trading Scheme: Joined in 2002. First automaker to enter into this voluntary trading program.

AUTO SECTOR

Ford Motor Company
Dearborn, Michigan

Board Oversight

Chairman and CEO: William Clay Ford, Jr. (since 2001).

Age: 44. Also chairs the Environment & Public Policy Committee.

Board of directors: 14 members; 8 independent. Elected annually. Met 12 times in 2001.

Avg. age: 59 **Avg. tenure:** 11 years

Standing committees: 5 — Audit, Compensation, Environment & Public Policy, Finance, Nominating and Governance.

Environmental oversight: The Environmental & Public Policy Committee (established in 1997) monitors social, environmental and ethical strategies, as well as Ford's progress in growing the business globally within the framework of its values. It consists of the chairman/CEO and five independent directors. *(See * listings in Director Affiliations.)* The committee met twice in 2001. Ford also has a Strategy and Business Governance Committee that includes most Ford senior managers. This committee is charged with setting overall strategy on climate change, including analyzing potential targets and product scenarios for achieving emissions reductions.

Selected Director Affiliations

Ford family members **Edsel***, **William Clay** and **William Clay Jr.*** own 32.7% of Ford Class B common stock.

John Bond* is chairman of HSBC Holdings (1998–present) and is a director of the Institute of International Finance.

Irvine Hockaday is the retired president and CEO of Hallmark Cards (1986–2001). He is also a director of Crown Media Holdings, Dow Jones & Company, Estee Lauder., Sprint Corp. and UtiliCorp United Inc.

Marie-Josee Kravis is a senior fellow of the Hudson Institute (1994–present). She is also a director of Canadian Imperial Bank of Commerce, Hollinger International Inc., USA Networks Inc. and Vivendi Universal.

Ellen Marram* is managing director of North Castle Partners LLC and is a director of The New York Times.

Homer Neal* is a professor of physics at the University of Michigan (1987–present). He has served as a member of the U.S. National Science Board and of the Advisory Board of the Oak Ridge National Laboratory.

Jorma Ollila* is chairman/CEO of Nokia (1999–present) and a director of Otava Books and UPM-Kymmene Corp.

Carl Reichardt is vice chairman of Ford Motor (2001–present). He is also a director of ConAgra, HCA Healthcare, HSBC Holdings PLC, McKesson HBOC, Newhall Management Corp. and PG&E Corp.

Management Accountability

Top EHS official: Susan Cischke, Vice President, Environmental & Safety Engineering.

Reports to: Martin Zimmerman, Group Vice President, Corporate Affairs.

# of reporting levels to CEO: 2

# of EHS staff: 350

Env. link to compensation: Top execs.: Yes Operating managers: Yes Other staff: No. *In 2001, Ford added environmental data, including energy use, to a scorecard evaluating manufacturing performance.*

Env. audits: Employed since 1973. Facility audits every year. All Ford and supplier manufacturing sites will be ISO 14001 certified by July 2003.

Auditors: Corporate and plant staff conduct internal audits. Third-party auditors conduct ISO 14001 re-certification each year.

Review and disclosure: Board Environmental & Public Policy Committee reviews environmental audits. Summaries not made public.

Stakeholder Disclosure

Form 10-K: Seven-paragraph discussion, especially concerning requirements in Europe. Says U.S. CO_2 emission controls "could have substantial adverse effects on [Ford's] sales volumes and profits."

Annual report: No mention of climate change issue.

EHS report: Issued annually since 1995. Ford adopted Global Reporting Initiative format in 1999. Web site has extensive discussion of climate change policy responses and sustainability issues. It includes data on recent CO_2 emissions trends from U.S. and European vehicles.

Stakeholder dialogue: Ford has conducted dialogue sessions and engaged with NGOs on climate change on an ongoing basis. As part of its CERES commitment, Ford publishes a Corporate Citizenship Report based on the Global Reporting Initiative guidelines. The 65-page 2001 report includes a 20-page section on stakeholder relationships with communities, employees, customers, investors, suppliers, dealers and civil society. Climate change and sustainable mobility are key focuses of the report.

Shareholder Activity

Report on climate change: Shareholder proposals asking Ford to report on the costs and liabilities of global warming came to votes in 1998 (3.0% support) and 1999 (2.6% support). The primary filers were church groups.

Report on fuel efficiency: Church filers withdrew a resolution in 2000 asking Ford about its plans to increase vehicle fuel efficiency standards. The withdrawal came after Ford announced it was leaving the Global Climate Coalition.

AUTO SECTOR

General Motors Corp.
Detroit, Michigan

General Motors is the world's largest vehicle manufacturer, with15% of the world light duty vehicle market. It has manufacturing facilities in 30 countries and sells cars and light trucks in some 200 countries. As the largest seller of light duty vehicles in the U.S., GM accounted for about one-third of CO_2 emissions from vehicles sold in 1990–2000, according to an independent benchmarking study. GM was the only automaker to raise the fuel economy of both its U.S. car and light truck fleets in 1990–2000, according to the study, helping to limit its estimated growth in CO_2 emissions per vehicle to under 3%. For the GM fleet overall, the estimated growth in emissions was nearly 13% in 1990–2000, reflecting a 9% gain in sales (including a 57% gain in light-truck sales). For 2000–2005, GM has set goals to decrease greenhouse gas emissions from its North American facilities and energy use by its global facilities each by 10%. In 1995, GM was the first automaker to voluntarily record its emissions reductions in the federal registry.

U.S. Fleet and Vehicle Carbon Emissions

Sales and Market Share

1990: 4,326,000 (34.2%)

2000: 4,742,000 (29.3%)

Fuel Economy (mpg) and Auto/Truck Sales (%)

1990 Cars: 27.3 (71.6%)
1990 Trucks: 19.7 (28.4%)

2000 Cars: 27.6 (54.5%)
2000 Trucks: 20.6 (45.5%)

Vehicle CO_2 Emissions Rate

1990: 5.05 tons CO_2/year

2000: 5.20 tons CO_2/year

Fleet Carbon Burden (million metric tons of CO_2 per year) and Share of Industry Total (%)

1990: 22.0 MMT/yr (35.1%) **2000:** 24.6 MMT/yr (30.1%) **1990–2000 running total:** 254.3 MMT/yr (32.8%)

Alternative vehicles: GM plans to make electric-assist or hybrid motors an option on more than a dozen vehicle models by 2007. An integrated starter alternator system on two full-size GM pickup truck models will be available in late 2003, boosting fuel economy by 10–12%. Displacement on Demand (DoD) engines will be available starting in the 2005 model year and featured on more than 2 million vehicles by 2008. DoD may boost fuel economy up to an additional 8%. In 2005, GM will introduce a Saturn SUV with an advanced hybrid system that is expected to get 40 mpg and improve fuel economy up to 50%. GM also is developing advanced diesel engines for the U.S. heavy-duty truck market. GM is a partner in DOE's FreedomCAR Program to develop advanced technologies for use in vehicles. GM's HyWire concept car envisions use of fuel cells, drive-by-wire technology and a reconfigurable design. In the long term, GM says development of fuel cell technologies and alternative fuels, such as renewable hydrogen and ethanol made from cellulose, are the most effective ways to improve energy efficiency and cut GHG emissions.

Facility and Product Emissions Disclosure

Emissions inventory: Measures CO_2 from facilities and initial charges of refrigerants in vehicles.

1990 CO_2 emissions: 11.67 million metric tons (MMT).*

2000 CO_2 emissions: 10.13 MMT (a 13% decrease).*

Future CO_2 emissions: Not projected companywide.

*U.S. facility CO_2 emissions only.

Emissions savings: In the U.S., GM has cut CO_2 facility emissions by 18.4% in 1990–2001, to 9.52 MMT in 2001. Savings achieved mainly through fuel switching, energy management systems and consolidation. GM has cut use of refrigerants and halogenated compounds by 90.5% in 1990–2001, to 3.96 MMT of CO_2 equivalent in 2001.

Emissions projections: GM has a target of a 10% reduction in CO_2 emissions from its North American facilities in 2000–2005, and a 25% reduction in energy use in those facilities from 1995–2005. GM also has a goal to cut global energy use 10% in 2000–2005.

Emissions targets: In Europe, GM is part of an industry voluntary agreement and says it is on track to cut fleet fuel use and tailpipe CO_2 emissions by 25% in 1995–2008.

Climate Change Policies

Science merits action?
GM says it "continues to support scientific research to improve the understanding of possible long-term effects of economic growth and other human activities on the climate system."

Voluntary measures sufficient?
Yes. Policy response is "best facilitated by voluntary initiatives and market-oriented measures, not government mandates."

Supports Kyoto?
No. GM also may file a lawsuit to block a California law restricting auto CO_2 emissions.

Policy statement: GM says "the development and global implementation of new, cost-effective technologies is the most effective way to improve energy efficiency and reduce greenhouse gas emissions." GM has a website devoted to sustainability issues at: http://gm.com/company/gmability/sustainability/reports/02/home.html.

Climate-Related Associations

CERES Principles: In 1994, GM became the third large public firm and first auto company to endorse the principles.

Climate Leaders: Joined in 2002. Will cut CO2 emissions by 10% in its North American facilities in 2000–2005.

EPA Energy Star: 2001 Partner of the Year. Also EPA WasteWise Partner of the Year in 2002.

EPA Green Power Partnership: Joined in 2001. Founding member. Also Green Power Market Development Group.

Global Climate Coalition: Joined in 1998. Dropped out in March 2000.

AUTO SECTOR

General Motors Corp.
Detroit, Michigan

Board Oversight

Chairman: G. Richard Wagoner

Age: 50.
(Jack Smith retired in April 2003.)

Board of directors: 12 members; 10 independent. Elected annually. Met 8 times in 2001.

Avg. age: 57 **Avg. tenure:** 4.5 years

Standing committees: 6 — Audit, Capital Stock, Director and Corporate Governance, Executive Compensation, Investment Funds, Public Policy.

Environmental oversight: The Public Policy Committee (created in 1970) is responsible for overseeing GM's environmental affairs. *(See * listings in Director Affiliations.)* Topics reviewed by the committee include research and development, environmental and energy matters, auto safety, employee health and safety, diversity, health care, education, communications, trade and philanthropic activities. Environmental focus areas in 2001 were corporate average fuel economy standards, the zero emissions vehicle mandate in California and end-of-life vehicle dismantling and recycling in Europe. In 2002, the committee's environmental review focused on GM's facility as well as product performance, advanced technology plans, sustainability and climate change. It met four times in 2001 and in 2002.

Selected Director Affiliations

Percy Barnevik* is chairman of AstraZeneca PLC (1999–present) and was chairman of ABB Ltd. (1997–2001). He chairs GM's Public Policy Committee.

John Bryan is the retired chairman and CEO of Sara Lee Corp. (1976–2001) and is a director of BP PLC.

Armando Codina* is chairman and CEO of the Codina Group, a commercial real estate firm based in Florida. He is also a director of AMR Corp., BellSouth Corp. and FPL Group.

George Fisher is the former chairman and CEO of Eastman Kodak (1993–2001). He is also a director of AT&T, Delta Air Lines and Eli Lilly & Company, and is chairman of the National Academy of Engineering.

Karen Katen* is executive vice president of Pfizer Inc. (2001–present). She is also a director of Harris Corp.

Alan Lafley is chairman, CEO and president of The Procter & Gamble Company (2002–present). He is also a director of General Electric.

Management Accountability

Top EHS official: Elizabeth Lowery, Vice President, Environment & Energy.

Reports to: Thomas Gottschalk, Executive Vice President, Law and Public Policy and General Counsel.

# of reporting levels to CEO: 1.

GM also has a Public Policy Center led by company vice presidents that "anticipate external trends and changes that could impact our business decisions."

# of EHS staff: 75 **Env. link to compensation:** Top execs.: Yes Operating managers: Yes Other staff: Yes

Env. audits: Employed since 1972. Conducted on a risk-prioritized basis under direction of GM Legal Staff. Virtually 100% of GM facilities conform with ISO 14001 environmental management standards.

Auditors: GM Audit Staff and qualified outside service providers working under direction of GM Legal Staff.

Review and disclosure: Board Audit Committee annually reviews environmental audit experience in summary. Summaries not made public. Public Policy Committee receives performance briefing.

Stakeholder Disclosure

Form 10-K: No mention of climate change issue.

Annual report: No mention of climate change issue.

EHS report: Issued annually since 1994 using CERES format. GM adopted Global Reporting Initiative format in 1999. Web site has extensive discussion of advanced technologies and climate change policy responses. Data on recent emissions trends from facilities and vehicles.

Stakeholder dialogue: Stakeholders credit GM for its collaboration on voluntary, strategic projects like the Global Reporting Initiative, and on technical, time-limited projects leading to environmentally preferable outcomes, such as reducing chemical use or increasing recycling. CERES evaluation says GM has been more guarded on policy issues.

Shareholder Activity

Report on climate change: Shareholder proposals asking GM to report on the costs and liabilities of global climate change came to votes in 1998 and 1999, receiving 4.6% support each time. The primary filers were church groups.

Report on fuel efficiency: Church filers withdrew a resolution in 2000 asking GM about its plans to increase vehicle fuel efficiency standards. Withdrawal came after dialogue and GM announced pullout from Global Climate Coalition.

AUTO SECTOR

Honda Motor Co. Inc.
Tokyo, Japan

Honda is the world's seventh largest vehicle manufacturer. It has production facilities in 30 countries and sells vehicles in 109 countries. In fiscal 2002, 56% of its sales were in North America, 25% were in Japan and 8% were in Europe. Automobile sales account for about 80% of Honda's total revenue. (It also makes motorcycles, portable generators, outdoor motors, and commercial and residential-use machinery.) Honda's U.S. vehicle fleet has the highest fuel economy rating of any major automaker. In 1990–2000, its U.S. fleet had a 22% increase in CO_2 emissions, according to an independent benchmarking study. The increase resulted from a 22% increase in sales, including expansion of its model line into sport utility vehicles and minivans. Because Honda raised the fuel economy of its new cars by 3.6% in 1990–2000, it was able to hold CO_2 emissions per U.S. vehicle sold virtually constant over the period (despite the new light-truck offerings). Honda's two-passenger Insight, equipped with a gasoline-electric hybrid engine, is among the world's most fuel-economical cars. Honda also produces a five-passenger Civic Hybrid and a dedicated natural gas vehicle, the Civic GX. Honda recently delivered the first fuel cell vehicle to be government-certified as a zero emission vehicle to the City of Los Angeles.

U.S. Fleet and Vehicle Carbon Emissions

Sales and Market Share

1990: 938,000 (7.4%)

2000: 1,141,000 (7.0%)

Fuel Economy (mpg) and Auto/Truck Sales (%)

1990 Cars: 30.4 (100%)
1990 Trucks: No trucks

2000 Cars: 31.5 (83.7%)
2000 Trucks: 25.3 (16.3%)

Vehicle CO_2 Emissions Rate

1990: 4.09 tons/year

2000: 4.10 tons/year

Fleet Carbon Burden (million metric tons of CO_2 per year) and Share of Industry Total (%)

1990: 3.85 MMT/yr (6.2%) **2000:** 4.70 MMT/yr (5.7%) **1990–2000 running total:** 39.56 MMT/yr (5.1%)

Alternative vehicles and R&D: Honda's R&D expenses were equal to 5% of sales in fiscal 2002. Honda is focused on environment-related technologies and corporate activities aimed at "zero environmental impact" and is developing alternative energy technologies. In 1999, Honda introduced the Insight, a gasoline-electric two-passenger car that gets 70 mpg, followed in 2002 by the Civic Hybrid, a five-passenger model that gets about 50 mpg. Honda may introduce hybrid versions of its Odyssey minivan, Acura MDX and Pilot SUV in the next few years. Honda has applied some R&D funds for experimental operations at a solar-powered hydrogen production and fueling station for fuel cell vehicles as well as for development of ultracompact fuel cells. Honda introduced a prototype fuel cell vehicle in late 2002. Honda says it plans to continue to "expand the use of next-generation engines that enable both the improvement of fuel efficiency and the cleanliness of exhaust gases." Honda was a leader in offering cars with lean-burn engines and variable valve timing. Its new "dual and sequential ignition" system engine without electric assist, equipped with two ignition plugs, enables its new subcompact car, the Fit, to get 55 mpg with very low exhaust emissions.

Facility and Product Emissions Disclosure

Emissions inventory: Honda measures CO_2 emissions from production and logistics.

1990 CO_2 emissions: 615,600 metric tons.*

2000 CO_2 emissions: 506,000 MT (18% reduction).*

Future CO_2 emissions: 480,000 MT target for 2002.*
** (Emission figures are for Japanese facilities only.)*

Emissions projections: In Japan for 2002, Honda projected that CO_2 emissions would be 480,000 metric tons for production and 126,400 MT for vehicle transport. (See also emission targets.)

Emissions savings: In Japan, Honda achieved a 21% reduction in production-related CO_2 emissions in 1990–2001. Cuts achieved mainly through energy savings, increased cogeneration, reductions in spot welding and greater use of waste heat. Emissions intensity in Japan fell 16% (per unit of sales) over the period.

Emissions targets: Toward 2010, Honda is seeking a 30% reduction in energy intensity in Japan, compared with 1990. Honda sets annual CO_2 targets for production and transport of finished vehicles, and per unit of sales.

Climate Change Policies

Science merits action?
Yes.

Voluntary measures sufficient?
No. "[U]rgent priority to mitigate the impacts [of vehicles] on the environment."

Supports Kyoto?
Yes. Cites the Kyoto Protocol as the means to promote necessary CO_2 reduction efforts in Japan.

Policy statement: "Global warming involves a relentless increase in global atmospheric temperature due to increased emission of greenhouse gases… into the atmosphere…. The most typical greenhouse gas is CO_2 generated by the consumption of fossil fuels. To bring the emission of CO_2 down is essential at all stages of human activities." Honda's full Ecology Report is available at: http://world.honda.com/environment/ecology/ecology_full.pdf.

Climate-Related Associations

U.S. Climate Partnership Association.

AUTO SECTOR

Honda Motor Co. Inc.
Tokyo, Japan

Board Oversight

Chairman: Yoshihide Munekuni. (Since 1997.) **Age:** 64.

Chief Executive Officer: Hiroyuki Yoshino. (Since 1998) **Age** 63.

Board of directors: 35 employee directors, one outside director and four corporate auditors. Directors elected annually.

Avg. age: 56
Avg. tenure: 6 years

Standing board committees: None. Honda has a board of corporate auditors. It does not have a compensation or nominating committee.

Environmental oversight: Honda established a Japan Environmental Committee in 1991 and a World Environment Committee in 1995 (which reports to the Executive Committee). Regional environmental committees and individual departments are responsible for implementing three-year plans under a "Plan, Do, Check, Action" process set by the Executive Committee and overseen by the World Environmental Committee. Each factory or office has a General Environmental Administrator. Honda launched its "Green Factory" planning concept in 1997 to promote environmentally sound manufacturing practices, including conserving energy and reducing CO_2 emissions. Its goal is to achieve "zero load on the environment" through recycling and use of renewable resources.

Selected Director Affiliations

Koichi Ameniya is an executive vice president (since 1997) and chief operating officer of North American operations.

Takeo Fukui is president and director of Honda R&D (since 1998).

Atsuyoshi Hyogo is senior executive vice president and chief operating officer of American Honda Motor (since 1996).

Takanobu Ito is senior managing director of Honda R&D (since 2001).

Satoru Kishi is chairman of the board of the Bank of Tokyo-Mitsubishi Ltd. (Honda's main creditor).

Masahiro Yoshimura is director of Automobile New Model Center in Production Operations (since 1992).

Hiroyuki Yoshino is chief executive officer (since 1998).

Yahuharu Tabuta is a corporate auditor (since 1997) and advisor of the Ryoshin DC Card Co. Ltd.

Management Accountability

Top environmental official: Michiyoshi Hagino, Chief Operating Officer for Automobile Operations and representative director (both since 1999).

Reports to: Hiroyuki Yoshino, CEO and President

# of reporting levels to CEO: 0.

# of EHS staff: No data.

Environmental link to compensation: No information provided.

Env. audits: Each facility is audited annually for progress toward medium-term environmental plan. Surveillance audits conducted by third-party firms.

Auditors: Internal auditing teams, engineers from other factories and external certification groups. Major facilities and suppliers are ISO 14001-certified.

Review and disclosure: General Environmental Administrators' Committee reviews audits. Discloses number of "recommendations, findings and advices."

Stakeholder Disclosure

Form 20-F: No explicit mention of climate change issue or CO_2 emission controls. Several broader references to fuel economy and emission control requirements and initiatives.

Annual report: Virtually no discussion of climate change. Notes that two production facilities in Japan have cut CO2 emissions 20-40% after recent renovations.

Environmental report: Honda Ecology report issued annually since 1998; fully revamped in 1999. Lists CO_2 emissions from vehicles sold in Japan, trends in production-related emissions. Discussion of engine technology, including fuel economy and exhaust gases. Discussion of emissions and emissions savings from production and logistics, including energy conservation measures. Discussion of next-generation environmental technologies, including hybrid vehicles and fuel cells.

Stakeholder dialogue: In addition to issuing an annual environmental report, Honda has environmental exhibitions at each of its facilities as a means of providing interaction with local communities. Since 1996, Honda has held three "Green Conferences" to promote environmental goals among its suppliers.

Shareholder Activity

No shareholder resolutions filed on climate change or fuel economy issues.

AUTO SECTOR

Toyota Motor Corp.
Toyota City, Japan

Toyota is the world's third largest vehicle manufacturer. It has production facilities in 25 countries and sells vehicles in about 160 countries. In fiscal 2002, 40% of its unit sales were in Japan, 32% were in North America and 13% were in Europe. In 1990-2000, Toyota's U.S. vehicle fleet had the largest percentage increase in CO_2 emissions of any automaker, according to an independent benchmarking study. The increase resulted from a near-doubling of its U.S. sales (including a 150% increase in light truck sales) and a slight decline in the average fuel economy of its fleet. Its CO_2 emissions per U.S. vehicle sold rose 6.1% in 1990-2000, according to the study. Toyota introduced the first hybrid commercial vehicle in 1997; it sold its 100,000th Prius sedan in 2002. Toyota says cutting CO_2 emissions is a top priority. It reported CO_2 emissions from global affiliates for the first time in 2001 and has set goals through 2005.

U.S. Fleet and Vehicle Carbon Emissions

Sales and Market Share

1990: 798,000 (7.7%)

2000: 1,586,000 (9.8%)

Fuel Economy (mpg) and Auto/Truck Sales (%)

1990 Cars: 30.6 (76.1%)
1990 Trucks: 21.9 (23.9%)

2000 Cars: 30.0 (62.8%)
2000 Trucks: 21.8 (37.2%)

Vehicle CO_2 Emissions Rate

1990: 4.45 tons/year

2000: 4.72 tons/year

Fleet Carbon Burden (million metric tons of CO_2 per year) and Share of Industry Total (%)

1990: 4.37 MMT/yr (7.0%) 2000: 7.49 MMT/yr (9.2%) 1990–2000 running total: 59.31 MMT/yr (7.6%)

Alternative vehicles and R&D: Toyota invests 5% of its annual revenue in R&D. It says these efforts, "particularly the development of environmentally friendly new vehicle technologies and intelligent transport systems, provide it with a strategic advantage as a global competitor." Toyota is a leading developer of gasoline-electric hybrid vehicles. It introduced the first commercially available hybrid car in 1997. The Prius four-passenger sedan gets 48 mpg in city driving. In Japan, Toyota also sells hybrid versions of the Crown sedan, Estima minivan and Coaster mini-bus. It sold 37,000 hybrid vehicles in 2001, and expects to sell 300,000 hybrids annually by 2007 (including hybrid versions of the Lexus RX330 SUV, Toyota Highlander SUV and Sienna Minivan). Employing scalable technology, Toyota hopes to have hybrid versions available across all of its model lines by 2012. Ford is purchasing hybrid engine parts for its Escape SUV from a Toyota affiliated company in 2003; Nissan plans to do so in 2006. Toyota rolled out its first fuel-cell concept car in late 2002, but does not expect mass production of fuel-cell vehicles until after 2010. Toyota's ECO project, launched in 1996, spurred production of several fuel-saving technologies, such as lean-burn engines, variable-valve timing, and direct-injection gasoline and diesel engines. Emphasis now is on system controls, such as computer control of fuel injection, gear shifting and regenerative braking. Toyota has R&D alliances with GM for development of advanced environmental technologies, and with ExxonMobil for development of fuels compatible with future power sources.

Facility and Product Emissions Disclosure

Emission inventory: Toyota tracks all six Kyoto-regulated greenhouse gases from production and logistics.

1990 CO_2 emissions: 1.95 million metric tons.

2000 CO_2 emissions: 1.70 MMT (13% decrease).*

2005 CO_2 emissions: Not to exceed 1.85 MMT.

** Emissions were 5.54 MMT for 55 affiliated companies.*

Emissions savings: Toyota has cut CO_2 intensity per unit of sales by 25% since 1990 (to 2.06 metric tons per billion yen in 2001), including a 9% reduction in 2001 alone. Savings include product line consolidation, energy conservation, increased cogeneration and wind power purchases (projected to reach 2 million kWh in 2002).

Production emissions targets: Toyota has set a goal not to exceed 1.85 MMT of CO_2 emissions from production in 2005 (5% below 1990 levels). Emissions in 2001 were 1.63 MMT from production. The 2005 goal for logistics is 0.32 MMT; 2001 emissions were 0.29 MMT. (Logistics include vehicle shipments and wrapping materials.)

Vehicle emissions targets: For Japanese vehicles, Toyota has a goal to achieve 2010 fuel efficiency standards in all vehicle categories by 2005; 51% of production met that goal in 2001. In Europe, Toyota is part of a voluntary industry agreement to cut vehicle fuel use and CO_2 emissions by 25% in 1995–2008.

Climate Change Policies

Science merits action?
Yes.

Voluntary measures sufficient?
Unclear. Focusing on unilateral efforts it can take to help address the problem.

Supports Kyoto?
Unclear. Toyota says it is achieving treaty mandates in Japan and Europe, but similar actions in the U.S. would be costly and limit product options.

Policy statement: "It is an undeniable fact that the automobile has been one of the major elements [in global warming] impact on the earth. We must be fully aware of this fact, and must endeavor by all means to balance our accounts." Toyota's 2002 Environmental Report is available at: http://www.toyota.co.jp/en/ci.html.

Climate-Related Memberships

Pew Center on Climate Change: Joined Business Environmental Leadership Council in 1998 as a founding member.

AUTO SECTOR

Toyota Motor Corp.
Toyota City, Japan

Board Oversight

Chairman: Hiroshi Okuda. (Since 1999.) **Age:** 69.

Chief Executive Officer: Fujio Cho. (Since 1999) **Age:** 65

Board of directors: 57 employee directors and six corporate auditors (including one outside auditor). Directors are elected for two-year terms, set to expire in June 2004.

Avg. age: 60 **Avg. tenure:** 6 years

Standing board committees: None. Toyota has a board of corporate auditors. It does not have a compensation or nominating committee.

Environmental oversight: Toyota established an Environmental Committee in 1992, chaired by President Fujio Cho. It created a secretariet of Environmental Committees in 1998 to draft and manage company-wide environmental policy, and to implement annual and five-year action plans. Toyota formed a "Global Warming Prevention Council" in 1998, made up of 25 Toyota group companies and affiliates to meet the CO_2 emission targets set by the Kyoto Protocol. Toyota expects to meet the goal by raising production efficiency throughout the company and its affiliates. An intranet Environmental Information Network System was developed in 2001 to evaluate environmental actions and promote performance improvements at some 60 companies subject to consolidated environmental management.

Selected Director Affiliations

Ryuji Araki is an executive vice president (since 2001) and is a director of New United Motor Manufacturing Inc.

Fujio Cho is company president (since 1999) and was president of Toyota Motor Manufacturing USA (1988–1994). He also serves as a director of Aioi Insurance Co. Ltd.

Kosuke Ikebuchi is vice chairman (since 2001) and is a director of New United Motor Manufacturing Inc.

Iwao Isomura is vice chairman (since 1996) and is a director of Central Japan Railway Co. and UFJ Holdings Inc.

Katsuhiro Nakagawa is a senior managing director. Before joining the company in 2001, he was the executive advisor of The Tokio Marine and Fire Insurance Co. Ltd. (1998–2001) and deputy director-general of the Industrial Policy Bureau at the former Japanese Ministry of International Trade and Industry.

Yoshitoshi Toyoda is a company corporate auditor (since 1982). He is honorary chairman of Toyota Industries Corp. Three other members of the Toyoda family also are members of the board of directors. These include Shoichiro Toyoda, who is honorary chairman of Toyota Motor Corporation (director since 1952).

Hiroyuki Watanabe is general manager of the Toyota Fuel Cell System Development Center (appointed in 2002). He has been a company director since 1996 and became a senior managing director in 2001.

Management Accountability

Top environmental official: Kosuke Shiramizu, Executive Vice President (since 2001). Chairs the Production Environment and Recycling Committees. Became a member of the board of directors in 1992.

Reports to: Fujio Cho, President

# of reporting levels to Chief Executive Officer: 0

# of EHS staff: No data.

Environmental link to compensation: No information provided.

Env. audits: Employed since 1963. Production Engineering Group conducts primary and follow-up audits.

Auditors: Internal audit teams work with plant managers. Third-party firms also used. Facilities and suppliers are ISO 14001-certified.

Review and disclosure: Toyota Environment Committee reviews audits. Listing of goals and results in annual environmental report.

Climate Change Disclosure

Form 20-F: Discusses emission restrictions in Japan and Europe and proposed in the U.S. Says U.S. CO2 emission controls "would be costly" and "could significantly restrict the products it is able to offer in the U.S."

Annual report: Chairman's letter to shareholders says global warming is an issue spurring technological innovation and that Toyota will be a leader in the field.

EHS report: In Japan, issued annually since 1998. Report has extensive information on technology innovation, especially hybrid vehicles and fuel cells. Lists CO2 emissions trends from production and vehicles. No discussion of climate change science or policy, but many references to priority efforts to reduce greenhouse gas emissions.

Stakeholder dialogue: In addition to issuing an annual environmental report, Toyota holds community councils to disclose information to people in the communities near its plants and housing works.

Shareholder Activity

No shareholder resolutions filed on climate change or fuel economy issues.

ELECTRIC POWER SECTOR

American Electric Power Co.
Columbus, Ohio

American Electric Power is the nation's largest electric utility, serving 4.9 million electricity customers in 11 states, with 38,000 miles of transmission lines. Central and South West Corp., based in Texas, merged with AEP in 2000. AEP owns or leases more than 38,000 megawatts of U.S. generating capacity. AEP also owns 4,000 MW of coal-fired capacity in the United Kingdom and has interests in facilities in Brazil, China and Mexico. Nearly half of its U.S. assets are deregulated. AEP is the largest U.S. consumer of coal and ranks as the #1 U.S. utility emitter of CO_2, accounting for 8% of the industry's 2000 emissions, according to an independent benchmarking study. AEP is one of the largest and most active traders of credits for sulfur dioxide emissions, and it is one of the founding members of the Chicago Climate Exchange. For 2003, AEP estimates that construction expenditures will be $1.5 billion and environmental capital expenditures will be $237 million. AEP has spent $843 million on compliance with nitrogen oxides emissions controls and could spend another $500 million to $1.1 billion. Pending Clean Air Act regulations could have a material adverse effect on its operations and financial condition.

U.S. Generation and Carbon Emissions (2000)

Fuel mix: Coal 65%, gas 25%, nuclear 7%, hydro/ wind/other 3%

Future fuel mix: Not projected.

Generation: 199,092,729 MWh

Demand growth: 1 –2% / year

Peak growth: 1 – 2% / year

CO_2 emissions: 174.1 MMT (#1)

All source CO_2: 1,924 lb/MWh (#35)

Fossil CO_2: 1,979 lb/MWh (#65)
(Source: NRDC top 100 emitters study)

Capacity: 39,482 MW

Construction: No new generating capacity under construction or proposed.

Renewables and R&D:AEP has approximately 1,151 MW of renewable capacity, including 311 MW of owned wind capacity in Texas, making it the nation's second largest wind provider. AEP is evaluating solar and biomass technologies, and is providing related public education programs. AEP is a major research funder of clean coal technologies. AEP believes integrated gasification coal technology could significantly reduce coal-fired CO_2 emissions and be commercially viable between 2010 and 2020.

Facility Emissions Disclosure

Emissions inventory: Yes. Measures CO_2 and sulfur hexafluoride at company-owned facilities.

1990 CO_2 emissions: Not reported.

2000 CO_2 emissions: 168 million metric tons (US only)

2006 CO_2 emissions: Not to exceed 160.5 MMT.*
** Figure includes possible offsets from CO2 trading.*

Emissions savings: In 1991–2001, AEP avoided 19.5 MMT of CO_2 equivalent in the U.S., mainly through more nuclear generation, improvements in transmission and generation efficiency, end-use efficiency programs and carbon sequestration. AEP has planted 60 million trees since the 1940s. It has cut SF6 leaks 51% since 1996.

Emissions projections: AEP is a partner in rainforest protection projects in Bolivia and Brazil to sequester 7-9 MMT of CO_2 over 40 years. (See also targets.)

Emissions targets: AEP has pledged 16.4 MMT in CO_2 cuts/ offsets by 2006 through Chicago Climate Exchange, which exceeds 4% target set by participating companies.

Climate Change Policies

Science merits action?
Yes. Supports research, funding, analysis of climate change dynamics, effects and economics, plus technology development and mitigation.

Voluntary measures sufficient?
Unlikely. Says it is "actively reducing greenhouse gas releases through a number of voluntary efforts and is continually researching ways to decrease them."

Supports Kyoto?
No. Says it is "highly unlikely" the Kyoto Protocol will be implemented in the U.S. in its current form.

Policy statement: AEP says it is "integrating sustainability considerations into our business decisions and performance measurements." It contributed to the Electricity Sector Report for the World Summit on Sustainable Development, and is providing technical assistance to developing nations. AEP's current environmental policy statement is available at:http://www.aep.com/environmental/performance/envreport/policy.htm.

Climate-Related Memberships

Chicago Climate Exchange: Founding member in 2003. First U.S. utility to join this voluntary trading program.

DOE/EPA Programs: Climate Challenge, Green Lights (1998 partner award), Natural Gas Energy Star, SF6 Program.

E7: Joined in 2001 with eight other leading electricity companies in G7 nations to promote sustainable development.

Global Climate Coalition: Joined in 1989; dropped out in 1997.

International Emissions Trading Association: Joined in 2001, now a member of the board of directors.

MIT Joint Program on the Science & Policy of Global Change: Program sponsor.

Pew Center on Climate Change: Joined Business Environmental Leadership Council as a founding member in 1998.

American Electric Power Co.
Columbus, Ohio

ELECTRIC POWER SECTOR

Board Oversight

Chairman and CEO: Dr. E. Linn Draper (since 1993).
Age: 60
Draper heads Business Roundtable Environmental Task Force.

Board of directors: 13 members; 11 independent. Elected annually. Met nine times in 2001.

Avg. age: 61 **Avg. tenure:** 5 years.

Standing committees: 7 — Audit, Executive, Governance, Finance, Human Resources, Nuclear, Policy.

Environmental oversight: All independent directors serve on the Policy Committee (including directors listed below). This committee examines "AEP's policies on major policy issues affecting the AEP System, including environmental, industry change and other matters…." The committee met three times in 2001; the proxy statement did not mention the issues it discussed. Senior managers, including Chairman Draper, have received briefings on climate change. The board has been and will continue to be briefed on climate change issues, and has made decisions regarding climate change policies and initiatives. AEP believes that while CO_2 emissions reductions will be required eventually, they can be achieved through market-based mechanisms stressing new coal-based technology, emissions trading and carbon sequestration.

Selected Director Affiliations

Donald Carlton is a director of Valero Energy Corp; was president and CEO of Radian International (1969–98).

John DesBarres is a director of Texas Eastern Products Pipeline Co.; was chairman of Transco Energy Co. (1992–95).

Robert Fri is a visiting scholar with Resources for the Future. He was acting administrator of the Energy Research and Development Administration (1975–77), and president of Energy Transition Corporation (1978–86). He was president and director of Resources for the Future (1986–95). Fri chairs AEP's Policy Committee.

William Howell is a director of three other energy companies—Exxon Mobil, Halliburton and The Williams Cos.

Leonard Kujawa is now an international energy consultant. He headed Arthur Andersen's energy and telecommunications business (1985–95).

Richard Sandor is chairman and CEO of Environmental Financial Products LLC (1993–present), which develops and trades in new environmental, financial and commodity markets. (Environmental Financial Products is the prime developer of the Chicago Climate Exchange.)

Linda Gillespie Stuntz is a partner in the law firm of Stuntz, Davis & Staffier. She was minority counsel for the Subcommittee on Fossil and Synthetic Fuels (1981–1987) and Deputy Secretary of Energy (1992–January 1993). She is also a director of Schlumberger Ltd. and the Electricity Innovation Institute.

Kathryn Sullivan is CEO of Center of Science and Industry Museum in Columbus, Ohio. She was a NASA astronaut (1978-1993) and chief scientist at the National Oceanic and Atmospheric Administration (1993–1996).

Management Accountability

Top EHS official: Dale Heydlauff, Senior Vice President, Governmental and Environmental Affairs

Reports to: Susan Tomasky, Executive Vice President

# of reporting levels to CEO: 1

# of EHS staff: 143 **Env. link to compensation:** **Top execs.:** No **Plant managers:** Yes **Other env. staff:** No

Env. audits: Company-wide since 1992. Audits now scheduled according to risk-based approach.

Auditors: Full-time auditing staff, separate from environmental compliance organization.

Review and disclosure: Board audit committee reviews audits. Audit summaries are not made public.

Stakeholder Disclosure

Form 10-K: AEP is a "significant emitter" of CO_2 and could be "materially adversely affected" by CO_2 controls. Says controls could impose "substantial costs on industry and society and erode the economic base" that AEP serves. AEP's 4,000 MW of coal plants in the U.K. "may be exposed to potential [CO_2] emission control obligations" and is "developing an emissions mitigation plan for these plants to ensure compliance as necessary."

Annual report: No mention of climate change.

EHS report: "Toward Environmental Excellence" report is updated every two years. Used CERES format for latest report, covering 1999–2000. Environmental section on website highlights voluntary efforts to reduce or sequester CO_2 and SF6 emissions, and national policy efforts. No discussion of climate change science. Statistics on emissions for 1999 and 2000, but no future projections. AEP stresses that it is committed to fuel diversity.

Stakeholder dialogue: AEP "is accountable to our primary stakeholders—residents of the communities in which we operate, shareholders, customers, employees and government officials. We communicate openly about our environmental performance. We establish performance measures, track and publicly report on our performance regularly."

Shareholder Activity

Report on climate change: The Connecticut State Treasurer's office filed and withdrew a resolution in 2002.

ELECTRIC POWER SECTOR

Cinergy Corp.
Cincinnati, Ohio

Cinergy is the nation's 14th-largest investor-owned electric utility, serving 1.5 million customers in Indiana, Ohio and Kentucky. Its regulated utility companies provide nearly 90% of operating profits. Its generating capacity is mainly coal-fired, making Cinergy the sixth largest industry emitter of CO_2, accounting for 2.9% of the industry's emissions in 2000, according to an independent benchmarking study. Cinergy will spend $800 million through 2005 for controls of nitrogen oxides emissions at its coal-fired plants. Cinergy has 6,004 MW of regulated power plants and 7,084 MW of merchant power plants. About 1,800 MW of its merchant fleet is fueled by natural gas. Cinergy owns VESTAR, the fifth largest energy service company in North America.

U.S. Generation and Carbon Emissions (2000)

Fuel mix: Coal 89%, natural gas 6%, oil 4%, hydro, 1% (2001)

Future fuel mix: Not projected.

Generation: 64,787,036 MWh

Energy demand growth: 1.4% / year

Peak demand growth: 1.0% / year
(5-year demand projections)

CO_2 emissions: 62.0 million metric tons (#6)

All source CO_2: 2,106 lb/MWh (#25)

Fossil CO_2: 2,122 lb/MWh (#45)
(Source: NRDC top 100 emitters study)

Capacity: 13,088 MW (2001)

Construction expenditures: $4.7 billion (2001–2006, mainly environmental)

Renewables: Cinergy is developing a renewable energy portfolio to offer "green pricing" options. Cinergy spent $260 million on renewable energy and energy efficiency projects in 1998–2000. It has installed 87 megawatts of domestic wind power, 35 MW of domestic biomass energy and 30 MW of landfill gas recovery energy. Cinergy finished testing of a 250-kW fuel cell in 2001 and favors additional fuel cell research.

Facility Carbon Emissions

Emissions inventory: Yes. Measures CO_2, methane and sulfur hexafluoride at company-owned facilities.

1990 CO_2 emissions: 42.0 million metric tons (MMT).

2000 CO_2 emissions: 63.3 MMT (a 50% increase).

Future CO_2 emissions: Not estimated.
(Addition of the Zimmer coal station accounted for nearly one-third of the CO_2 emissions increase in 1990-2000.)

Emissions savings: Cinergy has avoided or offset 17 MMT of CO_2 equivalent since 1990, mainly through power plant efficiency improvements. Other savings have been achieved through renewable energy and forest management programs. VESTAR energy efficiency projects have saved 1.5 MMT of CO_2 equivalent since 1998.

Emissions projections: Cinergy is implementing an environmental management information system that will focus on coal-fired plants first, but will become company-wide eventually. In the event of new regulations, the system will track CO_2 emissions, reductions and offsets.

Emissions targets: Cinergy will reduce SF6 emissions 20% by 2010, resulting in 58,000 tons of CO_2-equivalent reductions. Cinergy is researching carbon storage and clean coal technologies and is calling for development of CO_2 "scrubbing" technology.

Facility Emissions Disclosure

Science merits action?
Yes. While Cinergy does not believe that recent warming is most likely due to human activity, it strongly agrees that future business plans should take into account greenhouse gas emissions.

Voluntary measures sufficient?
Yes. For future business planning, Cinergy supports "three-pollutant" legislation that excludes mandatory caps on CO_2 emissions, but that recognizes voluntary savings and provides incentives for additional CO_2 emission cuts.

Supports Kyoto?
No. Cinergy expects the treaty to enter into force without U.S. ratification, but does not expect it to have a negative impact on its business.

Policy statement: Brief policy statement in Form 10-K and annual report. In the spring of 2001, Chairman Rogers testified before the U.S. Senate in favor of multi-pollutant power plant legislation that addresses carbon dioxide. "Who will make a decision to invest a billion dollars in a new coal plant if you can only guess at future environmental regulations," he asked, predicting that legislation that fails to address CO_2 will be outdated in five years. For more on Cinergy's position, see http://www.cinergy.com/pdfs/environmental/different_perspective.pdf.

Climate-Related Associations

Climate Challenge: Joined in 1995.

Climate Leaders: Joined in February 2002. Founding member.

Global Climate Coalition: Joined in 1989. Dropped out in mid-1990s.

Pew Center on Global Climate Change: Joined Business Environmental Leadership Council in 2001.

ELECTRIC POWER SECTOR

Cinergy Corp.
Cincinnati, Ohio

Board Oversight

Chairman and CEO: James E. Rogers (since 2001). **Age:** 54.

Board of directors: 9 members; 8 independent. Elected to staggered, 3-year terms. Met nine times in 2001.

Avg. age: 57 **Avg. tenure:** 7 years.

Standing committees: 5 — Audit, Compensation, Corporate Governance, Executive, Public Policy.

Environmental oversight: Cinergy told IRRC: "The Board and the Public Policy Committee have been involved with many environmental issues on a continuing basis. Examples include nitrogen oxide and sulfur dioxide controls, CO2 emission credits, results of internal audits, and implementation of an environmental management information system. The Board and Committee receive regular reports on environmental issues from executive officers." The Public Policy Committee was established in 1994. It is comprised of four independent directors. *(See * listings in Director Affiliations.)* The company's 2002 proxy statement does not describe recent activities of the Public Policy Committee or list how many times it met in 2001.

Selected Director Affiliations

Philip Cox* is president and CEO of Cox Financial Corp. (a provider of financial and estate planning services).

George Juilfs is chairman and CEO of SENCORP (manufacturer of fastening systems and health-care technologies).

Mary Schapiro* is a president and a board member of NASD Regulation, Inc. (responsible for regulating all member brokerage firms and individual-registered representatives and for oversight of The Nasdaq Stock Market).

Philip Sharp* is a senior fellow in public policy at Harvard University's John F. Kennedy School of Government. A 10-term Democratic Congressman from Indiana, Mr. Sharp was chairman of the House Energy and Power Subcommittee and a ranking member of the House Energy and Commerce Committee. He serves as a member of the Secretary of Energy's Advisory Board, and served as Chairman of the Secretary's Electric System Reliability Task Force from 1996 until issuance of its final report in 1998. He also is a director of New England Power Company.

Management Accountability

Top EHS official: William F. Tyndall, Vice President, Environmental Policy and Federal Affairs.

Reports to: William Grealis, Executive Vice President and Chief of Staff.

# of reporting levels to CEO: 1

# of EHS staff: 68

Env. link to compensation: Top execs.: Yes Operating managers: Yes Other staff: No

Env. audits: Employed since 1988. In-house facility audits every 1-2 years, third-party audits every 5 years.

Auditors: Corporate staff for in-house audits. Environmental consultants for third-party audits.

Review and disclosure: Board Public Policy Committee reviews audits. Audit summaries are not made public.

Stakeholder Disclosure

Form 10-K: No statement on financial risks of climate change to the company. It says passage of CO2 legislation is uncertain, but favors multi-pollutant legislation that addresses CO2. It says it is conducting voluntary reduction programs and is doing research on advanced technologies.

Annual report: No mention of CO2 emissions or climate change issue in front section. Management Discussion and Analysis has three-paragraph section that is identical to the Form 10-K statement.

EHS report: Issued annually since 1996. Report includes references to CO2 reduction efforts and statement by Chairman Rogers in support of multi-pollutant legislation that recognizes voluntary reductions and promotes R&D on carbon storage and clean coal technology.

Stakeholder dialogue: Company says it "discusses environmental matters in meetings with financial analysts. On a much smaller and more ad hoc basis, [it] discusses such matters with community groups, neighbors of major facilities, and other citizens when planning or implementing major construction projects."

Shareholder Activity

Report on climate change: A shareholder proposal asking the company to report on the costs and liabilities of global climate change was filed and withdrawn in 2000. The filer was the General Board of Pensions of the United Methodist Church.

ELECTRIC POWER SECTOR

Southern Company
Atlanta, Georgia

Southern Company is the nation's second largest electric utility, serving 4 million customers in Georgia, Alabama, Florida and Mississippi. Its regulated utility companies provide more than 90 percent of earnings. Southern has 37,000 megawatts of generating capacity and expects to have an additional 5,000 MW of new gas-fired generation on line by the end of 2005. With coal representing about two-thirds of its fuel mix in 2002, Southern is the #2 industry emitter of CO_2. It accounted for 6.4% of U.S. utilities' CO_2 emissions in 2000, according to an independent benchmarking study. Southern plans to spend more than $1 billion by 2004 for nitrogen oxides emissions controls at its coal-fired plants. It expects to spend an additional $4 billion or more by 2015 to further reduce overall emissions. Southern says it is considering the adoption of CO_2 emissions control targets. It has no plans to participate in emissions trading.

U.S. Generation and Carbon Emissions (2000)

Fuel mix: Coal 76%, nuclear 16%, gas 4%, hydro 3%, oil 1%

2020 fuel mix: Gas 53%, coal 38%, nuclear 6%, hydro 2% oil 1%

Generation: 172,188,817 MWh

Demand growth: 3.5% / year

Customer growth: 1.5% / year

CO_2 emissions: 134.8 MMT (#2)

All source CO_2: 1,722 lb/MWh (#47)

Fossil CO_2: 2,107 lb/MWh (#49)
(Source: NRDC top 100 emitters study)

Capacity: 32,006 MW

Construction: 4,560 MW owned and 628 MW purchased (all natural gas)

Renewables and R&D: Renewable energy programs allowing customers to purchase 100 watt blocks of renewable energy for $5–6 per month per block have been approved in Alabama and Mississippi. Similar programs, using a portfolio of renewable options, are awaiting approval in Georgia and Florida. Southern is conducting research on biomass, solar and landfill methane technologies. It has installed a 250-kW fuel cell demonstration plant. Southern is conducting extensive research on carbon storage and coal-gas technologies.

Facility Emissions Disclosure

Emissions inventory: Yes. Measures CO_2 and sulfur hexafluoride at company-owned facilities.

1990 CO_2 emissions: 102 million metric tons (MMT).

2000 CO_2 emissions: 128 MMT (26% increase)

2010 CO_2 emissions: 143 MMT (estimate)

2020 CO_2 emissions: 148 MMT (estimate)
(Source: Southern 2001 Environmental Progress Report)

Emissions savings: Southern has avoided or offset 55 MMT of CO_2 equivalent since 1991, mainly through improved performance of three nuclear power plants and through sequestration programs such as planting 35 million trees. Savings also include 3.6 MMT from demand-side management programs, 0.2 MMT from biomass co-firing, 0.6 MMT of CO_2 equivalent from methane reductions and 0.8 MMT of CO_2 equivalent from SF6 reductions.

Emissions projections: CO_2 emissions are projected to be 40% above 1990 levels by 2010, and 45% above 1990 levels by 2020. Southern's energy demand is projected to rise 75% over the period.

Emissions targets: Southern expects more offsets through 2005, but has not quantified them. It has received 20-year license extensions for two nuclear power plants.

Climate Change Policies

Science merits action?
Unclear. Southern says the issue is "global and long term" and that policies must "seek to resolve remaining scientific uncertainties about the nature, scope, and pace of change to the climate system."

Voluntary measures sufficient?
Unclear. Southern says policies must "incorporate the unrestricted use of market-based flexibility mechanisms such as emissions trading and joint implementation."

Supports Kyoto?
No. Southern favors the Bush administration's Clear Skies proposal, with a focus on carbon intensity, development of new GHG-reducing technologies and transferring those technologies to developing countries.

Policy statement: Southern issued its first environmental policy statement in 1992. Its most recent statement on climate change was issued in August 2000. The full policy statement is available at: http://www.southerncompany.com/planetpower/climatepolicy.asp.

Climate-Related Associations

Climate Challenge: Joined in 1995. Reporting emission savings under Section 1605(b) of the Energy Policy Act.

Global Climate Coalition: Joined in 1989. Dropped out in February 2000, one month before GCC ended its corporate memberships program. Southern told IRRC it was concerned that the GCC was "as strident as its most strident member" and had decided not to align itself with other groups on the climate change issue.

Southern Company
Atlanta, Georgia

ELECTRIC POWER SECTOR

Board Oversight

Chairman and CEO: Allen Franklin (since 2001). **Age:** 57.

Board of directors: 9 members; 7 independent. Elected annually. *Met six times in 2001.*

Avg. age: 57 **Avg. tenure:** 7 years.

Standing committees: 5 – Audit, Compensation & Management Succession, Finance, Governance, Nuclear Oversight.

Environmental oversight: No board committee is charged with explicit oversight of the company's environmental affairs. The Audit Committee is responsible for reviewing environmental compliance audits along with compliance audits in other business areas. The entire board receives updates on environmental management issues periodically. The 2002 proxy statement makes no reference to environmental issues discussed by the board of directors. The board has not conducted a formal review of the climate change issue.

Selected Director Affiliations

Allen Franklin is a director of Vulcan Materials.

Donald James is chairman and CEO of Vulcan Materials.

Zack Pate is chairman of the World Association of Nuclear Operators and chairman emeritus of the Institute of Nuclear Power Operations (INPO), an independent, nonprofit organization promoting safety and reliability in the operation of nuclear power plants. Prior to 1998, he was president and chief executive officer of INPO.

Management Accountability

Top EHS official: Dr. Charles H. Goodman, Senior Vice President, Research and Environmental Affairs.

Reports to: Paul Bowers, President, Southern Co. Generation and Energy Marketing; and Dwight Evans, President of External Affairs.

# of reporting levels to CEO: 1

# of EHS staff: 242 **Env. link to compensation:** Top execs.: Yes Operating managers: Yes Other EHS: Yes

Env. audits: Company-wide since 1992; facility audits every 1–2 years.

Auditors: Corporate and facility staff.

Review and disclosure: Board Audit Committee reviews audits. Summaries are not made public.

Stakeholder Disclosure

Form 10-K: States only that possible legislation related to climate change "could significantly affect" the company.

Annual report: Brief mention of recorded and projected CO_2 emissions savings. No discussion of climate change science or policy issues.

EHS report: First issued in 1993; now issued biennially. Report includes climate change policy statement, summary of CO_2 reduction efforts and projection of emissions trends.

Stakeholder dialogue: Southern says in climate change policy statement that it is committed to "establishing and maintaining dialog with public and private interest groups to expand the understanding of the climate change issue and to enhance the development and implementation of appropriate climate change policy."

Shareholder Activity

Report on climate change: Shareholder proposals asking the company to report on the costs and liabilities of climate change were filed and withdrawn in 1997, 1999 and 2002. Filers were church groups affiliated with the Interfaith Center on Corporate Responsibility.

Renewable energy development : A shareholder proposal on developing renewable energy was supported by 9.5% of shares voted in 2001 and 9.2% in 2002. The filer was Robert Mills, an individual investor. Management opposed the proposal on grounds that adoption of a plan to increase supply from renewables to 20% by 2020 would adversely affect generating system cost and reliability. Management stated, "The Company's objective is to utilize the market and our customers' needs to propel the growth of renewable energy technologies through a voluntary green power program."

ELECTRIC POWER SECTOR

TXU Corp.
Dallas, Texas

TXU Corp. is the nation's seventh largest investor-owned electric utility, serving 5 million electricity and gas customers in the United States and Australia. (TXU is working with creditors to sell its operations in Europe.) TXU owns 19,123 megawatts of generating capacity in Texas, where 80% of its customers are located. Largely reliant on natural gas and coal, TXU is the #5 industry emitter of CO_2, accounting for 3.2% of U.S. utilities' CO_2 emissions in 2000, according to an independent benchmarking study. TXU's operations in Texas are subject to competition. TXU Australia serves almost 1 million electricity and gas customers in Australia, and owns and operates 1,280 MW of generating capacity. TXU also provides merchant energy trading and marketing, telecommunications, and energy-related services. In 2001, TXU derived more than 75% of its earnings from its merchant energy business.

U.S. Generation and Carbon Emissions (2000)

Fuel mix: Natural gas 61%, coal/lignite 28%, nuclear 11%.

Future fuel mix: Not projected.

Generation: 96,850,759 MWh

Demand growth: 4.4%/year*

Peak growth: 4.7%/year*
(Texas region, 1997–2000)*

CO_2 emissions: 66.8 million metric tons (#5)

All source CO_2: 1,517 lb/MWh (#56)

Fossil CO_2: 1,874 lb/MWh (#71)
(Source: NRDC top 100 emitters study)

Capacity: 19,123 MW (2002)

Construction: None. (3,850 MW of projected capacity purchases.)

Renewables: TXU says it encourages "research and development of more efficient, environmentally benign sources of energy and, whenever warranted by market opportunity, to offer customers the benefits of energy produced from renewable resources." TXU offers a "green pricing" option in each jurisdiction it serves. In the U.S., it has contracts for 382 MW of wind power. TXU Australia has contracts for 20 MW of wind power and 30 MW of hydro and landfill gas generating capacity. TXU says it is also evaluating photovoltaic, solar thermal, waste-to-energy and biomass technologies.

Energy efficiency: TXU says it is actively promoting conservation and load management programs. In 2001, it reported 600,000 tons of CO_2 savings/offsets of under Section 1605(b) of the Energy Policy Act.

Facility Emissions Disclosure

Emissions inventory: Yes. Measures CO_2 , methane and sulfur hexafluoride at owned and operated facilities.

1990 CO_2 emissions: Not reported.

2000 CO_2 emissions: Not reported.*

Future CO_2 emissions: Not projected.
*(*except through EPA Continuous Emissions Monitors, equal to 66.8 million metric tons.) Separately, TXU reported that its operations in the U.S. and Australia emitted 72.8 MMT in 2001.*

Emissions projections: None reported. TXU says its CO_2 emissions would have been 28% higher in 2001 were it not for savings and offsets achieved since 1990.

Emissions savings: TXU reported savings/offsets of 23 million metric tons of CO_2 equivalent in 2001 and 196 MMT since 1990, more than any other U.S. investor-owned electric utility. Most savings are from nuclear plants that came on line in the 1990s, but also include heat rate improvements in fossil energy plants, demand-side management programs, methane recovery, SF6 reduction programs and tree planting. TXU Australia reported savings/offsets of 230,000 tons in 2001.

Emissions targets: TXU Australia is expected to achieve a 16% reduction in greenhouse gas emissions by 2004.

Climate Change Policies

Science merits action?
No discussion.

Voluntary measures sufficient?
No discussion.

Supports Kyoto?
No discussion.

Policy statements: As part of its Statement of Environmental principles, TXU says it will "continue to take prudent steps to voluntarily reduce our emissions of greenhouse gases and to promote carbon sequestration programs." It says it has set "challenging sustainability targets in the medium and long term" that include increased use of renewable fuels, reducing greenhouse gas emissions through more efficient electricity production and use, assisting carbon sequestration through reforestation and other technologies, and actively promoting conservation and load management programs. Quantitative targets are not provided. The company's full Statement of Environmental Principles is available at: http//www.txucorp.com/globcit/envcom/globalreport/principles.

Climate-Related Associations

Climate Challenge: Joined in 1995. Supports continuation of Section 1605(b) emissions reporting program under Department of Energy leadership. Company will not join Climate Leaders program.

EPA SF6 Emissions Reduction Program: Charter partner.

ELECTRIC POWER SECTOR

TXU Corp.
Dallas, Texas

Board Oversight

Chairman and CEO: Erle Nye (since 1997).
Age: 64.

Board of directors: 9 members; 6 independent. Elected annually. Met four times in 2001.
Avg. age: 66 **Avg. tenure:** 14 years.

Standing committees: 7 – Audit, Executive, Finance, Nominating, Nuclear, Organization and Compensation, Business Development.

Environmental oversight: No board committee is charged with explicit oversight of the company's environmental affairs. The company says it does not set CO_2 reduction targets, but strives to develop and implement workable and economically viable reduction projects. It says it following developments in CO_2 emissions trading but is not participating this market at present. The board has not conducted a strategic review of the climate change issue.

Selected Director Affiliations

Derek Bonham is the non-executive chairman of Imperial Tobacco Group PLC. He was chairman of The Energy Group PLC (1997–1998) and was deputy chairman and CEO of Hanson PLC (1993–1997).

J. S. Farrington is the retired chairman and CEO of TXU (1987–1997).

Jack Little is the retired president and CEO of Shell Oil Co. (1998–1999) and is a director of Noble Drilling Corp.

Charles Perry makes private investments in oil and gas, and is chairman and CEO of Avion Flight Centre, Inc.

Herbert Richardson is Associate Vice Chancellor for Engineering and Director, Texas Transportation Institute, The Texas A&M University System.

Management Accountability

Top EHS official: Paul Plunket, Executive Vice President

Reports to: Tom Baker, Executive Vice President
# of reporting levels to CEO: 1

# of EHS staff: 110 **Env. link to compensation:** Top execs.: Yes Operating mgrs.: Yes Other employees: Yes

Env. audits: Company-wide since 1987; audits of major facilities conducted every year.

Auditors: Corporate staff, plant staff and staff from other facilities. Business units benchmarked against ISO 14000.

Review and disclosure: Board audit committee reviews audits. Summaries not made public.

Stakeholder Disclosure

Form 10-K: "[Unable] to predict the impact, if any, of the [Bush] Administration proposal or related legislation" on climate change.

Annual report: No discussion of climate change.

EHS report: Company has issued an environmental report annually since 1991. Latest report includes a brief policy statement on climate change and savings/offsets achieved in 2000 (U.S.) and 2001 (Australia and Europe).

Stakeholder dialogue: TXU says it will "employ effective means to identify and reach out to all of our stakeholders—not only to shareholders, employees, customers, and business partners, but also to regulators affected communities, citizens and environmental groups, research institutions, and nongovernmental organizations—engaging with them to help refine and broaden our understanding and application of more sustainable environmental practices." In the U.S., TXU personnel are members of advisory bodies of The Nature Conservancy of Texas. This organization serves as an outside advisor to the Climate Challenge program. TXU says it provides environmental information to the public in all regions on request.

Shareholder Activity

Report on climate change: Members of the Interfaith Center on Corporate Responsibility filed and withdrew a resolution on the costs and liabilities of climate change in 1997.

ELECTRIC POWER SECTOR

Xcel Energy Inc.
Minneapolis, Minnesota

Xcel Energy is the nation's fourth largest investor-owned electric utility, serving 3.2 million electricity and 1.7 million natural gas customers in 12 Western and Midwestern states. It was created by the merger of Northern States Power (NSP) and New Century Energies (NCE) in 2000. In 2001, regulated operations accounted for 82% of Xcel Energy's revenues; the remaining 18% came from nonregulated operations. Xcel has more than 15,200 megawatts of owned generating capacity, and expects to acquire another 2,400 MW by 2005. Xcel subsidiary NRG Energy, a large independent power producer, filed for bankruptcy in May 2003. Upon NRG's emergence from bankruptcy, expected in the second half of 2003, Xcel will have no stake in NRG. NRG Energy has approximately 20,000 MW of owned generating capacity in the United States, Europe, Australia and South America. The combined U.S. generating assets of Xcel Energy and NRG Energy accounted for 4.4% of U.S. utilities' CO_2 emissions in 2000, making it the fourth largest industry emitter, according to an independent benchmarking study. (The company reports that NRG Energy accounted for 25% of the combined emissions.) Xcel Energy has invested $211 million in new emissions controls for three coal-fired plants in the Denver area. It is also committed to invest $1 billion to convert two coal-fired plants to natural gas in the Minneapolis/St. Paul area and to upgrade a third coal plant, which will lead to substantial reductions in carbon dioxide emissions.

U.S. Generation and Carbon Emissions (2000)

Fuel mix: Coal 50%, gas/oil 10%, nuclear 11%, Manitoba hydro 4%, renewables 2%, purchased power 23% (Xcel only)

Future fuel mix: Not projected.

Regulated capacity: 15,220 MW

Generation: 110,174,086 MWh

Demand growth: 1.6%/year*

Peak growth: 1.6%/year*
*(*NSP service area, 2002-2015.)*

Regulated construction: None.

CO_2 emissions: 93.5 million metric tons (#4)

All source CO_2: 1,866 lb/MWh (#39)

Fossil CO_2: 2,143 lb/MWh (#41)
(Source: NRDC top 100 emitters study)

Renewables and R&D: Xcel Energy will have 790 MW of wind power in service by the end of 2003, making it one of the largest suppliers of wind power to utility customers in the country. Xcel Energy also runs the largest customer-driven wind energy program in the nation. Customers in New Mexico, Colorado, and Minnesota can participate in the Windsource® program, allowing them to select wind-generated electricity at a premium price. Xcel contributes $8.5 million annually to a fund for energy research.

Energy efficiency: NSP is forecasting 1,174 MW of additional demand reduction by 2015 through conservation/load management programs.

Facility Emissions Disclosure

Emissions inventory: None reported to shareholders.

1990 CO_2 emissions: Not reported.

2000 CO_2 emissions: Not reported.*

Future CO_2 emissions: Not projected.
*(*except through EPA Continuous Emissions Monitors. Xcel Energy reported 63.6 million metric tons of CO_2 emissions to DoE for 2000, excluding NRG Energy.)*

Emissions projections: None reported.

Emissions savings: In 2001, Xcel Energy listed 6.32 million metric tons of CO_2 emissions savings and offsets with the DoE Section 1605(b) registry, equal to about 10% of Xcel Energy's baseline emissions (excluding NRG Energy). Largest offsets came from demand-side management programs, wind power, coal ash utilization and nuclear plant upgrades.

Emissions targets: No firm targets or timetables.

Climate Change Policies

Science merits action?
Unclear. More research should be conducted before the government sets any controls on greenhouse gases.

Voluntary measures sufficient?
Yes. Company supports the need for additional research into technology to reduce and sequester greenhouse gases.

Supports Kyoto?
No.

Policy statements: Xcel Energy says its climate change policy is currently under development. Company adopted a uniform post-merger environmental policy statement in October 2000. The current policy statement is available at: http://www.xcelenergy.com/Community/CommunityEnvironment.asp

Climate-Related Associations

Climate Challenge: Joined in 1995. Reporting emission savings with Section 1605(b) registry.

ELECTRIC POWER SECTOR

Xcel Energy Inc.
Minneapolis, Minnesota

Board Oversight

Chairman and CEO: Wayne Brunetti (since 2001).
Age: 64.

Board of directors: 12 members; 11 independent. Elected to staggered, 3-year terms. Met seven times in 2001.
Avg. age: 57 **Avg. tenure:** 7 years.

Standing committees: 4 — Audit, Finance, Compensation and Nominating, and Operations and Nuclear.

Environmental oversight: Xcel Energy's Operations and Nuclear Committee is charged with reviewing the company's environmental compliance. Environmental issues are reviewed as appropriate by the board and/or Corporate Governance Council as a whole. Temporary subcommittees may be formed to review environmental issues when warranted. The four primary environmental issues addressed by the board in 2001 were: high level nuclear waste storage and disposal, changing air quality regulations (e.g., New Source Review and mercury emission controls), voluntary emission reduction initiatives and global climate change.

Selected Director Affiliations

Wayne Brunetti, Xcel chairman and CEO, served as CEO of Public Service Co. of Colorado and New Century Energy before the merger with Northern States Power. He has served on the Colorado Renewable Energy Task Force.

Roger Hemminghaus is the retired chairman of Ultramar Diamond Shamrock Corp. (1996 - 2000) and is past chairman of the National Petrochemicals and Refiners Association.

Douglas Leatherdale is the retired chairman and CEO of The St. Paul Companies, Inc. (1990 – 2001) and is board chairman of the International Insurance Society. He is also a director of The St. Paul Companies, John Nuveen Co. and United HealthCare Group. He once was employed by the Board of Pensions of the Lutheran Church in America.

Allan Schuman is chairman and CEO of Ecolab Inc. and is a director of the National Association of Manufacturers.

W. Thomas Stephens is the retired President and CEO of MacMillan Bloedel Ltd., a forest products and building materials company (1996 – 1999). He is also a director of TransCanada Pipeline, Norske Canada Ltd., Qwest Communications International Inc., Mail-Well Inc. and The Putnam Funds.

Management Accountability

Top EHS official: Olon Plunk, Vice President, Environmental Affairs.

Reports to: David Wilks, President, Energy Supply
# of reporting levels to CEO: 1

# of EHS staff: 90 **Env. link to compensation:** Top execs.: Yes Operating mgrs.: Yes Other employees: Yes

Env. audits: Company-wide since 1987; audits of major facilities conducted every year.

Auditors: Corporate staff, plant staff and staff from other facilities. Business units benchmarked against ISO 14000.

Review and disclosure: Board audit committee reviews audits. Summaries not made public.

Stakeholder Disclosure

Form 10-K: Only reference to climate change concerns one NRG Energy power plant that may not comply with proposed CO2 regulations in Massachusetts.

Annual report: No mention of climate change issue in front section. Management Discussion & Analysis section has same single reference as in Form 10-K.

EHS report: Company issued an environmental report in 2002, copies of which are available on request. Web site has no mention of climate change issue.

Stakeholder dialogue: Company says it uses "a wide variety of methods to communicate with [stakeholder] groups, such as print or electronic media communications, personal visits or presentations by employees to stakeholders, open houses at facilities, etc."

Shareholder Activity

No shareholder resolutions on climate change or renewable energy development. The General Board of Pensions of the United Methodist Church submitted proposals in 2001 and 2002 asking Xcel Energy, in its power purchase contracts with Manitoba Hydro, to avoid undue adverse effects on the Pimicikamak Cree Nation and other indigenous peoples.

Oil & Gas Sector

BP PLC
London, United Kingdom

BP is one of the world's largest oil and gas companies, formed by the merger of British Petroleum and Amoco in 1998, and the acquisition of ARCO in 2000. BP is the largest oil and gas producer in the U.S., where it has nearly half of its assets, revenues and employees. BP's oil and gas production in 2000 was the source of 410 million metric tons of end-use CO_2 emissions, equal to 1.7% of global CO_2 emissions from fossil fuels. In 1997, BP became the first oil company to acknowledge risks posed by global warming. It has since reduced its facility emissions 10% below 1990 levels and has pledged to keep them stable through 2012. BP is one of the world's largest providers of solar energy. BP has participated in the greenhouse gas reporting protocol developed by World Resources Institute and WBCSD.

Reserves, Production and Carbon Emissions (2000)

OIL	*NATURAL GAS*	*PRODUCTION CO_2 Emissions*
Reserves (million barrels): 4,318	**Reserves (billion cubic feet):** 24,269	**OIL:** 247.5 MMT
Production (million barrels): 601	**Production (billion cubic feet):** 3,087	**NATURAL GAS:** 163.0 MMT
Production (quadrillion Btu): 3.33	**Production (quadrillion Btu):** 3.07	**COAL:** Minimal
% of company assets: 27%	**% of company assets:** 25%	**% of global CO_2 emissions:** 1.7%

Renewables and R&D: BP provides $100 million annually in external funding for environmental research, 60–70% of which is related to climate change. BP is one of the largest makers of photovoltaic products, pledging $500 million in investment for 2000–2003. PV production was 54 megawatts in 2001. A new factory in Madrid, Spain, will be able to make 60 MW of photovoltaic modules annually in 2003, equal to 20% of world demand. BP has put solar panels on 147 of its filling stations. BP has a 61% stake in a 22.5 MW windfarm at a Dutch oil refinery. It is exploring other wind project sites in Europe. In 2000, BP established the Carbon Mitigation Initiative at Princeton University (along with Ford Motor) to conduct basic research on carbon capture, storage and conversion to a hydrogen-based economy. In 2001, BP began funding a five-year research program at London's Imperial College into building-integrated renewable power generation, building energy use and storage. Also in 2001, BP began funding a 10-year program in partnership with the Chinese Academy of Sciences to find ways to develop a sustainable energy economy in China.

Facility Emissions Disclosure

Emissions inventory: Yes. Measures CO_2 and methane from facilities it owns or controls.

1990 CO_2 emissions: 90.1 million metric tons.

2000 CO_2 emissions: 83.7 MMT (7.1% reduction).

2012 CO_2 emissions: Not to exceed 81.1 MMT.

Emissions projections: BP has projected its emissions would grow 62% in 1990–2010 without program savings. BP engaged in internal emissions trading in 1999–2001. It is now pursuing external trading programs.

Emissions savings: BP's emissions peaked at 94 MMT in 1998, and then fell to 80.5 MMT by 2001. (BP's 2001 energy purchases totaled another 11.9 MMT.) Hundreds of emission-reducing projects have focused on energy efficiency, fuel switching and reductions in gas flaring.

Emissions targets: BP set a target in 1998 to cut its emissions 10% below 1990 levels by 2008. It met the target in 2002. BP now seeks to keep emissions stable through 2012, including application of emission credits.

Climate Change Policies

Science merits action?
Yes. IPCC reports predict rising temperatures will lead to more extreme weather.

Voluntary measures sufficient?
Unlikely. Favors effective measures, whether voluntary or mandatory.

Supports Kyoto?
Yes. Provides a useful framework and represents a step forward in a continuing process.

Policy statement: "Our target is to sustain the [facility] emissions reduction we have already achieved at 90% of our 1990 baseline…. For our customers, we intend to provide cleaner fuels with lower carbon content, and work with others so that these products can be used more efficiently. For our operations our actions will involve a renewed focus on energy efficiency as well as further projects to achieve sustainable greenhouse gas reductions. We also plan to grow our renewable energy business and continue our research into separation and storage of carbon dioxide." For the full policy statement, see http://www.bp.com/environ_social/environment/clim_change/index.asp.

Climate-Related Memberships

Climate Leaders: Joined in February 2002. Founding member.

Environmental Defense Partnership for Climate Action: Joined in 2000. Founding member.

EPA Energy Star and Natural Gas Star Program: Reporting project savings with Section 1605(b) registry.

Global Climate Coalition: In 1997, BP became the first oil company to withdraw from the GCC.

International Emissions Trading Organization and UK Emissions Trading Scheme (committee chair).

Pew Center on Climate Change: Joined Business Environmental Leadership Council in 1998 as a founding member.

OIL & GAS SECTOR

BP PLC
London, United Kingdom

Board Oversight

Chairman: Peter Sutherland (since 1997) **Age:** 55

Chief Executive Officer: Lord John Browne (since 1995). **Age:** 53

Board of directors: 15 members; 11 non-executive. Staggered elections, serving 3-year terms.

Avg. age: 60 **Avg. tenure:** 8 years.

Standing committees: 6 – Audit, Chairman's, Ethics and Environment Assurance, Nomination, Remuneration and Results.

Environmental oversight: The Ethics and Environment Assurance Committee (established in 1997) oversees BP's environmental affairs. It consists of 3 to 6 independent directors. (See * listings in Director Affiliations.) The committee affirmed BP's climate change policy in 1998 and amended it in 2002. The Group Vice President of Health, Safety & Environment is responsible for setting and monitoring the policy. BP benchmarks its greenhouse gas emissions against other oil companies. For 1999-2001, BP estimated a lifetime net benefit of $650 million from its greenhouse gas reduction efforts to capture natural gas for sale that once was flared or vented. BP has identified other emissions-savings opportunities with positive or neutral benefits, but they must compete against other projects.

Selected Director Affiliations

John Browne is BP CEO and a member of the supervisory board of DaimlerChrysler.

John Bryan is retired chairman of Sara Lee Corp. and a director of General Motors Corp.

Erroll Davis is CEO of Alliant Energy and a director of Edison Electric Institute and Electric Power Research Institute.

DeAnne Julius was an economic advisor to Royal Dutch Shell Group and a project economist with the World Bank.

Floris Maljers* is a supervisory board member of SHV Holdings (engaged in energy and raw materials distribution).

Walter Massey* is president of Morehouse College and serves on the President's Council of Advisors on Science and Technology. He was director of the National Science Foundation (1991-1993) and was director (1979-1984) and vice president (1984-1991) of the Argonne National Laboratory.

Michael Miles* is chairman of Johnson Matthey (precious metals) and a director of ING Baring and Balfour Beatty.

Robin Nicholson served as a member of the UK government's Council for Science and Technology (1993-2000).

Michael Wilson* is president and CEO of Brinson Canada Co. and is a director of Manufacturers Life Insurance Co. He was a member of the Canadian Parliament (1979-1993) and was Minister of Industry, Science and Technology.

Management Accountability

Top EHS official: Greg Coleman, Group Vice President, Health, Safety & Environment.

Reports to: Dick Olver, Deputy Group Chief Executive.

Reporting levels to CEO: 1

# of EHS staff: ~100

Env. link to compensation: Top execs: Yes Plant managers: Yes Other employees: Yes
Greenhouse gas targets are a factor in compensation of top executives, operating managers.

Env. audits: Since 1995, facilities audited every 3 years under "Getting Health, Safety & Environment Right" program. Facilities also receive third-party audits under ISO 14001 certification program every 1–3 years.

Auditors: Corporate auditors, staff external to business units and accounting firms. KPMG and DNV perform annual audits of greenhouse gas inventories to assure there is no material misstatement of data.

Review and disclosure: Ethics & Environmental Assurance Committee review audits. Result summaries are not made public. ISO-certified facilities publish an annual verified environmental statement.

Stakeholder Disclosure

Form 20-F: Extensive discussion of pending emission requirements, including Kyoto Protocol and EU and UK Emissions Trading.

Annual report: Highlights new position statement on climate change and key challenges in cutting emissions.

EHS report: Issued annually since 1990. Has used a sustainability format since 1997; attested by Ernst & Young. Includes statements on climate change science, Kyoto Protocol, company policies and goals, emissions trading, audit programs, renewable energy development.

Stakeholder dialogue: BP held forums in the U.S. and U.K. To review its environmental progress with stakeholders, including representatives of labor, environmental groups and social investing groups. Local sites hold regular consultation sessions with key stakeholders, including local councils, voluntary groups and residents.

Shareholder Activity

Arctic drilling: Resolutions on BP's interest in drilling in the Arctic National Wildlife Refuge received support from 7.6% (2000) and 10.3% (2002) of shares voted. Primary filers were Greenpeace and social investing funds.

End oil production: A 2001 proposal calling for phasing out oil and gas production and sales received 7.4% support.

Oil & Gas Sector

ChevronTexaco Corp.
San Francisco, California

ChevronTexaco is the nation's second largest integrated oil and gas company, operating in 180 countries. CVX also is involved in chemical manufacturing through a joint venture with ConocoPhillips and in energy production through its 26% equity stake in Dynegy. CVX's oil and gas production in 2000 was the source of 387 million tons of end-use CO_2 emissions, equal to 1.8% of global emissions from fossil fuels. Before the 2001 merger of Chevron and Texaco, each company tracked carbon emissions from their facilities using different inventory systems. (Emissions were relatively flat for both companies from 1997–1999.) CVX adopted a new inventory system in 2002 and will set a target to reduce its emissions intensity of production. CVX is making modest investments in renewable energy and fuel cell research.

Reserves, Production and Carbon Emissions (2000)

OIL	*NATURAL GAS*	*PRODUCTION CO_2 Emissions*
Reserves (million barrels): 5,668	**Reserves (billion cubic feet):** 13,176	**OIL:** 300.3 MMT
Production (million barrels): 729	**Production (billion cubic feet):** 1,630	**NATURAL GAS:** 86.6 MMT
Production (quadrillion Btu): 4.04	**Production (quadrillion Btu):** 1.63	**COAL:** 36.7 MMT
% of company assets: 42%	**% of company assets:** 15%	**% of global CO_2 emissions:** 1.8%

Renewables and R&D: In 2002-2003, CVX will invest $80 million in wind power and gasification technologies. In partnership with BP, CVX has a 31% interest in a 22.5-megawatt windfarm at the Nerefco oil refinery in The Netherlands. In Indonesia, CVX's joint venture partner Amoseas operates a geothermal plant; future expansion will displace 200,000 tons of CO_2 emissions a year. CVX has a 20-percent equity stake in Energy Conversion Devices and has been a joint venture partner with ECD to develop regenerative fuel cells and advanced batteries that store hydrogen in metal hydrides. CVX is one of eight companies in the CO_2 Carbon Capture Project to conduct R&D on advanced separation, geologic storage and new carbon sequestration technologies. CVX is a leader in gasification technology that converts carbon-based feedstocks into cleaner synthesis gas used to produce chemicals, fuels, fertilizer and/or electricity. The process significantly reduces emissions of CO_2 nitrogen oxides and sulfur dioxide.

Company Emissions Disclosure

Emissions inventory: Yes. Measures CO_2, methane and nitrous oxide from facilities, plus purchased energy.

1990 CO_2 emissions: Not reported.

2000 CO_2 emissions: Not reported.

Future CO_2 emissions: Not projected. In 2002, CVX created an auditable greenhouse gas and energy data reporting system for all operations company-wide.

Emissions projections: Three major tree-planting projects are expected to sequester more than 1.5 million metric tons of CO_2over the next 40–70 years.

Emissions savings: CVX has achieved savings through fuel switching, reductions in gas venting and flaring, and renewable energy and gasification projects. Some of these projects may qualify under the Kyoto Protocol's Clean Development Mechanism. Chevron's North American business units have cut energy use 17% since 1990. Texaco's refineries have cut energy use 13%.

Emissions targets: In 2003, CVX is expected to announce a target to reduce the emissions intensity of production.

Climate Change Policies

Science merits action?
Yes. Concern is growing that CO_2 increase will lead to adverse climate change.

Voluntary measures sufficient?
Unclear. CVX supports use of flexible, market-based mechanisms.

Supports Kyoto?
CVX respects a country's decision whether to support Kyoto, and CVX is responsive by managing its greenhouse gas emissions appropriately.

Policy statement: CVX recognizes "the increasing public and government concerns about global climate change" and has a four-fold action plan: (1) reduce greenhouse gas emissions and increase energy efficiency, (2) invest in research and development and improved technology, (3) pursue business opportunities in promising innovative technologies, and (4) support flexible and economically sound policies and mechanisms to protect the environment. For the full statement, see: http://www.chevrontexaco.com/social_responsibility/environment/global_climate.asp.

Climate-Related Memberships

American Petroleum Institute: CVX has implemented an Energy and Greenhouse Gas Emissions Inventory System (SANGEA) based entirely on the American Petroleum Institute Compendium of Emissions Inventory Methodologies.

Energy Star: Chevron was 1999 "Natural Gas Star Partner of the Year." Two projects listed with 1605(b) registry.

Global Climate Coalition: Texaco withdrew in 2000. Chevron stayed until the end of the corporate member program.

Int'l Petroleum Industry Environmental Conservation Assn: Former chair of climate change working group.

OIL & GAS SECTOR

ChevronTexaco Corp.
San Francisco, California

Board Oversight

Chairman and CEO: David J. O'Reilly (since 2000). **Age: 55.** *O'Reilly is chairman of the American Petroleum Institute.*

Board of directors: 15 members; 11 independent. Elected annually. *Met eight times in 2001.*

Avg. age: 63 **Avg. tenure:** 8 years.

Standing committees: 4 — Audit, Management Compensation, Public Policy, and Board Nominating and Governance.

Environmental oversight: The Public Policy Committee (established in 1989) has oversight for many public policy matters, including environmental issues, and specifically climate change. Six directors serve on the committee; five are independent. *(See * Director Affiliations below.)* The committee reviewed the company's climate change policy in April 2002. CVX says "The committee continually identifies, monitors, and evaluates worldwide social, political, and environmental issues and ensures [CVX] takes the appropriate actions to address these issues." CVX's chairman also reviews the company's climate change policy. Over the next three years, CVX plans to incorporate greenhouse gas assessments into all capital projects and strategic business planning.

Selected Director Affiliations

Robert Eaton* is former chairman of DaimlerChrysler AG (1998–2000). He is a director of International Paper Co.

Franklyn Jenifer* is president of the University of Texas at Dallas and a director of Texas Science & Tech. Council.

Bennett Johnston* is CEO of Johnston & Associates and was a U.S. Senator from Louisiana (1972–1996). He served on the Senate Committee on Energy and Natural Resources. He chairs CVX's Public Policy Committee.

Sam Nunn* is a senior partner of King & Spalding and was U.S. Senator from Georgia (1972–1996). He is a director of General Electric Co. and Scientific-Atlanta.

Frank Shrontz* is retired chairman of The Boeing Co. He is a director of Boise Cascade Corp. and 3M Corp.

Carl Ware* is executive vice president of public affairs for Coca-Cola Co. He is a director of Georgia Power Co.

John Young is retired vice-chair of Novell and co-chair of the President's Committee on Science and Technology.

Management Accountability

Top EHS official: Warner Williams, Vice President of Health, Environment and Safety.

Reports to: Gregory Matiuk, Executive Vice President.

# of reporting levels to CEO: 1

# of EHS staff: 135 **Env. link to compensation:** Top execs.: Yes Plant managers: Yes Other employees: Yes

Env. audits: Company-wide since 1981. Facilities audited about every 4 years, using internal Operational Excellence Management System. OEMS encompasses environment, safety, health, reliability, efficiency.

Auditors: Corporate staff, staff from other facilities and environmental consulting firms. CVX is weighing certification of OEMS consistent with environmental management standards of the ISO 14001 program.

Review and disclosure: Board reviews OEMS targets and results more than twice annually. Metrics for OEMS include greenhouse gas emissions. Audit summaries are not made public.

Stakeholder Disclosure

Form 10-K: No discussion of climate change.

Annual report: No discussion of climate change.

EHS report: CVX has not issued an environmental, health and safety report since the merger of Chevron and Texaco in 2001. CVX's website has a detailed discussion of its four-part action plan on climate change, but does not provide any company-wide emissions data.

Stakeholder dialogue: CVX says it "understands the need to work collaboratively with local communities and to communicate issues openly… [with] investors, customers, host governments, local communities and employees, not only for the goals we achieve but how we achieve them." Information provided through its website, "ChevronTexaco Way" brochure, CVX Magazine, annual report, stockholder's meeting speeches and analyst webcast briefings. CVX says it has had considerable stakeholder dialogue on some projects with significant greenhouse gas emissions.

Shareholder Activity

Report on climate change: Shareholder proposals asking Chevron to report on the costs and liabilities of global warming came to votes in 1999 (7.4% support), 2000 (8.8%) and 2001 (9.6%). Church groups were the primary filers. Church groups filed and withdrew similar resolutions at Texaco in 1999 and 2000, and at ChevronTexaco in 2002.

Oil & Gas Sector

Conoco Phillips Corp.
Houston, Texas

ConocoPhillips is the nation's third largest and world's sixth largest integrated energy company. COP has operations in 49 countries. The merger of Conoco and Phillips Petroleum in August 2002 has not yet led to development of any combined-company policies on climate change. Conoco issued a position statement and also launched a verifiable emissions inventory system in 2001. (Phillips Petroleum had done neither of these things.) Combining assets for 2000, COP's oil and gas production led to estimated customer emissions of 181 million tons of CO_2, equal to about 0.8% of global CO_2 emissions from fossil fuels. The information in this profile reflects historical information about Conoco, except reserves/production, board membership and selected management information.

Reserves, Production and Carbon Emissions (2000, combined figures)

OIL	*NATURAL GAS*	*PRODUCTION CO_2 Emissions*
Reserves (million barrels): 2,726	**Reserves (billion cubic feet):** 11,431	**OIL:** 121.1 MMT
Production (million barrels): 295	**Production (billion cubic feet):** 1,133	**NATURAL GAS:** 60.0 MMT
Production (quadrillion Btu): 1.63	**Production (quadrillion Btu):** 1.13	**COAL:** Minimal
% of company assets: 35%	**% of company assets:** 29%	**% of global CO_2 emissions:** 0.8%

Renewables and R&D: In addition to its petroleum operations, COP has three emerging businesses—natural-gas-to-liquids technology, fuels technology and power generation. Among emerging technologies, renewable energy is an "area of interest." *(The following information concerns Conoco only, prior to the merger.)* Conoco Global Power plans to use its offshore engineering, power and project management skills in the development of offshore wind power in Europe and perhaps onshore wind power in other parts of the world. It is completing an assessment of possible sites in U.K. waters and is working on the use of carbon fiber in large wind turbines. Conoco's Cevolution carbon fiber business is seeking to become a "climate neutral" business by finding opportunities to reduce incremental CO_2 emissions from the manufacturing process while striving for product applications that offset existing CO_2 emissions. In natural gas refining, Conoco is developing technology to convert natural gas reserves in remote locations to clean, sulfur-free fuels that can be transported to market economically. These clean fuels could displace less-efficient, higher-emission fuels in the transportation market and reduce the need to flare gas in oil production areas where there is no infrastructure or commercial market.

Facility Emissions Disclosure

Emissions inventory: (Conoco) Yes. Measures CO_2 and methane from ownership interest in facilities, purchased energy.

1990 CO_2 emissions: Not reported.

2001 CO_2 emissions: 15.5 million metric tons. (Conoco)

Future CO_2 emissions: Not projected.

Emissions projections: No projections.

Emissions savings: (Conoco) Not aggregated. Conoco is listing some emission savings with Section 1605(b) registry. It has achieved savings mainly through fuel switching and reductions in gas flaring. One project in Syria is reducing CO_2 emissions by 4 MMT a year by switching from heavy oil to previously flared natural gas.

Emissions targets: No targets or timetables.

Climate Change Policies

Science merits action? (Conoco)
Yes. "Tentatively accepts" findings of the 2001 IPCC and National Academy of Sciences reports, despite "uncertainties" about human role.

Voluntary measures sufficient? (Conoco)
Yes. Supports free market solutions that balance emissions and economic growth.

Supports Kyoto? (Conoco)
No. Treaty should include developing nations and allow more time for new emission-saving technologies.

Policy statement: (Conoco) "Addressing global climate change effectively and equitably will require carefully considered policies and programs that can be adjusted and developed progressively as the world gains more knowledge and understanding of this extremely complex subject. It is… important that international policymakers agree on a consistent and comprehensive approach that: (1) does not jeopardize the world's economies; (2) leads to greater clarity and consensus about the impact of greenhouse gases on the global climate; (3) enables free markets to find and implement effective solutions; (4) covers a sufficient span of time that allows for development and commercialization of technologies to reduce atmospheric greenhouse gas concentrations; and (5) involves all countries in helping to find solutions to the problem, while fostering economic vitality for everyone." For the full statement, see http://www.conoco.com/safety/policies/gcc.asp.

Climate-Related Memberships

EPA Natural Gas Star Program: (Conoco) Founding member and serves on advisory board.

OIL & GAS SECTOR

Conoco Phillips Corp.
Houston, Texas

Board Oversight

Chairman: Archie Dunham (Conoco CEO since 1996) **Age:** 63

President and CEO: James Mulva (Phillips CEO since 1999). **Age:** 55

Board of directors: 16 members; 14 independent. Eight members each from Conoco and Phillips boards.

Avg. age: 60 **Avg. tenure:** 6 years.

Standing committees: 5 – Audit and Compliance, Executive, Compensation, Directors' Affairs, and Public Policy.

Environmental oversight: Public Policy Committee, consisting of four outside directors (*see * listings in Director Affiliations below*) has oversight responsibility for the company's environmental affairs. It is in the process of developing a climate change position statement for the newly emerged company. **(Conoco):** In 2001, Board Audit and Compliance Committee reviewed new company policies and commitments, such as the Global Climate Change Position, Sustainable Development Policy and Social Progress Position. Conoco regarded development of its Global Climate Change Position and a verifiable greenhouse gas inventory as its most important environmental achievement of 2001.

Selected Director Affiliations

Richard Auchinleck* is retired president and CEO of Gulf Canada Resources Ltd. (1998-2001). He is a founding director and member of the Canadian Heavy Oil Association and a director of Hydro One Inc. and Sonic Mobility Inc.

Kenneth Duberstein is chairman and CEO of the Duberstein Group, a strategic planning and consulting company. He served as White House chief of staff to President Reagan. He is a director of Boeing and four other companies.

David Boren* is president of the University of Oklahoma. He is a former U.S. Senator and Governor of Oklahoma. He is a director of AMR Corp., Texas Instruments and Torchmark Corp.

Frank McPherson is retired chairman and CEO of Kerr-McGee Corp. (1983-1997).

William Reilly* is CEO of Aqua International Partners and former U.S. EPA Administrator (1989-1993). He is a director of DuPont and Royal Caribbean International and is chairman of the World Wildlife Fund.

J. Stapleton Roy is managing director of Kissinger Associates and former U.S. Ambassador to Singapore, Indonesia and the People's Republic of China. He is also a director of Freeport-McMoRan Copper & Gold.

Victoria Tschinkel* is the director of the Florida Nature Conservancy and a former senior environmental consultant to Landers & Parsons, a Tallahassee, Florida, law firm (1987–2002). She is a former secretary of the Florida Department of Environmental Regulation.

Management Accountability

Top EHS official: Robert Ridge, Vice President of Health Safety, and Environment.

Reports to: J.J. Mulva, President & CEO.

# of reporting levels to CEO: 0

# of EHS staff: 145

Conoco link to compensation: Top execs: Yes Plant mgrs: Yes Other employees: Yes

Env. audits: (Conoco) Since early 1990s. Facility audits each 1-2 years. Three-tiered system of annual facility self-audits, policy and regulatory compliance audits, and bi-annual SH&E management system audits.

Auditors: (Conoco) Corporate and plant staff, staff from other facilities, accounting firms. Management system consistent with environmental management standards of ISO 14001, EMAS and other EMS codes.

Review and disclosure: (Conoco) Board Audit and Compliance Committee reviews SH&E audits. Audit summaries not made public. Audits and 2001 emissions inventory certified by Ernst & Young.

Stakeholder Disclosure

Form 10-K: (ConocoPhillips, 2002) Says countries in which it has interests "have made commitments to the Kyoto Protocol" and that "the U.S. may ratify the treaty in the future." Says company "expenditures could be substantial."

Annual report: (ConocoPhillips, 2002) No discussion of climate change. **(Conoco, 2001)** Highlights new position on climate change and describes key challenge on emissions.

EHS report: ConocoPhillips has not yet issued a combined environmental report. **(Conoco)** Issued annually since 1993; audited by Ernst & Young. Used GRI format in 2001. Includes statements on climate change science, policy and U.S. position on Kyoto Protocol.

Stakeholder dialogue: Conoco says it made significant progress in 2002 on the development of Sustainable Development and Stakeholder Engagement tools for use by Conoco businesses. Conoco also was working with NGO's through several trade organizations, including the Fund for Peace & Human Rights and Business Roundtable.

Shareholder Activity

Report on climate change: No shareholder resolutions filed at Conoco or Phillips Petroleum.

Arctic drilling: A 2002 shareholder proposal at Phillips Petroleum asking for a report on plans to drill in the Arctic National Wildlife Refuge received support from 5.5% of the shares voted. Primary filer was Green Century Funds.

Oil & Gas Sector

ExxonMobil Corp.
Irving, Texas

ExxonMobil is the world's largest petroleum and petrochemical company. XOM is engaged in all aspects of fossil energy production. It also has interests in coal, minerals and electric power generation. XOM's fossil fuel production in 2000 was the estimated source of 610 million metric tons of CO_2 emissions, equal to about 2.6% of global emissions from these sources. XOM has achieved a 35% gain in energy efficiency at its own facilities and is in partnerships to conduct research on technology innovations, especially fuel cells. XOM entered into a new research partnership with Stanford University in 2002. XOM began reporting its greenhouse gas emissions from facilities in 2002. Exxon and Mobil merged in 1999. Previously, each company halted renewable energy development efforts.

Reserves, Production and Carbon Emissions (2000)

OIL	*NATURAL GAS*	*PRODUCTION CO_2 Emissions*
Reserves (million barrels): 11,561	**Reserves (billion cubic feet):** 55,866	**OIL:** 383.5 MMT
Production (million barrels): 932	**Production (billion cubic feet):** 3,775	**NATURAL GAS:** 199.7 MMT
Production (quadrillion Btu): 5.16	**Production (quadrillion Btu):** 3.76	**COAL:** 26.4 MMT
% of company assets: 24%	**% of company assets:** 17%	**% of global CO_2 emissions:** 2.6%

Renewables and R&D: XOM spends $600 million annually on R&D, including $150 million annually on safety, health and environment-related matters. In 2002, XOM committed $100 million of funding over 10 years to Stanford University for R&D on new energy supply options to reduce greenhouse gases. XOM's own R&D efforts focus mainly on technology innovations to use gasoline and diesel fuel more efficiently and potentially to produce hydrogen for fuel cells. XOM is in a fuel cell R&D partnership with General Motors and Toyota. In 1983, Exxon sold its Solar Power Corp. subsidiary, citing forecasts for lower-priced oil; it was the third largest producer of photovoltaic cells at the time. Mobil sold its solar power business in 1995. The companies' combined spending on alternative energy development topped $500 million. XOM now says, "While renewables offer promise in the future, we are convinced it would be a poor investment… to force the premature, large-scale introduction of renewable resources today."

Facility Emissions Disclosure

Emissions inventory: Yes. Measures CO_2 and methane from global upstream, refining and chemicals operations.

1990 CO_2 emissions: Not reported.

2000 CO_2 emissions: 122.9 million metric tons.

Future CO_2 emissions: Not projected.
XOM has produced a chart of normalized emissions (GHG per 100 tons of throughput) for 1998-2001.

Emissions savings: XOM has not reported its CO_2 emissions savings. In 2001, emissions were 124 MMT; facility-related reductions were offset by increases in drilling and flaring. XOM has achieved a 35% gain in energy efficiency at its refineries and chemical plants since 1973. Cogeneration now supplies 90% of power at these plants, saving 7 MMT per year. XOM is cutting methane emissions by reducing waste, leakage and flaring during production.

Emissions projections: XOM says 13% of CO_2 emissions from its petroleum products come from production. Customer use accounts for the other 87%.

Emissions targets: XOM expects to achieve an additional 15% improvement in energy efficiency at its facilities through its Global Energy Management System. No timetable is set for this target.

Climate Change Policies

Science merits action?
While "many uncertainties" remain, XOM supports energy-saving programs and technological innovation as well as further basic research.

Voluntary measures sufficient?
Yes. XOM is seeking "practical future reductions in greenhouse gases while we improve our understanding of the science of this complex issue."

Supports Kyoto?
No. XOM says treaty would require "massive reductions in energy use within a few years" and that developing nations must also commit to controls.

Policy statement: XOM "recognizes that the risk of climate change and its potential impacts on society and ecosystems may prove to be significant. While studies continue to better understand these risks and potential consequences, we will continue to take tangible actions and work with others to develop effective long-term solutions that minimize the risk of climate change from energy use without unacceptable social and economic damage." More information is available at: http://www2.exxonmobil.com/Corporate/Notebook/Climate/Corp_N_ClimateDetails.asp.

Climate-Related Memberships

American Forests: Exxon and XOM have planted more than 2 million trees since 1996 through this partnership.

American Petroleum Institute: Working with API and the International Petroleum Industry Environmental Conservation Association to improve emissions reporting and reach a common agreement on a measurement protocol.

Global Climate Coalition: Exxon and Mobil were members until the corporate program was dropped in 2000.

OIL & GAS SECTOR

ExxonMobil Corp.
Irving, Texas

Board Oversight

Chairman and CEO: Lee R. Raymond (since 1993). **Age:** 63.
Raymond is also a director of the American Petroleum Institute.

Board of directors: 12 members; 10 independent. Elected annually.
Met 10 times in 2001.
Avg. age: 64 **Avg. tenure:** 10 years.

Standing committees: 7— Affairs, Audit, Advisory Committee on Board Contributions, Compensation, Executive, Finance and Public Issues.

Environmental oversight: The Public Issues Committee oversees XOM's environmental, health and safety matters. It consists of four independent directors. *(See * listings in Director Affiliations.)* The committee receives an annual briefing from the vice president of safety, health and environment, hears reports from operating units and visits sites to observe and comment on current practices. The committee met twice in 2001. XOM's Management Committee also conducts an annual safety, health and environmental performance review of each business unit. The board reviews the company climate change policy at least annually.

Selected Director Affiliations

Michael Boskin is a professor of economics at Stanford University and a senior fellow at the Hoover Institution.

William Esrey is chairman and CEO of Sprint Corp. and a director of Duke Energy Corp.

Donald Fites* is former chairman and CEO of Caterpillar. He is a director of AK Steel Corp., Georgia-Pacific Corp. and Oshkosh Truck Corp.

William Howell is Chairman Emeritus of J.C. Penney Co. and is a director of three other energy companies—American Electric Power, Halliburton and The Williams Cos.

Helene Kaplan* is of counsel to Skadden, Arps, Slate, Meagher & Flom LLP.

Reatha Clark King is president and executive director of the General Mills Foundation. She was a research chemist with the National Bureau of Standards and a chemistry professor and associate dean at City University of New York.

Philip Lippincott* is retired chairman of Campbell Soup Co. and retired chairman and CEO of Scott Paper Co. He chairs XOM's Public Issues Committee.

Henry McKinnell is chairman and CEO of Pfizer Corp. and chair of the Stanford Business School Advisory Council.

Walter Shipley* is retired chairman of Chase Manhattan and is a director of Verizon and American Home Products.

Management Accountability

Top EHS official: Frank Sprow, Vice President of Safety, Health and Environment.

Reports to: E.G. Galante, Senior Vice President

# of reporting levels to CEO: 1

# of EHS staff: 1,810 **Env. link to compensation:** Top execs.: Yes Plant managers: Yes Other env. staff: Yes

Env. audits: Company-wide since 1992. Major facilities audited every 1–2 years, based on internal Operations Integrity Management System (OIMS).

Auditors: Corporate staff and staff from other facilities. OIMS review consistent with environmental management standards of ISO 14001 certification program.

Review and disclosure: Board Public Issues Committee reviews audits. Lloyds' Registry Quality Assurance provides attestation. Summaries not made public.

Stakeholder Disclosure

Form 10-K: No discussion of climate change issues.

Annual report: Brief mention of climate change in two-page environmental, health and safety section.

EHS report: First issued in 1990. Corporate Citizenship Report issued annually since 2002. One of five sections of the report is devoted to climate change, including scientific research to resolve uncertainties, XOM's efforts to raise energy efficiency at its facilities, and its technology research on fuel cells.

Stakeholder dialogue: XOM provides extensive information on climate change on its website. XOM also publishes a Corporate Citizenship Report with information about its greenhouse gas emissions and climate change policy. XOM has issued two brochures since 1998 and published more than a dozen "op-ed" paid advertisements on climate and alternative energy topics. XOM funds scientific and economic studies of climate change at major universities and research organizations. XOM staff scientists have participated in the Intergovernmental Panel on Climate Change.

Shareholder Activity

Report on climate change: Shareholder proposals asking Exxon to report on the costs and liabilities of global warming came to votes in 1998 (4.6% support) and 1999 (5.3%). Church groups were the primary filers.

Report on renewable energy: Shareholder proposals asking ExxonMobil to report on its renewable energy plans came to votes in 2000 (6.1%), 2001 (8.9%) and 2002 (20.2%). New York City pension funds was among 40 co-filers.

Oil & Gas Sector

Royal Dutch/Shell Group
The Hague, The Netherlands

Royal Dutch/Shell is one of the world's largest integrated energy companies, operating in 140 countries. Shell is 60% owned by Royal Dutch Petroleum and 40% owned by Shell Transport & Trading. Shell's revenues come mainly from oil and gas sales. It also makes chemicals, transports natural gas, trades gas and electricity, and develops renewables. Shell's oil and gas production in 2000 was the estimated source of 508 million tons of end-use CO_2 emissions, equal to 2.2% of global emissions from fossil fuels. In 1998, Shell became the second oil company to commit to cutting its facility CO_2 emissions. By 2000, Shell had cut emissions 11% below 1990 levels. It established Shell Renewables in 1997, and Shell Hydrogen in 1999 to promote fuel cell and hydrogen infrastructure development.

Reserves, Production and Carbon Emissions (2000)

OIL	*NATURAL GAS*	*PRODUCTION CO_2 Emissions*
Reserves (million barrels): 4,469	**Reserves (billion cubic feet):** 26,043	**OIL:** 333.7 MMT
Production (million barrels): 810	**Production (billion cubic feet):** 3,288	**NATURAL GAS:** 174.2 MMT
Production (quadrillion Btu): 4.49	**Production (quadrillion Btu):** 3.28	**COAL:** Nil
% of company assets: 23%	**% of company assets:** 22%	**% of global CO_2 emissions:** 2.2%

Renewables and R&D: Shell Renewables committed $500 million to invest in solar, wind and biomass from 1997–2002. It is expected to invest $500 million to $1 billion more in 2002–2007. Shell says its wind and solar power businesses are growing by more than 20% a year. It acquired two wind projects in 2001, raising its installed capacity from 8 megawatts to 138 MW. In 2002, Shell Renewables acquired its partners' 67% share in the Siemens/EON/Shell global solar joint venture, making Shell Renewables the world's fourth largest supplier of solar panels. Shell Renewables also is developing hot-fractured-rock geothermal technology. Shell Hydrogen is focused on long-term transformation away from fossil fuels and towards a hydrogen and fuel cell-based economy. Shell Hydrogen established four joint ventures in 2001, two of which focus on existing technology (fuel processors and metal hydride storage) and two of which are private capital joint ventures in emerging companies.

Facility Emissions Disclosure

Emissions inventory: Yes. Measures all six Kyoto-listed greenhouse gases from facilities it owns or controls.

1990 CO_2 emissions: 114 million metric tons.

2000 CO_2 emissions: 101 MMT (11.4% reduction).

2010 CO_2 emissions: Not to exceed 108 MMT.

Emissions projections: Since 1995, Shell has shared global energy scenarios through 2050. Scenarios stress greater use of natural gas, fuel cell technologies and renewables to make hydrogen, with possible stabilization of atmospheric CO_2 below 550 parts per million.

Emissions savings: Shell estimates its 2002 emissions would have been 150 MMT without emissions savings programs. Emission-reducing projects have focused on reductions in gas flaring, greater energy efficiency (through Eniserve subsidiary) and emissions trading.

Emissions targets: Shell intends to stay within Kyoto targets through 2010. It will end continuous venting in 2003 and continuous operational flaring by 2008, thereby cutting its emissions by 30 MMT a year. Typical payback on efficiency investments is 1 to 3 years.

Climate Change Policies

Science merits action?	**Voluntary measures sufficient?**	**Supports Kyoto?**
Yes. Precise impact is not yet known, but the evidence warrants action now.	Favors stable regulatory regime with flexible market mechanisms.	"Signifies an important change in… attitude… and shows [nations] are serious…."

Policy statement: "We believe action is required now to lay the foundation for eventually stabilising greenhouse gas emissions in the atmosphere in an equitable and economically responsible way. It is time to pursue stable, market-based policies that help energy users and suppliers pursue innovative energy solutions." For the full policy statement, see http://www.shell.com/climate.

Climate-Related Memberships

Environmental Defense Partnership for Climate Action: Joined in 2000. Founding member.

EPA Energy Star and Natural Gas Star Program: Reporting project savings with Section 1605(b) registry.

Global Climate Coalition: Shell's U.S. affiliate withdrew from the GCC in 1998.

International Emissions Trading Association and UK Emissions Trading Scheme: Internal trading done from 2000–2002. Shifted to external focus in 2001. Established Emissions Trading business unit within in Shell Trading.

MIT Joint Program on the Science & Policy of Global Change: Program sponsor.

Pew Center on Global Climate Change: Joined Business Environmental Leadership Council in 1999.

OIL & GAS SECTOR

Royal Dutch/Shell Group
The Hague, The Netherlands

Board Oversight

Chairman: Philip Watts (Shell Transport, since 2001) **Age:** 57

President: Jeroen van der Veer (Royal Dutch, since 2000) **Age:** 55

Boards of directors/management: 22 members, 17 non-executive. Elected to staggered terms.

Avg. age: 61 **Avg. tenure:** 4 years.

Standing joint committees: 3 — Group Audit, Remuneration and Succession Review, and Social Responsibility.

Environmental oversight: Royal Dutch Petroleum has an eight-member supervisory board and a three-member management board. Shell Transport has an 11-member board of directors. The Social Responsibility Committee (created in 1997) oversees the company's environmental affairs. It has six employee and six non-employee directors, and has reviewed Shell's climate change policy. *(See * listings in Director Affiliations.)* A Committee of Managing Directors oversees the policy's implementation. Shell has been factoring carbon costs in all of its major projects since 2000 "for optimal profitability in a carbon-constrained world."

Selected Director Affiliations

Teymour Alireza* is chairman of the National Pipe Co. Ltd., Saudi Arabia; a director of Arabian Gulf Investments (Far East) Ltd., Hong Kong; and is on the International Board of Trustees of the World Wide Fund for Nature.

Eileen Buttle* has served as the UK member of the European Environment Agency's Scientific Committee, has served on government and research council environmental committees and is a trustee of several ecology groups.

Luis Giusti was chairman and CEO of the Venezuelan state oil company, Petroleos de Venezuela, SA (1994–1999).

Jonkheer Loudon* is a director of Corus Group (formerly British Steel) and an advisory board member of Allianz.

Hubert Markl is president of the Max-Planck-Gesellschaft and on the supervisory boards of BMW and Siemens.

Joachim Milberg is chairman of BMW's board of management.

Ronald Oxburgh* is chairman of the Science, Engineering, Technology and Mathematics Network and chairman of the House of Lords Select Committee on Science and Technology.

Henny de Ruiter is vice chairman of the supervisory board of Aegon (insurance), vice chairman of the board of Corus Group and on the supervisory board of Royal Vopak (tank storage for oil, gas & chemicals; transportation services).

Jan Timmer* was president and chairman of the board of management of Royal Philips Electronics. He is chairman of the supervisory board of PSV and on the supervisory board of ING Group.

Maarten van den Bergh* is chairman of the board of Lloyds TSB and a director of British Telecom.

Philip Watts is chairman of the executive committee of the World Business Council for Sustainable Development.

Management Accountability

Top EHS official: Lex Holst, Vice President, Health, Safety & Environment.

Reports to: Lynn Elsenhans, Director of Strategic Planning, Sustainable Development and External Affairs.

Reporting levels to Chairman: 1.

# of EHS staff: 50+

Env. link to compensation: Top execs: Yes Plant managers: Yes Other employees: Yes
Greenhouse gas targets are a factor in compensation of top executives, managers.

Env. audits: Since 1978. Audits every three years at major facilities and within five years at all installations.

Auditors: Corporate staff and staff from other facilities. Audits include facility compliance with Shell environmental management system.

Review and disclosure: Group Audit Committee reviews audits. Results not verified by a third party. Summaries not made public.

Stakeholder Disclosure

Form 20-F: Only reference is that "perceived threat of global warming" and concerns about energy security could lead to heightened interest in hydrogen fuel.

Annual report: President's letter highlights energy scenario planning to curb CO_2 emissions, activities in renewable energy and hydrogen development.

EHS report: Issued annually since 1997, using a sustainability format. Reports have been certified by KPMG and PriceWaterhouseCoopers. Extensive discussion of climate change science, company policies and goals, emissions reductions and trading programs, renewable energy development and partnerships.

Stakeholder dialogue: Shell has conducted consultations on climate change and dialogue with the conservation community on biodiversity issues. For some new projects, Shell engages energy and conservation leaders as part of its environmental/social impact assessment process.

Shareholder Activity

No shareholder resolutions filed on climate change or energy development issues.

OTHER INDUSTRY: METALS

Alcoa Corp.
Pittsburgh, Pennsylvania

Alcoa is the world's leading producer of aluminum, operating in 39 countries. Alcoa is active in all major aspects of the aluminum industry—technology, mining, refining, smelting, fabricating and recycling. Alcoa prides itself on making a "very sustainable product." Its aluminum products and components are used in aircraft, automobiles, beverage cans, buildings, chemicals, sports and recreation, and a wide variety of industrial and consumer applications. Among its other businesses are vinyl siding, packaging machinery, precision castings, plastic bottles and closures, fiber optic cables, and electrical distribution systems for vehicles. Nearly two-thirds of Alcoa's sales are in the United States. Alcoa estimates that nearly two-thirds of the 680 million tons of aluminum produced since the industry began in 1886 are still in use. Alcoa is seeking $100 million in annual environmental and energy cost savings by 2006 through elimination of wastes and design for sustainability. Alcoa is close to achieving a goal of a 25% reduction in its greenhouse gas emissions for 1990-2010. With new patented technology, a further 25% reduction is possible.

Products, Energy, and Research & Development

ALUMINUM: Transportation accounts for about one-third of U.S. aluminum demand. In a typical mid-size sedan, replacing two pounds of steel with one pound of aluminum can reduce lifetime CO2 emissions by 20 pounds. Use of automotive aluminum has doubled since 1991 and is expected to double again by 2005. Nearly 90% of automotive aluminum is recovered and recycled.

ENERGY USE: Electric power accounts for about 25% of Alcoa's primary aluminum costs. It generates about 25% of the power used at its smelters worldwide, and purchases the rest under long-term contracts. Coal and hydropower are Alcoa's main sources of electricity. It says it will continue to improve its energy efficiency.

INERT ANODE TECHNOLOGY: Alcoa is pursuing a patented process to develop inert anode technology that could result in substantial operating cost savings and environmental benefits. If the technology proves to be commercially viable, Alcoa plans to convert its existing potlines to this new technology and achieve an additional 25% reduction in its greenhouse gas emissions by 2010.

RECYCLING: Aluminum recycling requires 5% of the energy and produces 95% fewer greenhouse gases than primary aluminum production. Alcoa has set a global goal to use recycled aluminum in 50% of its products by 2020 (except for raw ingot sold to others). Automotive and beverage can aluminum accounts for 90% of recycled aluminum. In 2001, 55% of U.S. aluminum was recycled.

RENEWABLE ENERGY: Alcoa is one of eight companies in the Green Power Market Development Group, which has set a goal to create demand for 1,000 megawatts of electricity from renewable sources by 2010. Alcoa supports extending production tax credits and other economic incentives to promote renewable energy.

R&D: Alcoa's expenditures for R&D activities were $214 million in 2002. Each of the major process and product areas within Alcoa has a Technology Management Review Board. Each TMRB is responsible for formulating and communicating a technology strategy, developing and managing its technology portfolio and ensuring the global transfer of technology.

Facility Emissions Disclosure

Emissions inventory: Yes. Carbon dioxide, perfluorocarbons, sulfur hexafluoride, purchased energy.

1990 CO2-equivalent emissions: 51 million metric tons.

2000 CO2 equivalent emissions: 43 MMT (14% cut)

2010 CO2 equivalent emissions: Less than 38 MMT.

Emissions projections: Projected GHG emissions for 2010 range from 25.5-38 MMT, based on technology innovation. While cutting emissions, production volume is forecast to grow 40% in 1990-2010.

Emissions savings: In 1990-2002, Alcoa achieved a 23.5% reduction in its greenhouse gas emissions, to ~37 MMT of CO2 equivalent. A two-thirds cut in PFC emissions accounts for most of the savings. CO2 emissions have remained relatively stable at ~31 MMT.

Emissions targets: In 2000, Alcoa set a goal to reduce its greenhouse gas emissions 25% from 1990-2010. If inert anode technology proves successful, Alcoa says it will boost its 2010 reduction target from 25% to 50%.

Climate Change Policies

Science merits action?	Voluntary measures sufficient?	Supports Kyoto?
Yes.	*No.*	*Neutral.*

Policy statement: "[A]vailable evidence indicates greenhouse gas emissions from human activities affect climate. We recognize that the risk of significant climate change is an issue of vital importance requiring action." For Alcoa's full statement, see http://www.alcoa.com/global/en/environment/position_papers/climate_change.asp

Climate-Related Memberships

Climate Leaders: Joined in 2002. Charter member.

Pew Center on Global Climate Change: Joined Business Environmental Leadership Council in 2000.

WRI/BSR Green Power Market Development Group: Joined in 2001. Founding member.

OTHER INDUSTRY: METALS

Alcoa Corp.
Pittsburgh, Pennsylvania

Board Oversight

Chairman and CEO: Alain Belda (since 2001) **Age:** 59.
Belda also is a director of Citigroup, DuPont and The Ford Foundation.

Boards of directors: 10 members, 9 independent. Elected to 3-year terms. Met seven times in 2001.

Avg. age: 61 **Avg. tenure:** 6 years.

Standing committees: 5 — Audit, Compensation and Benefits, Executive, Nominating, Public Issues.

Environmental oversight: Alcoa created a Public Issues Committee in 2002 to provide formal oversight of the company's social and environmental affairs. The committee consists of six independent directors. *(See * listings in Director Affiliations.)* The Audit Committee also reviews environmental audits and monitors environmental compliance. Former Alcoa chairman and CEO Paul O'Neill (who was U.S. Treasury Secretary in 2001-2002) has been a leading advocate of corporate action on climate change. In 2000, Alcoa adopted greenhouse gas reduction targets as part of an expanded commitment to sustainable development. Alcoa's emissions baseline and annual inventory are now verified by third parties. Alcoa is evaluating internal trading mechanisms to see if such procedures will enhance GHG reduction strategies. In 2000, Alcoa formally linked environmental accountability with performance expectations and compensation. The Primary Metals Group has compensation goals for PFC emissions.

Selected Director Affiliations

Kathryn Fuller* is president of the World Wildlife Fund (since 1989). She has served as Chief of the U.S. Department of Justice's Wildlife and Marine Resources Section (1981–1982).

Carlos Ghosn* is president and CEO of Nissan Motor Co. Ltd. (since 2001). He is also a director of Mirant Corp.

Judith Guron* is president of Manpower Demonstration Research Corp. She chairs the Public Policy Committee.

Sir Ronald Hempel is chairman of United Business Media and former chairman of Imperial Chemical Industries PLC (1995–1999). He is a director of BAE Systems and was chairman of the UK Committee on Corporate Governance.

Henry Schacht* is chairman of Lucent Technologies and former chairman of Cummins Inc. (1977–1995).

Franklin Thomas is a consultant to the TFF Study group and former president and CEO of The Ford Foundation (1979–1996). Thomas is the lead director of Alcoa's board of directors. He is also a director of Avaya, Citigroup, Cummins, Lucent Technologies and Pepsico.

Ernest Zedillo* leads Yale University's Center of Studies on Globalization. He was President of Mexico (1994–2000).

Management Accountability

Top EHS official: William O'Rourke, Vice President, Environment, Health & Safety and Audit.

Reports to: Richard Kelson, Chief Financial Officer

Reporting levels to Chairman: 1

# of EHS staff: 8

Env. link to compensation: Top execs: Yes Plant managers: Yes Other employees: Yes
Primary Metals Group has links to reductions in PFC emissions in smelting operations.

Env. audits: Since 1990. Internal audits are conducted every 3–4 years, using a risk-based model. By 2005, Alcoa seeks to have all of its facilities certified under ISO 14001 environmental management system.

Auditors: Internal audit department and staff from other facilities for internal audits. Third-party auditing firms certify ISO 14001 facilities; 75% of facilities had ISO 14001 certification by the end of 2002.

Review and disclosure: Audit Committee reviews internal audits. Audit summaries are not made public. Independent firms certify audit results and annual greenhouse gas emissions inventories.

Stakeholder Disclosure

Form 10-K: No discussion of climate change.

Annual report: No discussion of climate change.

EHS report: Issued annually since 1992. In 2003, Alcoa will issue a combined environmental and community report based on the Global Reporting Initiative. The 2002 report includes 1990 baseline and recent GHG emissions data as well as targets for 2010.

Stakeholder dialogue: As part of its commitment to increased transparency and sustainability, Alcoa says it will establish community engagement programs at all of its businesses by 2004. With respect to climate change, Alcoa says it will "actively participate in discussions at national and international levels… and provide leadership, data and recommendations." It also says it will work with customers to "promote beneficial uses and recycling of its products to reduce GHG emission in transportation, construction, packaging and other applications."

Shareholder Activity

No shareholder resolutions on climate change. In 2001, church groups affiliated with the Interfaith Center on Corporate Responsibility withdrew a resolution asking the company to endorse the CERES environmental principles.

OTHER INDUSTRY: CHEMICALS

DuPont Corp.
Wilmington, Delaware

DuPont is a world leader in science and technology, with 22 strategic business units and operations in 75 countries. DuPont's main business lines are agriculture and nutrition, coatings and color technologies, electronic and communication technologies, performance materials, textiles and interiors, and safety and protection. Within its strategic business units, DuPont manufactures a wide range of products for sale to many different markets, including the transportation, textile, construction, motor vehicle, agricultural, home furnishings, medical, packaging, electronics and the nutrition and health markets. More than half of DuPont's sales are outside of the U.S. DuPont adopted a "sustainable growth" strategy in 1998. It participated in the development of the greenhouse gas reporting protocol by the World Resources Institute and WBCSD. DuPont achieved a 65% cut in its GHG emissions in 1990–2001.

Products, Energy Use and Research & Development

AGRICULTURE AND NUTRITION: About one-fifth of DuPont's sales come from its agriculture and nutrition business, which includes Pioneer Hi-Bred seeds, crop protection chemicals and soy-based protein products. This business is particularly affected by weather and government programs as well as market acceptance of the company's genetically enhanced products.

ENERGY USE: DuPont has kept its energy use flat since 1990, despite a 35% increase in production, and has achieved $1.65 billion in energy savings in 1990–2000. It expects to keep its energy demand flat through 2010.

FUEL CELLS: DuPont created a Fuel Cell business unit in 2001 to pursue growth in the emerging proton exchange membrane fuel cell market. It hopes to become an industry leader by combining its expertise in polymer chemistry, coatings and electrochemical technologies.

FLUOROCHEMICALS: DuPont is a leading global manufacturer of fluorochemicals, some of which are potent greenhouse gases. Fluorochemicals are used in air conditioning and refrigeration; their properties contribute to the safety and energy efficiency of such equipment. DuPont led industry efforts to promote improved containment, recovery and recycling of these compounds.

RENEWABLE ENERGY: In 2001, DuPont set a target to derive 10% of its energy from cost-competitive renewable sources by 2010, up from 2% in 2000. Main company sources are biomass and wind power.

R&D: DuPont's expended $1.2 billion on R&D in 2002. About half of R&D funding is for biotechnology and electronics. DuPont is placing strategic emphasis on biology-based materials. It has set a goal to achieve 25% of its revenues from nondepletable resources by 2010.

Facility Emissions Disclosure

Emissions inventory: Yes. All six greenhouse gases covered by Kyoto Protocol, including purchased energy.

1990 CO_2-equivalent emissions: 90 million metric tons.

2000 CO_2-equivalent emissions: 36 MMT (59.5% cut)

2010 emissions: Not to exceed 31.5 MMT.

Emissions projections: No formal projections given. DuPont's 2010 target implies that greenhouse gas emissions will not increase in 2000–2010.

Emissions savings: DuPont achieved a 65% cut in GHG emissions in 1990–2001. Half of the savings came from a $50 million investment to reduce nitrous oxide emissions in nylon production. If future emissions trading were to set a $10 price per metric ton of CO_2, DuPont's credits could have a market value of $472 million per year.

Emissions targets: In 1999, DuPont set a goal to cut GHG emissions by 65% (58 MMT of CO_2 equivalent) in 1990–2010. (It met this target 9 years ahead of schedule.)

Climate Change Policies

Science merits action?
Yes. Made first comments on action in 1991.

Voluntary measures sufficient?
No. Should have a "regulatory backstop."

Supports Kyoto?
Unclear. Expects treaty will go into force without U.S.

Policy statement: "We believe a workable [climate change] policy will involve at least two elements: a market-based 'emissions trading' system to optimize the use of resources and direct them to where they can have the most impact; and a clear set of goals or targets to set the direction and pace of change." See DuPont's 2001 environmental report at: http://www1.dupont.com/NASApp/dupontglobal/corp/index.jsp?page=/content/US/en_US/social/SHE/usa/us1.html..

Climate-Related Memberships

Chicago Climate Exchange: Founding member in 2003. DuPont has done pilot trades in the U.S., Canada and U.K.

Environmental Defense Partnership for Climate Action: Joined in 2000. Founding member.

EPA Energy Star, Natural Gas Star Programs: DuPont has cut CO2 emissions from energy by 5 MMT since 1990.

International Climate Change Partnership: Advocates emission credits for early action on climate change.

Keystone Center National Dialogue on Climate Change: Developing risk analysis tool for business community.

Pew Center on Climate Change: Joined Business Environmental Leadership Council in 1999.

WRI/BSR Green Power Market Development Group: Joined in 2001. Founding member.

OTHER INDUSTRY: CHEMICALS

DuPont Corp.
Wilmington, Delaware

Board Oversight

Chairman and CEO:
Charles Holliday Jr. (since 1998)
Age: 54.
Holliday is co-author of Walking the Talk (2002), a book published by WBCSD on sustainable growth.

Boards of directors: 13 members, 11 independent. Elected annually. Met six times in 2001.

Avg. age: 59 **Avg. tenure:** 8 years.

Standing committees: 5 — Audit, Compensation, Corporate Governance, Environmental Policy and Strategic Direction.

Environmental oversight: The Environmental Policy Committee (established in 1992) is responsible for oversight of DuPont's environmental affairs. *(See * listings in Director Affiliations below.)* The committee is regularly apprised of significant developments regarding climate change and greenhouse gas emissions, energy efficiency and renewable energy, and biotechnology. The committee periodically reviews the policy and overall progress in environmental performance. DuPont issued its first climate change policy statement in 1994. DuPont created a senior management level Environmental Leadership Council in the early 1990s. Business heads set waste and emissions reduction goals and enter project information (including financial data) in a Corporate Environmental Planning database. DuPont implements the most cost-effective projects, seeking to achieve 80% of potential reductions for 20% of the cost of all proposed projects. The Vice President of Safety, Health and Environment evaluates the performance of each business unit towards achieving corporate environmental commitments and goals.

Selected Director Affiliations

Alain Belda is chairman, president and CEO of Alcoa.

Louisa Duemling* is a board member of The Nature Conservancy and the Chesapeake Bay Foundation.

Deborah Hopkins is head of Citigroup's corporate strategy and a member of its management committee. Previously, she served as senior vice president and CFO of Boeing and held a similar CFO position for General Motors Europe.

Goran Lindahl* is Under Secretary-General and special advisor to the United Nations Secretary-General and Chairman of the Alliance for Global Sustainability.

William Reilly* is CEO of Aqua International Partners and former U.S. EPA Administrator (1989-1993). He is also a director of ConocoPhillips and Royal Caribbean International and is chairman of the World Wildlife Fund.

Charles Vest is president of MIT, a fellow of the American Association for the Advancement of Science and a member of the President's Committee of Advisors on Science and Technology. He is also a director of IBM Corp.

Management Accountability

Top EHS official: Paul Tebo, Vice President, Safety, Health & Environment.

Reports to: Chad Holliday, Chairman and CEO.

Reporting levels to Chairman: 0.

# of EHS staff: 200 **Env. link to compensation:** Top execs: Yes Plant managers: Yes Other employees: Yes

Env. audits: Since 1989. Internal audits are conducted every 2–3 years. DuPont has certified 25% of facilities under ISO 14001, EMAS or BS7750.

Auditors: Corporate staff and staff from other facilities. Third-party auditing firms certify ISO 14001, EMAS and BS7750 facilities.

Review and disclosure: Senior Management Committee reviews audits. Third-party consultant provides public evaluation report.

Stakeholder Disclosure

Form 10-K: "While well ahead of the target/timetable contemplated by the [Kyoto] Protocol on a global basis, [DuPont] faces prospects of country-specific restrictions where major reductions have not yet been achieved." (Separately, DuPont told IRRC it expects climate change to pose a minimal risk to its business through 2010.)

Annual report: No discussion of climate change in front section. MD&A section repeats Form 10-K statement.

EHS report: Issued annually since 1991. DuPont now uses a sustainability format based on the Global Reporting Initiative. Its 2002 environmental progress report includes 1990 baseline and recent GHG emissions data as well as targets for 2010. A letter by Chairman Holliday stresses the importance of emissions trading, noting, "[W]e still lack both U.S. and global policies to set guidelines for future investment and actions."

Stakeholder dialogue: In addition to its partnerships with climate-related groups, DuPont conducts meetings with community advisory panels set up at almost every one of its plant sites around the world. DuPont also has a biotechnology advisory panel with international membership. DuPont endorsed the U.N. Global Compact in 1999.

Shareholder Activity

No shareholder resolutions on climate change. Resolutions asking DuPont to label and restrict gene-engineered products were withdrawn in 2000 and 2001. Primary filers were church groups and the As You Sow Foundation.

OTHER INDUSTRY: DIVERSIFIED INDUSTRIAL

General Electric Corp.
Fairfield, Connecticut

General Electric is one of the largest and most diversified industrial corporations in the world. GE has engaged in developing, manufacturing and marketing a wide variety of electrical products since its incorporation in 1892. About 40% of its revenues now come from especially energy-intensive product lines, including aircraft engines, appliances, industrial products and systems (including lighting, transportation systems and industrial motors) and power systems. Altogether, GE's industrial businesses accounted for approximately 60 percent of the company's net income in 2001; GE Capital Services accounted for the other 40 percent. GE has not taken a formal position on climate change. It will conduct its first inventory of greenhouse gases in 2003 and use the results to determine any future internal initiatives. GE produces some of the most efficient appliances and power systems in the world. It estimates that 85% of GE Power Systems' 2003 revenues will come from "cleaner, more efficient or renewable energy solutions."

Power Systems, Efficiency and Research & Development

GAS TURBINES: GE is leading manufacturer of gas-fired turbines for electricity generation. Its H System turbine entered commercial service in 2002 and is the first gas turbine to achieve a 60% efficiency rating. Emissions of CO_2 from the H System turbine are about one-third of the amount emitted from a conventional coal-fired power plant. A similar GE combined-cycle turbine designed to burn "syngas" from coal emits only two-thirds as much CO_2 as from a traditional coal plant.

NUCLEAR POWER: GE designs nuclear (boiling water) reactors and provides nuclear fuel and support services for both new and installed reactors. GE is participating in the construction of nuclear power plants in Taiwan. In 1996, a Japanese utility completed construction of a reactor that resembles the design of an advanced boiling water reactor for which GE has received U.S. regulatory approval.

OTHER PRODUCTS: GE offers 162 appliance models with Energy Star ratings, more than any other company, including refrigerators, air conditioners, dishwashers, clothes washers, dehumidifiers and lighting systems. The GE90 jet engine burns 30% less fuel per pound of thrust than previous generation engines. New GE locomotives are the most efficient diesel electric locomotives ever.

RENEWABLE ENERGY: In 2002, GE bought Enron's wind power business for $180 million. The business encompasses wind turbine manufacturing and marketing, with facilities in the U.S., Germany, the Netherlands and Spain. GE expects more than $1 billion in sales in 2003 "with solid profitability." GE Hydro has been a long-time leader in the supply of turbines, generators and related equipment for the hydropower industry. GE also supplies geothermal steam turbine generators.

FUEL CELLS: Since the early 1990s, GE has been a major investor in Plug Power, a small company that designs and develops on-site electric power generation systems utilizing fuel cell technology. GE Power Systems has entered into a joint venture with Plug Power to sell its fuel cell systems globally. In 2001, GE Power Systems also acquired fuel cell and microturbine assets from Honeywell.

R&D: In 2002, GE committed $50 million of funding over 10 years to Stanford University for R&D on new energy supply options to reduce carbon emissions. Its 2001 Form 10-K says GE "continues to invest in intellectual property in order to further advance and protect its proprietary technological knowledge related to its electricity generating products and services."

Facility Emissions Disclosure

Emissions inventory: GE is conducting its first inventory of greenhouse gas emissions in 2003.

1990 CO_2 emissions: Not measured.

2000 CO_2 emissions: Not measured.

Future CO_2 emissions: Not projected.

Emissions projections: None provided.

Emissions savings: GE estimates that its Energy Star appliances introduced in 2000–2002 will emit 1 million fewer metric tons of CO_2 equivalent annually than the models they are intended to replace.

Emissions targets: None provided.

Climate Change Policies

Science merits action?	Voluntary measures sufficient?	Supports Kyoto?
No statement on climate change science.	*Yes.*	*No.*

Policy statement: GE has not issued a formal policy statement A company spokesman told IRRC in 2002 that the company supports a "rational and flexible approach to global warming that is as true to the science as possible."

For more on GE's environmental programs, see http://www.ge.com/en/commitment/ehs/index.htm.

Climate-Related Associations

EPA Energy Star Program: GE Lighting was 2002 partner of the year; 70 GE lighting products meet the standards.

International Climate Change Partnership

General Electric Corp.
Fairfield, Connecticut

OTHER INDUSTRY: DIVERSIFIED INDUSTRIAL

Board Oversight

Chairman and CEO: Jeffrey Immelt (since 2001) **Age: 46.**
Immelt serves on the Public Responsibilities Committee.

Boards of directors: 16 members, 6 independent. Elected annually. Met 10 times in 2001.

Avg. age: 58 **Avg. tenure:** 5 years.

Standing joint committees: 4 — Audit, Management Development and Compensation, Nominating and Corporate Governance, and Public Responsibilities.

Environmental oversight: The Public Responsibilities Committee is charged with oversight of GE's environmental affairs. Fourteen board members serve on this committee. *(See * listings in Director Affiliations for selected committee members.)* Former Senator Sam Nunn (D-Ga.) chairs the committee. It met three times in 2001. GE's board also had a Technology and Science Committee in 2001, on which five outside directors served. James Cash, a professor at the Harvard Graduate School of Business, chaired this committee. It met once in 2001 to review science and technology issues involving GE Power Systems. GE's board of directors has reviewed climate change as it relates to its products and reporting.

Selected Director Affiliations

James Cash* is on the faculty of the Harvard Graduate School of Business and is a director of The Chubb Corp. and Scientific-Atlanta.

Claudio Gonzalez is chairman and CEO of Kimberly-Clark de Mexico and a director of Kimberly-Clark Corp.

A.G. Lafley is chairman, president and CEO of The Procter & Gamble Co. He is also a director of General Motors Corp. and a member of The Business Council and The Business Roundtable.

Ralph Larsen is former chairman and CEO of Johnson & Johnson and a fellow of the American Academy of Arts and Sciences.

Sam Nunn* is a senior partner of King & Spalding and was U.S. Senator from Georgia (1972-1996). He served as chairman of the Senate Armed Services Committee and the Permanent Subcommittee on Investigations. He also is a director of ChevronTexaco Corp. and Scientific-Atlanta.

Roger Penske* is chairman of Penske Corp., Detroit Diesel Corp., Penske Truck Leasing Corp. and United Auto Group and is a member of the Business Council.

Andrew Sigler is retired chairman and CEO of Champion International Corp.

Management Accountability

Top EHS official: Stephen Ramsey, Vice President, Corporate Environmental Programs.

Reports to: Benjamin Heineman, General Counsel.

Reporting levels to Chairman: 1

# of EHS staff: 100 **Env. link to compensation:** Top execs: Yes Plant managers: Yes Other employees: Yes

Env. audits: Since the early 1990s. Self-audits every year, verification audits every two years.

Auditors: Corporate staff, plant staff, staff from other facilities and environmental consulting firms.

Review and disclosure: Audit Committee reviews audits. Audit results are not made public.

Stakeholder Disclosure

Form 10-K: No discussion of climate change.

Annual report: No discussion of climate change.

EHS report: GE has issued an annual environmental report since 1995. It also devotes a portion of its website to a discussion of environmental matters. Anecdotal information is provided on some GE products that have lower greenhouse gas emissions than competing products. GE notes that it has been a leader in several voluntary emission reduction programs not related to greenhouse gases. For example, GE has achieved a 94% cut in emissions reported under the U.S. EPA's Toxic Release Inventory Program since 1998.

Stakeholder dialogue: GE engages in dialogue with through community panels as well as through regular communication with employees, shareholders, investment analysts and government representatives.

Shareholder Activity

Report on global warming: A 2002 proposal asking GE to report on its plans to reduce emissions from its facilities and products received support from 19.2% of the shares voted. Church groups were the primary filers.

OTHER INDUSTRY: INFORMATION TECHNOLOGY

International Business Machines Corp.
Armonk, New York

IBM is the world's largest information technology company. It operates in more than 160 countries and derives more than half of its revenues from sales outside of the U.S. IBM's environmental affairs policy calls for the manufacture of products that are safe for their intended use, energy efficient, protective of the environment, and that can be reused, recycled or disposed of safely. Regarding climate change, IBM's main focus is on energy conservation in its facilities and by users of its products. It has set a goal to achieve energy conservation savings equivalent to 4% of annual electricity and fuel use by improving energy efficiency and giving credit to renewable energy use. IBM has been a participant in the greenhouse gas reporting protocol developed by the World Resources Institute and WBCSD.

Products, Energy, and Research & Development

INFORMATION TECHNOLOGY AND ENERGY: Cooling and power supply for IT systems account for up to 10% of U.S. electricity use. In 2001, IBM established a Low Power Center as part of a company-wide initiative to address energy consumption of technology. In the future, some IBM low-power computers may use only 10% as much power as current systems. All IBM personal computers and monitors meet EPA "Energy Star" criteria for reduced energy use. IBM also has a consulting practice to help customers cut their energy use.

ENERGY SAVINGS: In 1990–2001, IBM's facility energy conservation programs conserved 11.3 billion kilowatt-hours of electricity, saving more than $660 million in avoided energy costs over the period.

WEATHER AND CLIMATE FORECASTING: IBM is a leading manufacturer of computer systems used in climate and weather prediction. IBM is building the world's fastest supercomputers (capable of processing 100 trillion calculations per second by 2009) for use by U.S. government laboratories in predicting global climate change, weather and earthquake patterns. The U.S. National Weather Service and European Centre for Medium-Range Weather Forecasts are among IBM's other customers for its powerful supercomputers.

RENEWABLE ENERGY: IBM buys 40 million kWh of renewable energy per year in the U.K. and 5.4 million kWh in the U.S. IBM is a member of the Green Power Market Development Group, which seeks to develop a market for 1,000 MW of renewable electricity by 2010.

R&D: Expenditures (including engineering activities) were $5.2 billion in 2001. IBM Research is the world's largest information technology research organization, with 3,000 scientists and engineers at 8 laboratories in 6 countries.

Facility Emissions Disclosure

Emissions inventory: CO_2 from company-owned facilities and purchased energy.

1990 CO_2 emissions: 6.8 million metric tons.

2000 CO_2 emissions: 3.1 MMT

2001 CO_2 emissions: 2.95 MMT (57% cut from 1990)*.
** 31% from energy savings, 26% from consolidation.*

CO_2 target: As part of its Climate Savers and Climate Leaders agreements, IBM is committed to a 0.982 MMT cut in CO_2 emissions from energy use in 1998–2005, equal to a 4% per year emissions reduction.

Emissions savings: Energy conservation actions account for 6.4 MMT of cumulative avoided CO_2 emissions in 1990–2001. Energy savings reduced annual emissions by 31% over the period (not including plant consolidation). IBM cut PFC emissions 45% worldwide in 1995–June 2002, equal to 0.17 MMT of CO_2 equivalent.

Other GHG targets: In 1998, IBM was the first semiconductor manufacturer to seek voluntary cuts in PFC emissions, met ahead of schedule in 2002. It now seeks a 10% further cut in PFC emissions in 2000–2005.

Climate Change Policies

Science merits action?	Voluntary measures sufficient?	Supports Kyoto?
Yes.	*Unlikely.*	*Unclear.*

Policy statement: "Climate change is a complex problem. We at IBM have long thought that the most constructive approach… is to apply our technical and engineering expertise to reducing emissions in our own extensive operations and to creating products which are increasingly energy efficient…. We support the global objective of stabilizing the emissions of greenhouse gases… through market driven, flexible and technology-incented, cost-effective mechanisms. Such solutions are the most workable and sustainable over time, and sustainability is critical." See IBM's 2001 Environment and Well-Being Report at: http://www.ibm.com/ibm/environment/annual2001/release.shtml

Climate-Related Memberships

Climate Leaders: Joined in April 2002. Has set targets to reduce energy use and PFC emissions through 2005.

EPA Energy Star Program: Received "Excellence in Corporate Commitment" award in 2001.

Pew Center on Global Climate Change: Joined Business Environmental Leadership Council in 1999.

World Wildlife Fund Climate Savers Program: Joined in February 2000. Founding member.

WRI/BSR Green Power Market Development Group: Joined in 2001. Founding member.

OTHER INDUSTRY: INFORMATION TECHNOLOGY

International Business Machines Corp.
Armonk, New York

Board Oversight

Chairman and CEO: Samuel Palmisano (since 2003)
Age: 50.

Boards of directors: 14 members, 11 independent. Elected annually. Met nine times in 2001.
Avg. age: 61 **Avg. tenure:** 8 years.

Standing committees: 4 — Audit, Directors and Corporate Governance, Executive, Executive Compensation and Management Resources.

Environmental oversight: The Directors and Corporate Governance Committee (established in 1993) is responsible for oversight of IBM's environmental affairs. It consists of four independent directors. *(See * listings in Director affiliations.)* The committee has conducted a formal evaluation of climate change and related policies, and reviews the company's performance against its set targets. It reviews emissions data annually.

Selected Director Affiliations

Juergen Dormann is chairman of the board of management of Aventis S.A., a life sciences company, chairman of ABB Ltd. and a member of the supervisory board of Allianz AG.

Nannerl Keohane* is president and professor of political science at Duke University and a member of the American Academy of Arts and Sciences. She chairs the Directors and Corporate Governance Committee.

Charles Knight is chairman Emerson Electric Co. and a director of BP PLC.

Minoru Makihara* is chairman of Mitsubishi Corp.

Lucio Noto is a managing partner of Midstream Partners LLC, specializing in energy and transportation investments. He was chairman and CEO of Mobil Corp. (1994–1999) and then became vice chairman of ExxonMobil. He is a director of the United Auto Group and a member of the International Advisory Council of Mitsubishi Corp.

John Slaughter is president and CEO of the National Action Council for Minorities in Engineering, a former director of the National Science Foundation and a fellow of the American Academy of Arts and Sciences and the American Association for the Advancement of Science.

Alex Trotman* is chairman of Imperial Chemical Industries PLC and former CEO of Ford Motor Co. (1993–1998).

Charles Vest is president and professor of mechanical engineering at the Massachusetts Institute of Technology, a director of DuPont and a fellow of the American Association for the Advancement of Science.

Management Accountability

Top EHS official: Wayne Balta, Vice President, Corporate Environmental Affairs & Product Safety.

Reports to: N.M. Donofrio, Senior Vice President, Technology & Manufacturing.

Reporting levels to Chairman: 1

# of EHS staff: 40 **Env. link to compensation:** Top execs: No Plant managers: Yes Other employees: Yes

Env. audits: Since 1990. Internal audits every 2–3 years. In 1997, IBM earned a single, global registration to the ISO 14001 environmental management system, covering its manufacturing and hardware development operations worldwide.

Auditors: Corporate audit staff for internal audits. Environmental consulting firms and environmental unit of financial auditors for ISO 14001 audits and one EMAS-certified facility in Germany.

Review and disclosure: Audit and Directors & Corporate Governance Committee review audits. Audit summaries are not made public or certified. The nonprofit Center for Energy & Climate Solutions verifies GHG emissions data.

Stakeholder Disclosure

Form 10-K: No discussion of climate change.

Annual report: No discussion of climate change.

EHS report: Issued annually since 1990. The Environment & Well-Being Report contains a brief section on climate change, stressing IBM's energy conservation goals and CO_2 and PFC reduction efforts.

Stakeholder dialogue: IBM makes environmental information available to employees via an intranet site and through environmental awareness training. It is working with a number of NGOs on various environmental issues, particularly those relating to energy efficiency but also regarding waste issues. IBM maintains informal outreach programs with the communities in which it operates. The programs vary by site, but include activities such as open houses/site tours, Earth Day events, reduce-commute planning and emergency planning.

Shareholder Activity

No shareholder resolutions on climate change or related issues.

OTHER INDUSTRY: FOREST PRODUCTS

International Paper Co.
Stamford, Connecticut

International Paper is one of the world's largest providers of forest products, packaging and papers; its sales are roughly evenly divided between these three areas. IP operates in nearly 50 countries. About 75% of its sales are in the United States. IP is one of the world's largest private forest landowners, with 10 million acres of forestland in the U.S. and 10 million acres in Canada, Russia, New Zealand and Brazil. IP's forest plantations produce up to four times more tree volume than unmanaged forests. IP has set a goal to cut U.S. carbon dioxide emissions 4% in 2001–2006.

Products, Energy Use and Research & Development

FOREST PRODUCTS AND CARBON STORAGE: IP estimates that its owned and managed forests take in and hold more than 20 billion tons of carbon, "making them one of the most effective carbon-absorbing, oxygen-producing resources on earth." IP estimates that each pound of wood grown on its plantations takes in 1.47 lbs. of CO_2 and gives off 1.07 lbs. of oxygen. IP's Carbon Balance study—tracking U.S. forestry and manufacturing on a life-cycle basis—estimates that tree growing, product use and final disposition removes about 10% more carbon from the atmosphere than it contributes.

CARBON SEQUESTRATION AND CREDITS: IP is a founding member of the Chicago Climate Exchange and has committed to voluntarily reduce U.S. greenhouse emissions 4% below a 1998–2001 baseline average by 2006. IP will make other voluntary emission reduction commitments as a founding member of the Climate Leaders program. IP is a venture capital investor in ArborGen, a biotechnology startup company in Summerville, S.C. ArborGen is focusing on development of faster-growing trees and trees in which lignin content can be controlled. (Lignin content affects trees' rigidity.)

ENERGY USE: In 2001, IP's energy consumption per ton of unfinished paper at its U.S. pulp and paper mills was 32.5 million BTUs (down 4.4% from 2000).

RENEWABLE ENERGY: IP makes extensive use of wood waste and other biomass energy at its pulp and paper mills. In 2001, 61% of IP's U.S. energy needs came from company-owned biomass plants. (Biomass is carbon neutral; it is not included in IP's emissions totals.)

R&D: IP's research and development expenditures totaled $92 million in 2001. Its R&D activities do not include direct climate change research. Related research includes studies on improved forest species and management; energy conservation, re-use of raw materials in manufacturing processes; recycling of consumer and packaging paper products; innovations and improvement of products; and development of various new products.

Facility Emissions Disclosure

Emissions inventory: CO_2 from U.S. company-owned facilities, energy purchases and other indirect sources.

1990 CO_2 emissions: Not provided.

2000 CO_2 emissions: 13.15 million metric tons.

Future CO_2 emissions: Not projected.

Emissions projections: IP presently is conducting a company-wide greenhouse gas inventory based on World Resources Institute/WBCSD Greenhouse Gas Protocol.

Emissions savings: IP's 2001 CO_2 emissions in the U.S. totaled 14.68 MMT from fossil energy sources. IP has not listed any greenhouse gas emissions savings with DOE's Section 1605(b) registry. It says it will make new commitments under the Climate Leaders program.

Emissions targets: IP will cut U.S. facility emissions 4% by 2006, and says its European operations are "well positioned" to meet an 8% cut in CO_2 emissions by 2010 through increased energy efficiency.

Climate Change Policies

Science merits action?	Voluntary measures sufficient?	Supports Kyoto?
Yes.	*See below.*	*Unclear.*

Policy statement: IP issued its first climate change policy statement in 2002. IP supports a number of global climate change policy initiatives, including: (1) equal weight for economic, environmental and social considerations in any climate change solution; (2) accredited tracking and reporting of greenhouse gas emissions worldwide; (3) practical and verifiable carbon sequestration accounting methods; (4) an international trading system for greenhouse gas emissions and carbon sequestration credits; and, (5) incentives that promote the use of biomass fuels. For more of IP's discussion on climate change, see: http://www.internationalpaper.com/our_world/environment/climatechange.html.

Climate-Related Memberships

Climate Leaders: Joined in February 2002. First forest products company to join this program.

Chicago Climate Exchange: Founding member in 2003. First forest products company to join this program.

EPA Combined Heat and Power Partnership: Joined in October 2001. Founding member.

EPA National Environmental Performance Track: IP has eight U.S. mills committed to exceeding regulatory standards (including reduced emissions), making them eligible for preferential regulatory treatment.

OTHER INDUSTRY: FOREST PRODUCTS

International Paper Co.
Stamford, Connecticut

Board Oversight

Chairman and CEO: John Dillon (since 1996) **Age:** 61.
Dillon is the current chairman of The Business Roundtable and American Forest and Paper Association.

Boards of directors: 11 members, 9 independent. Elected to 3-year terms. Met eight times in 2001.

Avg. age: 63 **Avg. tenure:** 9 years.

Standing committees: 5 — Audit and Finance, Executive, Governance, Management Development and Compensation, Public Policy and Environment.

Environmental oversight: The Public Policy and Environment Committee (established in 1985) is responsible for oversight of IP's environmental affairs. *(See * listings in Director Affiliations.)* Recent environmental issues addressed by the board include reviewing implementation of sustainable forestry, reviewing sustainable manufacturing initiatives and reviewing environmental reporting initiatives. IP launched an internal climate change task force in 2002. The board reviews emissions data annually, including CO_2 emissions.

Selected Director Affiliations

Robert Eaton is the former chairman of the board of management of Daimler-Chrysler AG Corp. (1999–2000) and chairman of Chrysler (1993–1998). He is a member of The Business Roundtable and The Business Council.

Samir Gibara is chairman and CEO of The Goodyear Tire & Rubber Co. and a member of The Business Roundtable.

James Henderson is former chairman and CEO of Cummins Engine Co. and is a member of the Business Council.

W. Craig McClelland* is former chairman and CEO of Union Camp Corp. and a director of Allegheny Technologies.

Donald McHenry is a distinguished Professor of Diplomacy at Georgetown University and a director of the Institute for International Economics.

Patrick Noonan* is chairman of The Conservation Fund, a director of Ashland and the American Gas Association Index, a trustee of The National Geographic Society, a member of the Board of Visitors of Duke University School of the Environment. He chairs the Public Policy and Environment Committee.

Jane Pfeiffer* is a management consultant and a director of Ashland Oil.

Charles Shoemate is chairman and CEO of Bestfoods, a director of CIGNA and ChevronTexaco, and a member of The Business Roundtable.

Management Accountability

Top EHS official: Thomas Jorling, Vice President, Environmental Affairs.

Reports to: Richard Phillips, Senior Vice President - Technology.

Reporting levels to Chairman: 1.

# of EHS staff: 98 **Env. link to compensation:** Top execs: Yes Plant managers: Yes EHS employees: Yes

Env. audits: Since 1990. Audits domestic mills every 1–2 years; other facilities every 3–5 years. IP certifies its U.S. forestlands under Sustainable Forestry Initiative (SFI). Operations are also certified under ISO 14001, Canadian Standard Association and Europe's EMAS.

Auditors: Corporate audit staff and staff from other facilities perform internal audits. All independent certification programs require verification by outside groups.

Review and disclosure: Board of directors reviews audit results. Summaries generally made available to Community Advisory Councils. Highlights listed in IP's annual environmental report, which is publicly available.

Stakeholder Disclosure

Form 10-K: No discussion of climate change. Told IRRC that exposure to risks and opportunities will be assessed at completion of 2003 emissions inventory.

Annual report: No discussion of climate change.

EHS report: In 2001, IP issued its environmental report in a sustainability format, following guidelines of the Global Reporting Initiative. The report includes information on company energy use, forest carbon cycle.

Stakeholder dialogue: IP operates 37 Community Advisory Councils (CAC) in U.S. communities where it manufacture products or otherwise has a significant presence. Through regular CAC meetings, community members have the opportunity to discuss issues of mutual interest and concern, comment on planned company initiatives, air grievances and suggest ways to enhance the company/community relationship. Topics covered range from sustainable forestry and environmental matters to plant safety, hiring practices, education and civic events.

Shareholder Activity

No shareholder resolutions on climate change or related issues.

Profile Methodology

Basic Profile

Primary Information Sources

1. **COMPANY EMISSIONS DISCLOSURE:** Company environmental reports (usually available on corporate websites), company responses to IRRC Corporate Environmental Profiles Directory (CEPD) annual survey and other direct communication with IRRC. Additional sources include company submissions to the U.S. Department of Energy Section 1605(b) registry, and company statements/pledges made through partnership programs.
2. **CLIMATE CHANGE POLICIES:** Same as above, with emphasis on company responses to CEPD survey.
3. **CLIMATE-RELATED MEMBERSHIPS:** As reported by the company, by membership organizations and IRRC.

Sample Company Profile
With explanations of section headings

Company summary describes the company's lines of business and the geographical extent of its operations. The summary typically includes third-party information on the company's greenhouse gas (GHG) emissions as well as company-provided information on climate change policies and programs. Each company, except Toyota, reviewed a draft of its profile for accuracy and completeness.

Industry-Specific Emissions Information

(See following tables for explanation **Auto**, **Electric Power** *and* **Oil & Gas** *sector emissions information.)*

Facility Emissions Disclosure[1]

Emission inventory: Company measures of any of six greenhouse gases covered by the Kyoto Protocol—carbon dioxide, hydrofluorocarbons, methane, nitrous oxide, perfluorocarbons and sulfur hexafluoride. Inventories typically cover company facilities and (where noted) purchased energy, *not customer use of products*. Years listed are 1990 and 2000 (unless otherwise noted), plus future-year emission projections (if available).

Emissions projections: Company projections of future emissions trends. Projections may be region-, project- or product-specific, or company-wide.

Emissions savings: Reported company savings of greenhouse gas emissions that have occurred to date. Savings may include avoided, offset or sequestered emissions as well as absolute emissions reductions. Savings typically are cumulative and are expressed in metric tons of carbon dioxide equivalent. Reference is made to companies listing project savings with the Department of Energy's Section 1605(b) registry.

Emissions targets: Specified company targets for future emissions, with timetables and percentage goals (if available). Targets may be region-, project- or product-specific, or company-wide.

Climate Change Policies[2]

Science merits action?
Is there sufficient scientific evidence to warrant corporate action on climate change, or should such action await further scientific research?

Voluntary measures sufficient?
Is voluntary corporate action sufficient to address climate change concerns, or is some form of government intervention warranted?

Supports Kyoto?
Does the company support U.S. ratification of the Kyoto Protocol (which would require the nation to reduce its carbon dioxide emissions 7% below 1990 levels by the period 2008-2012)?

Policy statement: Excerpt from a company document that summarizes management's position on appropriate policies and action regarding climate change. A company website address lists links to more information.

Climate-Related Memberships[3]

Listings of memberships or partnerships with industry, governmental and/or environmental organizations that are focused primarily on climate- or greenhouse gas-related issues. Includes the year in which company joined program.

Sample Company Profile
Page 2 — Governance Information

BASIC PROFILE

Board Oversight[1]

Chairman and/or Chief Executive Officer: Name of chairman and/or CEO, year began position and age. (As of 2002 proxy statement).

Board of directors: Number of employee and independent directors ("independent" as defined by IRRC), election terms (annual or staggered).

Average age:
Average tenure:
(As of 2002 proxy statement).

Standing board committees: Number and name of standing board committees. (Committees charged with environmental oversight, but not considered standing committees, are also listed here.)

Environmental oversight: Description of board and/or board committee charged with oversight responsibility of the company's environmental affairs. Also listed are assigned responsibilities of the board committee and recent topics addressed (if available), with a focus on climate- and greenhouse gas-related issues. Committees and councils of top-ranking executives convened to address climate and other environmental issues are also listed (if applicable).

Selected Director Affiliations[2]

Name, title and other positions held by selected company directors. Directors listed include:

i. directors on a board committee with environmental oversight responsibility (* appears after their names);
ii. directors who serve on boards of other companies with energy-intensive products or operations (e.g., chemicals, electric power, oil & gas, transportation);
iii. directors who serve on boards of NGOs with educational, scientific or environmental missions;
iv. directors who have served in high-ranking government positions; and
v. directors with interlocking board relationships (typically CEOs who serve in reciprocating board roles).

Management Accountability[3]

Top environmental official: Name and title of chief environmental officer.

Reports to: Name and title of person to which the chief environmental officer reports.

# of reporting levels to Chairman/CEO: Number of reporting levels between chief environmental officer and Chairman/CEO. ("0" means s/he reports directly; "1" means his/her immediate supervisor reports directly.)

# of EHS staff: Environmental, health and safety personnel employed at corporate level. (Figure does not include facility-level EHS employees.)

Environmental link to compensation:
Top executives: Operating managers: Other staff: **"Yes"** indicates that the company includes environmental performance targets as a factor in determining annual compensation for this category of employees.

Environmental audits: Year in which audits began and average interval of time between facility audits. Reference is made to independent certification programs, such as the ISO 14001 environmental management standard.

Auditors: Types of company personnel and third-party groups assigned to conduct audits.

Review and disclosure: Director and/or executive committees responsible for reviewing audits. Reference is made to attestation by third parties and public availability of audit result summaries.

Climate Change Disclosure[4]

Form 10-K: Excerpt of any climate policy or greenhouse gas-related statements in the company's 2001 Form 10-K submission to the Securities and Exchange Commission. (For non-U.S. companies, the annual submission is a Form 20-F.)

Annual report: Excerpt of any climate policy or greenhouse gas-related statements in the company's 2001 annual report to shareholders, including Management Discussion & Analysis.

EHS Report: Year in which company began issuing a stand-alone environment, health and safety report, or sustainability report, and its reference to climate- and greenhouse gas-related issues. Reference is made to:

i. statistical data on greenhouse gas emission trends in company facilities or products;

ii. discussion of climate change science or policy;

iii. use of third-party reporting protocols; and

iv.attestation statements by third parties.

Stakeholder dialogue: Description of community, employee, environmental and other stakeholder groups that the company seeks to engage in discussing and formulating climate change and related environmental policy decisions.

Shareholder Activity[5]

Shareholder resolutions addressing climate change or energy-related issues, including resolution sponsors and outcomes since 1997. (Includes information on withdrawals or percentage of votes cast in favor of resolutions.)

Primary Information Sources

1. **BOARD OVERSIGHT:** Company 2002 proxy statements and responses to CEPD survey. (Determination of "independent" directors made according to definitions by IRRC's *Board Practices/Board Pay – 2002* report.)
2. **DIRECTOR AFFILIATIONS:** Company 2002 proxy statements. (Selections made by IRRC).
3. **MANAGEMENT ACCOUNTABILITY:** Company responses to CEPD survey, other direct communication with IRRC and corporate environmental reports.
4. **CLIMATE CHANGE DISCLOSURE:** Form 10-K or Form 20-F filings with the U.S. Securities & Exchange Commission, company annual reports to shareholders and company environmental reports.
5. **SHAREHOLDER ACTIVITY:** IRRC Social Issues Service database of annual shareholder resolutions.

Industry-Specific Emissions Information

The profile section following the company summary contains industry-specific emissions information. Because emission characteristics vary by industry, this section is adapted to present benchmark statistics applicable for three industry groups: Autos, Electric Power, and Oil and Gas. Emission statistics, methodology and information sources for each industry group are described below. (Five companies representing miscellaneous industry groups are also profiled in this report, but comparative emissions statistics are not provided.)

AUTO SECTOR

Auto Sector: U.S. Fleet and Vehicle Carbon Emissions[1]
(1990 and 2000 Model Years — U.S. Vehicle Sales Only)

Sales and Market Share[2]

Company light-duty vehicle sales, and **% market share of industry light-duty vehicle sales.**

Fuel Economy (mpg) and Auto/Truck Sales (%)[3]

Company fleet average fuel economy ratings and **% of company fleet sales** in auto and light-duty truck categories. *Note: Fleet average fuel economy ratings do not equal Corporate Average Fuel Economy (CAFE) ratings.*

Vehicle CO_2 Emissions Rate[4]

Average annual per-vehicle emissions of carbon dioxide for the combined auto and light-duty truck fleet. *Key assumptions are listed in Note 4 below.*

Fleet Carbon Burden (million metric tons of CO2 per year) and Share of Industry Total (%)
(1990 and 2000 Model Years — U.S. Vehicles Sales Only)

Company light duty fleet carbon dioxide emissions in million metric tons (MMT) per year of operation, and **% of industry aggregate light duty-fleet carbon dioxide emissions.**

Note: Emission figures are derived by multiplying company light-duty vehicle sales by average annual per-vehicle CO_2 emissions. **The 1990–2000 running total** is the sum of these annual emission figures for each model year in 1990–2000. The running total is intended as a crude approximation of annual CO_2 emissions from all company vehicles sold and operating in the United States.

Alternative vehicles and R&D: This section describes the company's efforts to research and develop vehicle and engine technologies that make for more efficient use of carbon-based fuels or that rely on alternative power sources. Alternative fuels include compressed natural gas, ethanol and hydrogen. Alternative power sources include gasoline-electric hybrid engines, fuel cells and electric batteries. Research and development partnerships are also noted.

Primary Information Sources

1. All information in this section (with the exception of "Alternative vehicles and R&D" is drawn from the following report: *Automakers' Corporate Carbon Burdens: Reframing Public Policy on Automobiles, Oil and Climate, Environmental Defense*, July 2002 (written by John DeCicco and Feng An).
2. Sales and market share data is derived from company statistics provided to the National Highway Safety Transportation Administration. The *Automakers' Corporate Carbon Burdens* report notes discrepancies in the NHSTA figures relative to what companies themselves report. Several companies provided different U.S. light duty vehicle sales figures to IRRC, especially for 1990. For example in 1990:
   - DaimlerChrysler reported light duty vehicle sales of 1,706,383, compared with 1,797,000 listed in this report.
   - Honda reported light duty vehicle sales of 854,879, compared with 938,000 listed in this report.
   - Ford Motor reported light duty vehicle sales of 2,713,195, compared with 3,182,000 listed in this report.

   Despite the reported discrepancies, IRRC has chosen to list figures from *Automakers' Corporate Carbon Burdens* to be consistent in its methodology of reporting sales data across companies.
3. Fleet average fuel economy ratings listed in this report do not equal the Corporate Average Fuel Economy (CAFE) ratings. Federal law offers credits toward CAFE compliance to companies that sell vehicles capable of using alternative fuels, such as ethanol or methanol. In actual practice, most flexible-fuel vehicles run almost exclusively on gasoline. Fuel economy ratings drawn from the *Automakers' Corporate Carbon Burdens* report do not include these credits in order to provide a more accurate reflection of the fleets' actual fuel economy ratings.
4. In estimating the average per-vehicle rate of CO_2 emissions, the *Automakers' Corporate Carbon Burdens* report makes the following key assumptions:
   i. vehicles are driven 12,000 miles per year
   ii. on-the-road fuel economy is 15% less than rated CAFE (test) values, and
   iii. CO_2 emissions equal 19.4 pounds per gallon of fuel consumed.

ELECTRIC POWER SECTOR

Electric Utility Sector: U.S. Generation and Carbon Emissions (2000)[1]
(2000 Generation, U.S. power plants only)

Fuel mix: Power generation by fuel source.

Future fuel mix: Company projection of future fuel mix (if available).

Generation: Megawatt-hours (MWh) of electricity generated by company-owned plants.

Demand growth: Projected annual % growth in energy demand (MWh) in regulated service areas.

Peak growth: Projected annual % growth in peak capacity demand (MW) in regulated service areas.

CO_2 emissions[2]: Annual carbon dioxide emissions from all company-owned power plants.

All source CO_2: Pounds of carbon dioxide emitted per megawatt-hour from all company-owned power plants.

Fossil CO_2: Pounds of carbon dioxide emitted per MWh from fossil-fired only, company-owned power plants.
All above figures include corporate rankings among the top 100 U.S. utility emitters (#1 = highest emitter).

Regulated capacity: Megawatts of company-owned generating capacity.

Regulated construction: New company-owned power plants under construction or with firm commitments. (Future power purchases under firm contract or projected environmental expenditures may also be listed here.)

Renewables and R&D: This section describes the company's efforts to research, develop, purchase or sell renewable energy sources, including biomass, geothermal, photovoltaics and wind power—including "green pricing" programs. Also noted are demand-side management programs to promote more efficient use of electricity by customers. Mention is made of company support for advanced coal technologies and research on carbon sequestration technologies. Funding support and contributions made through longstanding industry collaborations, such as the Electric Power Research Institute and Edison Electric Institute, are not included.

Primary Information Sources

1. Information in this section on generation and carbon dioxide emissions is drawn exclusively from the following report: *Benchmarking Air Emissions of the 100 Largest Electric Generation Owners in the U.S. — 2000*; Natural Resources Defense Council, Coalition for Environmentally Responsible Economies and Public Service Enterprise Group, March 2002. Company sources are used for the other information, including Fuel Mix, Demand Growth, Capacity, Construction, Renewables and R&D.
2. Data on CO_2 emissions is drawn principally from the Environmental Protection Agency's Continuous Emissions Monitors (CEM), which collect hourly emissions data from more than 900 of the nation's largest fossil energy plants. This data accounts for about 97% of the emissions information listed in the *Benchmarking Air Emissions* report (covering the year 2000). For smaller plants not subject to CEM, the report drew emissions data from EPA's EGRID20000 database, which lists 1998 emissions and emissions rates for more than 2,800 power plants.
In the IRRC Profile section on Company Emissions Disclosure, some utilities have reported power plant emissions data that is slightly different than what appears in the Benchmarking Air Emissions study. The discrepancy may result from utilities' reporting of CEM emissions data only or because of differences in how utilities are accounting for emissions from partially owned plants. Two of the utilities profiled in this report, TXU and Xcel Energy, have not listed their power plants' carbon dioxide emissions in any widely available reports to shareholders, although such emissions data is being collected through Continuous Emissions Monitors and reported to the EPA.

Oil & Gas Sector

Oil and Gas Sector:Reserves, Production and Carbon Emissions[1]

2000 Worldwide Production and Emissions from End-use Combustion

OIL

Reserves: Proved developed oil reserves *(in millions of barrels).*

Production: Crude oil production *(in million of barrels).*

Production: Crude oil production *(converted to quadrillion British thermal units, or Btus).*

% of company assets[3]: Proven developed oil reserves as % of total company assets.

NATURAL GAS

Reserves: Proved developed natural gas reserves (in billions of cubic feet).

Production: Production of natural gas *(in billions of cubic feet).*

Production: Production of natural gas (converted to quadrillion British thermal units, or Btus).

% of company assets[3]: Proven developed natural gas reserves as % of total company assets.

PRODUCTION CO_2 Emissions[2]

OIL: Carbon dioxide emissions from oil production end-use *(in millions of metric tons)*

NATURAL GAS: Carbon dioxide emissions from natural gas production end-use *(in millions of metric tons)*

COAL: Carbon dioxide emissions from coal production end-use (in millions of metric tons)

% of global CO_2 emissions[4]: Company production of oil, natural gas and coal CO_2 emissions as a % of world total from fossil fuels.

Renewables and R&D: This section describes the company's efforts to research, develop and commercialize renewable energy sources, including biomass, geothermal, photovoltaics and wind power. Also noted are company efforts to develop fuel cell technologies and hydrogen fuels. Mention is made of company support for advanced coal technologies and research on carbon sequestration technologies. Major R&D partnerships and collaborations are also noted.

Primary Information Sources

1. To derive production emissions information, this section uses methodology drawn from the following report: *Kingpins of Carbon: How Fossil Fuel Producers Contribute to Global Warming*, Natural Resources Defense Council, U.S. Public Interest Research Council and Union of Concerned Scientists, July 1999. The original report analyzed production and emissions data for 1997. IRRC updated this data based on company-reported production data for 2000.
   NOTE: *Production emissions do not include fuels purchased from third parties (such as government-owned petroleum companies) and refined and sold by the company.*
2. Source CO_2 emissions are calculated by taking annual production figures (in quadrillion Btus) and using the following conversion rates to calculate their CO_2 emissions upon combustion: oil—multiply quads by 74.32; natural gas—multiply quads by 53.10; coal—multiply quads by 94.46.
3. Company asset information is taken from Herold Comparative Appraisal Reports (various dates, 2001), as listed in *Changing Oil: Emerging Environmental Risk and Shareholder Value in the Oil and Gas Industry*, World Resources Institute, 2002. Asset categories include proven oil reserves; proven gas reserves; acreage; refining, marketing and transport; and other assets (such as chemicals, utilities, renewables, coal and other assets).
4. According the U.S. Energy Information Administration, carbon dioxide emissions from consumption and flaring of fossil fuels totaled 23,368 billion metric tons in 2000.

Appendix 3: 2003 Global Warming Shareholder Campaign

2003 Checklist of Global Warming and Renewable Energy Proposals

U.S. Companies

Company	Outcome	Company	Outcome
American Electric Power	26.9% support	General Motors	5.7
Caterpillar	Withdrawn	Gillette	Withdrawn
ChevronTexaco (renewables)	32.0	Marsh & McLennan	Withdrawn
Cinergy	Omitted	Occidental Petroleum	Withdrawn
Citigroup (funding policy)	5.2	PG&E	9.0
Citigroup (best practices)	5.9	Reebok	Withdrawn
ConocoPhillips	Withdrawn	Southern	23.0
Cummins	Withdrawn	Sprint	Withdrawn
ExxonMobil	22.0	Staples	Withdrawn
ExxonMobil (renewables)	21.0	TXU	24.2
ExxonMobil (energy efficiency)	Omitted	United Technologies	Withdrawn
Ford Motor	Withdrawn	Weyerhaeuser	8.0
General Electric	22.6	Xcel Energy	Withdrawn

US # filed	US # voted	US Support
26	12	17.1%

Canadian Companies

Company	Outcome	Company	Outcome
Encana	Withdrawn	Nexen	Withdrawn
Imperial	8.2	Petro-Canada	7.7
IPSCO	49.2		

Canada # filed	Canada # voted	Canada Support
5	3	21.7%

Note: All voting support levels are preliminary *Source: Investor Responsibility Research Center*

ENDNOTES

Climate Change: Recent Developments

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2. Munich Re Geoscience Unit, "Analysis of Natural Catastrophes in 2002," Munich Re Group, Munich, Germany, December 30, 2002.
3. United Nations Environment Programme, "Climate Change and the Financial Services Industry," Geneva, Switzerland, October 2002.
4. Worldwatch Institute, "Insurance Companies Warn Global Warming Will Cost $70 Billion Annually," *World Watch*, January 2003.
5. U.S. Environmental Protection Agency, *Climate Action Report 2002,* Washington, DC, May 2002.
6. United Nations Framework Convention on Climate Change, "Status of Ratification: Kyoto Protocol," updated March 20, 2003.
7. The White House, "Bush Administration Launches 'Climate VISION'; 'Climate, Voluntary Innovative Sector Initiatives: Opportunities Now' To Address Climate Change," Washington, DC, February 12, 2003. Analyses of the President Bush's plan with respect to carbon emissions are available from many non-governmental organizations, including the Pew Center on Global Climate Change, Environmental Defense and the Natural Resources Defense Council.
8. See, for example, Senate Bill 139, "Climate Stewardship Act," sponsored by Sen. Joseph Lieberman (D-Conn.) and Sen. John McCain (R-Ariz.), introduced on January 9, 2003.
9. Pew Center on Global Climate Change, *Greenhouse & Statehouse: The Evolving State Government Role in Climate Change*, Arlington, Va., Nov. 14, 2002.
10. Investor Responsibility Research Center, *Social Policy Shareholder Resolutions in 2002: Issues Votes and Views of Institutional Investors*, Washington, DC, February 2003; and Investor Responsibility Research Center, "2003 Shareholder Filings Raise New Social Issues," *Corporate Social Issues Reporter*, January 2003.

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1. World Economic Forum, "Business Leaders Say Climate Change Is Our Greatest Challenge," Davos, Switzerland, January 27, 2000.
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6. Sir Philip Watts, "Prudence Pays – Practical Steps to Bridge Conflicting Views on Climate Change," speech delivered at the opening of a new Shell Center for Sustainability at Rice University, Houston, Texas, March 12, 2003.
7. For more on the challenges posed by capital investment cycles, see the Pew Center on Global Climate Change, *Capital Cycles and the Timing of Climate Change Policy*, Arlington, Virginia, October 2002.

8. The World Meteorological Organization has provided credible scientific information on climate variability and climate change since 1994. Its annual "Status of Global Climate" report (see Note 2 above) highlights significant climate anomalies and events. In 2002, its regional observations included record low sea ice extent in the Arctic Ocean, record rainfall and floods in Europe and the Korean Peninsula, persistent and severe drought in Africa and Australia, and the second worst wildfire season and twice-normal tropical storm activity in the United States.
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12. See Note 10. Only half of the climate response resulting from a doubling of carbon dioxide is expected over a few decades. The full climate response is likely to take several centuries, based mainly on the rate of heat transfer from the ocean's surface and mixed layers to the deep ocean.
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18. See, for example, James Hawley and Andrew Williams, *The Rise of Fiduciary Capitalism*, (Philadelphia, Pa.: University of Pennsylvania Press, 2000); and Robert Monks, *New Global Investors: How Shareowners Can Unlock Sustainable Prosperity Worldwide* (Oxford, England: Capstone Publishing Ltd., 2001).
19. See, for example, Investor Responsibility Research Center, *Voting by Institutional Investors on Corporate Governance Issues,* Washington, DC, January 2002.
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3. The White House, "President Announces Clear Skies & Global Climate Change Initiatives," February 14, 2002. Analyses of the President Bush's plan with respect to carbon emissions trends are available from many non-governmental organizations, including the Pew Center on Global Climate Change, Environmental Defense and the Natural Resources Defense Council.
4. Auto company carbon emission rankings have been derived from the report by John DeCicco and Feng An, *Automakers' Corporate Carbon Burdens: Reframing Public Policy on Automobiles, Oil and Climate,* Environmental Defense, New York, NY, July 2002.
5. Electric utility carbon emission rankings have been derived from *Benchmarking Air Emissions of the 100 Largest Electric Generation Owners in the U.S. — 2000*; a joint project of CERES, Natural Resources Defense Council and Public Service Enterprise Group, March 2002.
6. Oil company carbon emission rankings have relied on methodology from *Kingpins of Carbon: How Fossil Fuel Producers Contribute to Global Warming*, a joint project of the Natural Resources Defense Council, U.S. Public Interest Research Group and Union of Concerned Scientists, July 1999. This report analyzed oil and natural gas production and emissions data for 1997. IRRC updated this data based on company reports for 2000.
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9. Investor Responsibility Research Center, *Market Proxy Voting Guide*, Washington, DC, October 2002. These market guides include descriptions of how boards of directors are elected in more than two dozen nations.
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About The Author

The Investor Responsibility Research Center (IRRC) is an independent research firm that has been the leading source of high quality, impartial information on corporate governance and social responsibility issues affecting investors and corporations, for 30 years. Founded in 1972, IRRC provides research, software products and consulting services to more than 500 institutional investors, corporations, law firms, academics, foundations, religious institutions and other organizations. IRRC offers proxy voting and portfolio screening services that are unique in the industry, as it does not advocate on any side of the issues it covers. Clients can be assured that the information and analysis IRRC provides is objective and unbiased.

Douglas G. Cogan, deputy director of IRRC's Social Issues Service, is the author of this report. Mr. Cogan joined IRRC in 1982 and is the author or co-author of several books on energy and environmental topics. His 1992 book, *The Greenhouse Gambit: Business and Investment Responses to Climate Change*, was one of the first to focus on the implications of climate change for the auto, electric power, agriculture and forest products industries. Since 1994, Mr. Cogan has covered the U.S. global warming shareholder campaign and has written more than three dozen company analyses on this topic. He has also written extensively on fiduciary issues related to social investing and shareholder activism. In 2000, Mr. Cogan edited *Tobacco Divestment and Fiduciary Responsibility: A Financial and Legal Analysis*. That report examined legal and fiduciary issues raised by fund trustees who wish to align investment management practices with their institutional missions. Mr. Cogan is a graduate of Williams College, where he received highest honors in political economics.

The Investor Responsibility Research Center has more than 80 professional staff members and is based in Washington, D.C. For more information, visit www.irrc.org.

About CERES

CERES is a coalition of investor, environmental, labor and public interest groups working together to increase corporate environmental responsibility worldwide. CERES represents more than $300 billion in assets. Investor members include state and municipal pension funds, socially responsible investment firms, religious groups, union funds, and foundations. Since its founding in 1989, CERES has persuaded dozens of companies to endorse the CERES Principles. Most recently, CERES co-founded the Global Reporting Initiative (GRI) with the United Nations Environment Programme. CERES is now bringing together the sustainability and corporate governance movements to improve corporate and public policies on climate change and other social, environmental and governance issues. For more information, visit www.ceres.org.

About This Report

This CERES Sustainable Governance Project report was written by Douglas Cogan of the Investor Responsibility Research Center. The report is available in PDF format on the Internet at: **http://www.ceres.org** and **http://www.irrc.org**.

A printed copy of this report can be obtained by contacting:
Chris Fox, CERES, 99 Chauncy St., Boston, MA 02111. Tel: 617-247-0700. • E-mail: fox@ceres.org

Copies also are available from IRRC's Online Store at **www.irrc.org** or by contacting: Publications Manager, IRRC, 1350 Connecticut Ave., NW, Washington, DC, 20036 Tel. 202-833-0700. • E-mail: michele.soule@irrc.org

CERES commissioned this guide from the Investor Responsibility Research Center. CERES is a coalition of investor, environmental, labor and public interest groups working together to increase corporate environmental responsibility worldwide. IRRC is an independent research firm that is the leading source of high quality, impartial information on corporate governance and social responsibility issues affecting investors and corporations.

CERES, Inc.
99 Chauncy Street
Boston, MA 02111
www.ceres.org

Investor Responsibility Research Center, Inc.
1350 Connecticut Ave., NW
Washington, DC 20036
www.irrc.org

Investor Guide to Climate Risk

Action Plan and Resource for Plan Sponsors, Fund Managers and Corporations

A Publication of the Investor Network on Climate Risk

Commissioned by

CERES

Authored by

Douglas G. Cogan
Investor Responsibility Research Center

IRRC

July 2004

Investor Guide to Climate Risk: *10 Key Steps*

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 the Investor Network on Climate Risk 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.

FOREWORD

Global climate change poses major risks and investment opportunities for shareholders and companies. The risks come primarily in two forms—physical risks and policy risks.

- Weather-related catastrophes topped $55 billion in 2003.[1] As global warming continues, the annual toll could reach $150 billion in the next 10 years—and $300 billion a year by 2050.[2] The French insurance company AXA estimates that about 20 percent of global GDP is now affected by climatic events and that "climatic risk in numerous branches of industry is more important than the risk of interest rates or foreign exchange risk."[3]
- Governments around the world, and regionally in the United States, are enacting policies to reduce emissions of carbon dioxide and other greenhouse gases (GHGs). Regulation of GHGs poses an additional financial risk, especially in sectors with significant GHG emissions, such as electricity, oil and gas, and automobiles.

The investment risks and opportunities posed by climate change are vast. Recent studies have shown:

- Modest greenhouse gas controls could reduce the market capitalization of many coal-dependent U.S. electric utilities by 5 to 10 percent. Under a more stringent Kyoto regulatory scenario, such companies could face a 10 to 35 percent reduction in market value.[4]
- Market capitalization of major oil companies could decline by as much as 6 percent as a result of CO_2 emission constraints, while companies with large reserves of natural gas stand to benefit.[5]
- Among auto companies, costs of compliance with climate policies could vary by a factor of 25, adding a new competitive dimension to the industry that could cause some companies' earnings to increase by up to 8 percent while others fall by as much as 10 percent.[6]

Fundamental changes must be made in the way we use and produce energy if we are to limit the downside risks posed by climate change. Pension fund and endowment trustees, with their long-term investment horizon, have a particular duty to address this challenge and fill the "governance gap" in investment decisions affecting climate change.[7] If these trustees do not look out for the lasting economic and environmental interests of their beneficiaries, short-term consumer and executive decisions will rule the day, locking in "business as usual" investment strategies that extend and compound the damage.

That is why state and city treasurers, labor pension fund leaders, and foundation leaders have formed the Investor Network on Climate Risk (INCR), for which CERES serves as Secretariat. The INCR issued a 10-point "Call for Action" at the Institutional Investor Summit on Climate Risk at the United Nations Headquarters on November 21, 2003.[8] It urges pension and endowment trustees, fund managers, securities analysts, corporate directors and government policymakers to increase their oversight and scrutiny of the investment implications of climate change.

To implement the INCR's Call for Action, CERES commissioned the Investor Responsibility Research Center to identify specific steps and resources available to investors. This *Investor Guide to Climate Risk*, authored by Douglas G. Cogan, identifies appropriate roles for plan sponsors and fund managers as well as the companies in which they invest. The Guide is intended to show how each of these entities can pursue independent initiatives. More importantly, it shows how they can link their efforts to reduce the financial risks and seize the investment opportunities posed by climate change. Readers should view the Guide with an eye toward such linkages.

This Guide has been posted on the INCR website (www.incr.com) and will be updated periodically. Its primary objectives are to:

- define the fiduciary duty to assess climate risk on behalf of shareholders and beneficiaries
- identify key business and investment risks and opportunities posed by climate change
- develop prudent investment and corporate response strategies and solutions
- support a government role to reduce investor uncertainty through a cap on GHG emissions

The Guide's intent is to help lay the groundwork and build a coordinated approach to mitigating climate risk. On an issue as complex as this, however, the Guide is merely a starting point for a sustained effort. I welcome your comments, suggestions and ideas as we work to move this process forward.

Mindy S. Lubber
Executive Director, CERES
Secretariat for the Investor Network on Climate Risk

How To Use This Guide

The Investor Guide to Climate Risk: Action Plan and Resource for Plan Sponsors, Fund Managers and Corporations is a comprehensive guide to actions individuals can take to address climate risk in their organizations. It is designed for online use to allow users to link to in-depth research and organizations that can assist them. This printed version of the Guide is a facsimile of the online version that will be updated periodically. Please view the Guide online at www.ceres.org and www.incr.com.

Who Should Use The Guide

The Guide is intended for broad application in the investment and corporate communities. Each page of the Guide is divided into three user categories:

- **Plan Sponsors** column is designed for pension plans and endowments and their investment consultants.
- **Fund Managers** column is intended for "buy side" investment managers and "sell side" brokers and securities analysts.
- **Corporations** column is designed for boards of directors, CEOs and top executives. (Managers of corporate retirement plans should also consult the Plan Sponsors column.)

Ten Key Steps

The Guide identifies three core actions to address climate risk – assessment, disclosure, and solutions – as well as ten key steps:

- **Assessment:** (1) seek expert advice, (2) conduct risk assessments, and (3) network with others;
- **Disclosure:** (4) issue a public statement, (5) make public disclosure of risks, (6) account for emissions, and (7) maintain stakeholder dialogue;
- **Solutions:** (8) devise investment strategy, (9) invest in clean energy, and (10) support government action.

The table appearing on the next page summarizes the actions available to Plan Sponsors, Fund Managers and Corporations. The Guide pages that follow provide a more detailed examination of each of the ten key steps, in the order they are listed above. The format is designed so users in one category can see how their actions relate to and influence actions taken by users in other categories. By reading down the columns, one can view a complete list of actions available in a user category. Reading across the rows show how users in all three categories can interact and coordinate their efforts.

Endnotes

1 Munich Reinsurance, Topics geo – *Annual Review of Natural Catastrophes 2003*, February 2004.

2 United Nations Environment Programme, *Climate Change and the Financial Services Industry*, October 2002; and Gerhard Berz, Munich Geoscience Unit, "Insuring Against Catastrophe," *Our Planet*, United Nations Environment Programme, February 2001.

3 AXA Insurance, "Answer to Carbon Disclosure Project Greenhouse Gas Emissions Questionnaire," April 2004.

4 Frank Dixon and Martin Whittaker, *Valuing Corporate Environmental Performance: Innovest's Evaluation of the Electric Utilities Industry*, New York, 1999.

5 Duncan Austin and Amanda Sauer, *Changing Oil; Emerging Environmental Risks and Shareholder Value in the Oil & Gas Industry*, World Resources Institute, Washington DC, 2002.

6 Duncan Austin, Niki Rosinski, Amanda Sauer, and Colin Le Duc, *Changing Drivers: The Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, World Resources Institute and Sustainable Asset Management, Washington, DC, and Zurich, Switzerland, 2003.

7 For more information on the "governance gap" affecting climate policy decisions, see the CERES report, *Corporate Governance and Climate Change: Making the Connection*, written by Douglas G. Cogan, Investor Responsibility Research Center, June 2003.

8 The initial members of INCR and signers of the 10-point "Call for Action" are California Treasurer Phil Angelides, Connecticut Treasurer Denise Nappier, Maine Treasurer Dale McCormick, New Mexico State Treasurer Robert Vigil, New York City Comptroller William Thompson, New York State Comptroller Alan Hevesi, Oregon Treasurer Randall Edwards, Vermont Treasurer Jeb Spaulding, Service Employees International Union National Industry Pension Fund Director Steve Abrecht and Communications Workers of America/ITA Negotiated Pension Plan Chairman William Boarman.

Investor Guide to Climate Risk:

Action Plan and Resource for Plan Sponsors, Fund Managers and Corporations

Action	Plan Sponsors	Fund Managers	Corporations
ASSESSMENT			
Expert Advice	Select an individual or team to raise awareness, identify risks and convey fiduciary duties to beneficiaries, fund managers, consultants and securities analysts on climate change.	Select an individual or team to develop capabilities to assess climate risks and opportunities in company research, selection and portfolio management.	Select an individual or team to report to the board of directors and CEO on climate change to ensure that the company makes responsible and informed capital investment decisions.
Risk Assessment	Assess climate risk exposure in investment portfolios and property holdings.	Assess climate risk exposure in evaluations of companies and industry sectors.	Assess climate risk exposure in fixed assets, products and competitive positioning.
Networking with Others	Join the Investor Network on Climate Risk and like-minded investor coalitions to promote climate risk analysis and sound investment policy.	Join investor coalitions and engage brokerage and research firms to promote climate risk analysis and sound investment policy.	Enter partnerships and collaborations to promote clean energy, greenhouse gas (GHG) emissions trading and responsible climate policy.
DISCLOSURE			
Public Statement	Declare that climate change poses a fiduciary risk to be addressed through sound investments and property management, proxy voting and corporate engagement.	Declare that climate change poses a financial risk to be addressed through research, engagement and investment strategies to maximize returns with reduced climate risk.	Declare positions by the board of directors and CEO that climate change poses a business risk to be addressed through GHG mitigation and ameliorative policies.
Public Disclosure	State institution's methods to assess and address climate risk in plan documents and declaration of investment principles.	State firm's capabilities to assess and address climate risk in investment prospectuses and in response to requests for proposals.	Identify material risks posed by climate change and GHG emissions controls in securities filings and sustainability reports.
Emissions Accounting	Ask companies to disclose emissions based on the Greenhouse Gas Protocol, and account for emissions from property holdings.	Ask companies to disclose emissions based on the Greenhouse Gas Protocol to provide comparable and verifiable emissions data.	Base emissions inventory methods, baselines and targets on the Greenhouse Gas Protocol, and make data independently verifiable.
Stakeholder Dialogue	Engage beneficiaries, fund managers and companies in dialogue, and adopt proxy voting guidelines to urge corporate action on climate change.	Ask companies about climate change strategies in analyst briefings, and vote proxies in support of company action on climate change.	Reach out to shareholders, investment analysts and public interest groups to promote an open forum and pro-active responses to climate change.
SOLUTIONS			
Investment Strategy	Seek long-term wealth creation by urging best practices among fund managers and companies.	Match fund objectives with reduced climate risk exposure to optimize investment returns.	Integrate climate policy in strategic business planning to maximize opportunities and minimize risks.
Clean Energy	Direct investment capital into clean energy technologies and promote climate friendly building practices.	Develop climate friendly investment products and analyze companies' energy use and trends.	Set goals to increase energy efficiency, purchase and/or develop clean energy and capture/ offset GHG emissions.
Government Action	Support government actions to promote investor certainty, including mandatory policies to achieve absolute GHG emissions reductions.	Support government actions to promote investor certainty, including mandatory policies to achieve absolute GHG emissions reductions.	Support government actions to promote strategic planning and technology innovations, including mandatory policies to achieve absolute GHG emissions reductions.

ASSESSMENT

Seek Expert Advice

Few investment managers and securities analysts have the specialized skills or experience necessary to quantify a company's exposure to climate risk. There are, however, a growing number of authorities with expertise in the technical, policy and financial aspects of climate change. Institutional investors and corporations would be remiss in their duties if they failed to utilize these resources and develop their own in-house expertise.

Plan Sponsors	Fund Managers	Corporations
Select an individual or team to raise awareness, identify risks and convey fiduciary duties to beneficiaries, fund managers, consultants and securities analysts on climate change.	***Select an individual or team to develop capabilities to assess climate risks and opportunities in company research, selection and portfolio management.***	***Select an individual or team to report to the board of directors and CEO on climate change to ensure that the company makes responsible and informed capital investment decisions.***
• identify climate change as a matter of fiduciary duty	• identify climate change as a matter of investment competence	• identify climate change as a matter of corporate governance
• assign key staff to monitor science, financial and policy developments on climate change	• assign key staff to monitor corporate, financial and policy developments on climate change	• assign key staff to monitor science, technology and policy developments on climate change
• have investment consultants evaluate fund manager investment capabilities and broker research on climate change and clean energy	• review literature connecting environmental performance with shareholder value, and literature connecting corporate governance and climate change	• create multi-departmental steering committee to coordinate and communicate climate change and clean energy strategy with board of directors and CEO
• urge credit rating agencies to assess GHG emissions data and mitigation strategies in company credit risk evaluations	• research and evaluate investment strategies to reduce climate risk exposure and promote climate friendly technologies, products and business development plans	• benchmark company performance relative to peers on GHG emissions, mitigation strategies, climate friendly technologies and governance oversight
• consult with outside technical, policy and scientific experts	• consult with outside technical, policy and scientific experts	• consult with outside technical, policy and scientific experts (including at the board level)
• join Investor Network on Climate Risk	• join Investor Network on Climate Risk	• join multi-stakeholder groups such as CERES

ASSESSMENT

Conduct Risk Assessment

Climate risk varies widely among companies and industry sectors. Risks include physical exposure of assets, regulatory exposure in markets with greenhouse gas controls, competitive positioning and product risks. As fiduciaries, institutional investors must understand and control their level of exposure, making this part of their overall risk management and corporate engagement process. Plan sponsors can ask investment consultants, fund managers, securities analysts and portfolio companies to conduct climate risk assessments. Companies, in turn, have a duty to disclose information as part of this assessment process.

Plan Sponsors

Assess climate risk exposure in investment portfolios and property holdings.

Plan sponsors should evaluate climate risk in relation to:

- investment time horizons and payout schedules to beneficiaries
- active vs. passive management styles
- rate of portfolio turnover
- geographic distribution of equities in markets with GHG emissions controls (region- and country-specific)
- portfolio weighting of climate risk-exposed industries ***(see Fund Managers column)***

Property risk exposure includes:

- energy use and fuel mix for heating, cooling and electricity
- building-integrated conservation and clean energy design features
- energy efficient lighting and energy management systems
- building age and viability of retrofit applications
- proximity to coastlines, flood plains and drought-prone areas
- storm and fire preparedness

Fund Managers

Assess climate risk exposure in evaluations of companies and industry sectors.

Industries with climate policy and competitive risk exposure include:

- electric power
- oil & gas
- transportation & automobiles
- clean energy/renewables
- basic industries (chemicals, paper, metals, mining)
- manufacturing (electrical equipment, semiconductors)
- banking and diversified financials

Also compare same-sector companies based on climate risk strategies.

Industries with physical risk exposure to climate change include:

- agriculture & food
- forestry
- fisheries
- water
- real estate
- tourism
- health care
- insurance

Corporations

Assess climate risk exposure in fixed assets, products and competitive positioning.

Corporate asset risk exposure includes:

- exposure in markets with GHG emissions controls
- direct GHG emissions
- age and projected life of assets
- energy use and fuel mix
- fuel switching capabilities and retrofit applications
- vulnerability of assets to power, water and other supply interruptions
- proximity to coastlines, flood plains and drought-prone areas

Product risk exposure includes product comparisons of:

- direct and indirect GHG emissions
- energy demand and fuel use
- energy efficiency and clean energy design features
- low-GHG product alternatives
- low-GHG research & development
- supply chain issues

Competitive risk exposure includes industry comparisons of:

- aggregate GHG emissions and emissions intensity of operations (and those of key suppliers)
- ability to respond to regulatory regimes and new markets
- age, projected life and geographic distribution of assets
- fuel switching capabilities and flexibility in manufacturing processes
- introduction of climate-friendly products and manufacturing processes
- effects of climate strategy on corporate reputation, brand value, credit risk, and legal risk

ASSESSMENT

Network with Others

Institutional investors can join with their peers in the Investor Network on Climate Risk (INCR). This network promotes investor understanding of climate risk and coordinates investor engagement with companies and policymakers. INCR was founded by ten investor leaders at the Institutional Investor Summit on Climate Risk at the United Nations in November 2003. CERES is the INCR Secretariat. Other investor, governance, business and environmental coalitions and partnerships are listed below.

Plan Sponsors

Join the Investor Network on Climate Risk and like-minded investor coalitions to promote climate risk analysis and sound investment policy.

Climate change investor networks and coalitions include:

- Investor Network on Climate Risk
- Carbon Disclosure Project
- Institutional Investors Group on Climate Change

Other major investor networks with members addressing climate risk include:

- Council of Institutional Investors
- Interfaith Center on Corporate Responsibility
- International Corporate Governance Network
- Local Authority Pension Fund Forum (U.K.)
- National Association of State Treasurers
- Social Investment Forum
- Social Investment Organization (Canada)

Fund Managers

Join investor coalitions and engage brokerage and research firms to promote climate risk analysis and sound investment policy.

Climate change investor networks and coalitions include:

- Investor Network on Climate Risk
- Carbon Disclosure Project
- Institutional Investors Group on Climate Change

Non-profit research groups addressing investment and governance implications of climate change include:

- CERES
- Global Reporting Initiative
- United Nations Environmental Programme Finance Initiative
- World Resources Institute

Corporations

Enter partnerships and collaborations to promote clean energy, greenhouse gas (GHG) emissions trading and responsible climate policy.

Climate change industry partnerships include:

- Business Council for Sustainable Energy
- Business Environmental Leadership Council
- Chicago Climate Exchange
- Climate Leaders
- World Economic Forum

Industry-NGO collaborations addressing climate change include:

- CERES
- Environmental Defense Partnership for Climate Action
- Greenhouse Gas Protocol
- World Resources Institute Green Power Market Development Group
- World Wildlife Fund Climate Savers

DISCLOSURE
Issue Public Statement

Investors can be very effective advocates for steering companies in a responsible direction on climate change. Institutional investors can state their views on climate risk, their intent to engage companies and vote for climate change shareholder resolutions as well as their incorporation of climate risk factors in investment plans. Plan sponsors can present this information in their statement of investment principles. Fund managers and brokerage houses can include this information in their investment prospectuses and in response to requests for proposals. Corporations can feature their responses to climate change in their annual reports, environmental reports and securities filings.

Plan Sponsors	Fund Managers	Corporations
Declare that climate change poses a fiduciary risk to be addressed through sound investments and property management, proxy voting and corporate engagement.	***Declare that climate change poses a financial risk to be addressed through research, engagement and investment strategies to maximize returns with reduced climate risk.***	***Declare positions held by the board of directors and CEO that climate change poses a business risk to be addressed through GHG mitigation and ameliorative policies.***
• statement on climate change as a matter of fiduciary duty	• statement on climate change as a matter of investment competence	• board statement on climate change as a matter of corporate governance
• specific funds and initiatives focused on clean energy and climate friendly companies	• investment products, services or strategies focused on clean energy and climate friendly companies	• strategic investments in clean energy and climate friendly products and services
• proxy voting guidelines and procedures for casting and reporting votes	• proxy voting guidelines and procedures for implementing plan sponsor guidelines and casting and reporting votes (including broker votes)	• reports and statements issued in response to shareholder requests
• means of engagement with plan beneficiaries, investment consultants, fund managers, brokers, property managers, companies and outside policy and scientific experts	• means of engagement with plan sponsors, companies, securities analysts, credit rating agencies and outside policy and scientific experts	• means of stakeholder engagement and third-party disclosure, such as through shareholder resolutions, company reports, the Global Reporting Initiative and the Carbon Disclosure Project
• how climate change relates to investment strategies and performance objectives	• research methods to address climate risk in evaluations of companies, industry sectors and managed portfolios	• board and CEO statements on company's GHG control strategy, including: · GHG emissions baselines, targets and trends · description of GHG emissions 'footprint' that includes product end-use emissions · how climate change and GHG controls may affect company's business strategy and product development · assessment of climate change science and human activities linked to global warming · comments on domestic and international policies to control GHG emissions

DISCLOSURE

Make Public Disclosure

The failure of companies to adequately disclose climate change-related risks is a major barrier facing investors and financial analysts. Better public disclosure is at the core of a global warming shareholder campaign that began in 1990. Investors have been asking companies to disclose corporate governance responses to climate change, greenhouse gas emissions, and to conduct analyses of the likely impact on the firm of climate risk and current and proposed climate change policies. In 2004, investors have asked the Securities and Exchange Commission to clarify that climate risk information must be reported under rules that compel disclosure of trends and uncertainties that are likely to have a material impact on a company's future operations. Other voluntary initiatives for public disclosure include the Global Reporting Initiative and the Carbon Disclosure Project. European governments are at various stages of implementing mandatory corporate disclosure on social and environmental issues such as climate change.

Plan Sponsors	Fund Managers	Corporations
State the institution's methods to assess and address climate risk in plan documents and declaration of investment principles.	***State the firm's capabilities to assess and address climate risk in investment prospectuses and in response to requests for proposals.***	***Identify material risks posed by climate change and GHG emissions controls in securities filings and sustainability reports.***
• statement on climate change as a matter of fiduciary duty	• statement on climate change as a matter of investment competence	• statement on climate change as a matter of corporate governance (including board oversight procedures)
• assessment of climate risk in portfolio management and property holdings	• research methods to assess climate risk and GHG regulations in evaluations of companies, industries and managed portfolios	• assessment of GHG regulations (proposed and in effect) and possible physical effects of climate change on company operations
• inclusion of climate risk competence as a selection criterion for investment consultants, fund managers and property managers	• investment products, services or strategies focused on climate friendly companies, technologies and products	• likelihood of material risks posed by GHG regulations and physical effects of climate change, including the time frame in which they may occur
• investment strategies to reduce climate risk and optimize returns for beneficiaries	• assessment of GHG exposure and emissions control plans in projections of company cash flow, capital cost and share price valuations	• GHG emissions baselines, targets and control strategies
• proxy voting guidelines and procedures, disclosure of votes and engagement with companies and policymakers	• proxy voting policies and procedures, disclosure of votes and engagement with companies and policymakers	• outside affiliations and activities focused on climate change, including shareholder engagement and lobbying activities

DISCLOSURE

Account for Emissions

The more that greenhouse gas reporting uses a common, standardized format, the easier it is for institutional investors and other stakeholders to assess and compare company performance, and to encourage companies to move to a higher performance level. The Greenhouse Gas Protocol, developed by the World Business Council for Sustainable Development and the World Resources Institute, has emerged as a common metric for emissions reporting and is incorporated in the Global Reporting Initiative Sustainability Reporting Guidelines.

Plan Sponsors	Fund Managers	Corporations
Ask companies to disclose emissions based on Greenhouse Gas Protocol, and account for emissions from property holdings.	***Ask companies to disclose emissions based on the Greenhouse Gas Protocol to provide comparable and verifiable emissions data.***	***Base emissions inventory methods, baselines and targets on the Greenhouse Gas Protocol, and make data independently verifiable.***
• urge companies to report GHG emissions based on the Greenhouse Gas Protocol	• urge companies to report GHG emissions based on the Greenhouse Gas Protocol	• submit annual emissions inventory data based on the Greenhouse Gas Protocol
• ask companies to submit annual reports based on the Global Reporting Initiative	• ask companies to submit annual reports based on the Global Reporting Initiative	• report emissions annually through the Global Reporting Initiative or comparable accounting system
• participate in the Carbon Disclosure Project	• participate in the Carbon Disclosure Project	• respond to questionnaires from the Carbon Disclosure Project
• support and sponsor shareholder resolutions seeking disclosure of GHG emissions baselines and targets	• support and sponsor shareholder resolutions seeking disclosure of GHG emissions baselines and targets, and request emissions data in analyst briefings	• set emissions reduction targets for operations and products that are updated at least annually and can be independently verified
• set engagement and investment criteria that favors companies with GHG emissions transparency and reduction goals	• pursue engagement and investment strategies that favor companies with GHG emissions transparency and reduction goals	• certify emissions by an accredited third party auditor and register emissions with an independent group such as the World Economic Forum Global GHG Register, Climate Leaders or the California Climate Action Registry
• assess GHG emissions from property holdings, as outlined in the Greenhouse Gas Protocol	• urge companies to report on GHG emissions from property holdings and product-life cycle emissions	• assess GHG emissions from property holdings and product life-cycle emissions

DISCLOSURE

Maintain Stakeholder Dialogue

Institutional investors can employ various forms of communication and dialogue to obtain climate risk information from corporations. One of the most effective means is through the support and sponsorship of climate change shareholder resolutions. Many companies have agreed to produce reports and engage in further dialogue when such proposals come to votes or have been withdrawn. Fund managers can obtain additional information through analyst briefings held regularly with companies. Letter-writing campaigns such as the Carbon Disclosure Project and programs facilitated by CERES and the Investor Network on Climate Risk also enable investors to pool their knowledge and assets to have greater leverage on companies.

Plan Sponsors	Fund Managers	Corporations
Engage beneficiaries, fund managers and companies in dialogue, and adopt proxy voting guidelines to urge corporate action on climate change.	***Ask companies about climate change strategies in analyst briefings, and vote proxies in support of company action on climate change.***	***Reach out to shareholders, investment analysts and public interest groups to promote an open forum and pro-active responses to climate change.***
• ask investment consultants, fund managers, securities analysts and portfolio companies for climate change risk assessments	• engage companies through analyst briefings and by other means to evaluate GHG risk exposure and mitigation plans	• seek input from and provide information to plan sponsors, fund managers and securities analysts to assess climate change risk and opportunities
• develop proxy voting guidelines to urge companies to report on climate-related risks, adoption of GHG controls and pursuit of climate friendly business strategies	• vote proxies in accordance with plan sponsor proxy voting guidelines and consistent with fiduciary prudence	• engage with shareholder proponents in an effort to reach agreement on climate change disclosure and action requests (sometimes resulting in resolution withdrawals)
• consider sponsoring or co-filing climate change resolutions, participate in proxy solicitations and letter writing campaigns (such as the Carbon Disclosure Project), and support the Global Reporting Initiative and Greenhouse Gas Protocol	• consider sponsoring or co-filing climate change resolutions, participate in proxy solicitations and letter writing campaigns (such as the Carbon Disclosure Project), and support the Global Reporting Initiative and Greenhouse Gas Protocol	• provide public information in accordance with third-party requests, such as through the Carbon Disclosure Project and Global Reporting Initiative, and invite feedback on the information presented
• join multi-stakeholder groups like CERES and the Investor Network on Climate Risk	• join multi-stakeholder groups like CERES and the Investor Network on Climate Risk	• join multi-stakeholder groups like CERES and other climate-related stakeholder networks
• conduct regular two-way communication on climate change with beneficiaries, fund managers, portfolio companies, government policymakers and outside experts on climate change	• communicate regularly with plan sponsors, portfolio companies, securities analysts, government policymakers and outside experts on climate change	• conduct regular two-way communication on climate change with employees, plan sponsors, fund managers, securities analysts, government policymakers and outside experts on climate change

SOLUTIONS

Devise Investment Strategy

All institutional investors, including pension funds, mutual funds, foundations and endowments, can develop strategies to address embedded climate risk and declare them in plan documents and statement of principles. Fund managers and securities analysts can incorporate climate risk in their evaluation of companies and industry sectors in an effort to attain superior, risk-adjusted returns. Corporations can factor costs of greenhouse gas emissions in major capital investment and operating decisions to gain competitive advantage and enhance their public reputations.

Plan Sponsors	Fund Managers	Corporations
Seek long-term wealth creation by urging best practices among fund managers and companies.	***Match fund objectives with reduced climate risk exposure to optimize investment returns.***	***Integrate climate policy in strategic business planning to maximize opportunities and minimize risks.***
• set investment time horizons that coincide with long-term fiduciary objectives and obligations	• expand time horizons to manage plan sponsor investments	• seek and obtain board approval of a long-term strategic plan to target and control GHG emissions
• establish climate risk competence as a selection criterion in requests for proposals with investment consultants, fund managers and property managers	• develop portfolio management strategies that reduce climate risk, and offer select funds and private equity placements in climate friendly technologies, products and companies	• make strategic investments in climate friendly technologies, products and manufacturing processes
• urge securities analysts and credit rating agencies to assess GHG exposure and emissions control plans in company credit risk evaluations	• rebalance active portfolios according to most and least risk-exposed companies and sectors, and enhance index funds through similar rebalancing efforts	• establish a business unit to collect GHG emissions data and engage in emissions trading to boost internal rates of return
• adopt 'universal ownership' principle that ties wealth creation to broad, sustainable economic growth, not just singular portfolio returns	• assess GHG exposure and emissions control plans in projections of company cash flow, capital costs and share price valuations	• include compensation incentives to achieve company GHG emissions reduction targets
• consider investment externalities (e.g., added public health and infrastructure costs from climate change) in measures of plan contributions to beneficiaries	• factor existing and prospective government policies as well as projected physical effects of climate change in sectoral and regional asset allocation decisions	• factor costs of GHG emissions in major investment and operating decisions, and physical effects of climate change in major facility siting decisions

SOLUTIONS

Invest in Clean Energy

Many promising investment opportunities are available for the development and commercialization of new clean energy technologies. Collectively, renewables like wind and solar are the world's fastest growing sources of energy. Plan sponsors can help minimize the adverse effects of climate change by allocating venture capital to private firms engaged in the development of clean energy technologies. Fund managers can channel investment capital into mutual funds and other managed accounts whose stock selection is focused on companies with clean energy technologies and products, and companies with superior positioning and reduced exposure to climate risk. Finally, plan sponsors, fund managers and securities analysts can engage companies directly to spur development of clean energy technologies in an effort to bolster their competitive positioning and reduce their greenhouse gas emissions.

Plan Sponsors

Direct investment capital to clean energy technologies and promote climate friendly building practices.

Clean energy technologies include:

- wind power
- photovoltaics and solar thermal
- biomass
- geothermal
- low-impact hydro
- landfill gas and coalbed methane recovery

Low-carbon technologies include:

- fuel cells and microturbines
- hybrid internal combustion engines
- integrated gasification combined cycle turbines
- carbon capture and storage

Climate friendly building practices include:

- comprehensive energy audits
- 'smart building' energy management systems
- energy efficient lighting and HVAC systems
- building-integrated design of passive and active solar power
- thermal energy storage systems
- shared-savings contracts with energy service companies
- benchmarking of building performance
- transportation and siting issues such as flexible work schedules, telecommuting, car pooling, use of mass transit, reduced employee travel and fleet purchases of fuel efficient vehicles

Fund Managers

Develop clean energy investment products and analyze companies' energy use and trends.

Climate friendly investment products include:

- portfolio screening based on company energy performance
- mutual fund instruments for clean energy companies, technologies and products
- venture capital investments in emerging clean energy companies, technologies and products

(See Plan Sponsors column for listing of clean energy technologies)

Analysis of energy use includes:

- power demand, power generation and total energy use
- normalized energy costs (e.g., Btus/$ revenue) and exposure to energy pricing volatility
- clean energy purchase and development plans
- energy management systems and personnel
- use of emissions credits to leverage energy efficiency and clean energy investments
- benchmarking of company energy performance

Corporations

Set goals to increase energy efficiency, purchase and/or develop clean energy, and capture/offset GHG emissions.

Clean energy goals include:

- targets to control energy and carbon intensity, including in products
- targets to increase energy efficiency and purchase of clean energy technologies and products
- research and development of clean energy technology and products
- research and demonstration of carbon capture and storage

(See Plan Sponsors column for listing of clean energy technologies)

Climate friendly building practices include:

- analysis of energy use and trends *(see also Fund Managers column)*
- climate friendly building practices *(see also Plan Sponsors column)*

SOLUTIONS

Support Government Action

Companies and investors face tremendous uncertainty regarding the future course of U.S. and international climate change regulation. Investors and corporations recognize that this uncertainty creates substantial business risk and makes for the least optimal path forward in making major investment decisions. Government action can address this investor and regulatory uncertainty by enacting mandatory policies to achieve clearly defined absolute reductions in greenhouse gas emissions.

Plan Sponsors	Fund Managers	Corporations
Support government actions to promote investor certainty, including mandatory policies to achieve absolute GHG emissions reductions.	***Support government actions to promote investor certainty, including mandatory policies to achieve absolute GHG emissions reductions.***	***Support government actions to promote strategic planning and technology innovations, including mandatory policies to achieve absolute GHG emissions reductions.***
• support current and proposed government requirements to achieve absolute reductions in greenhouse gas emissions	• support current and proposed government requirements to achieve absolute reductions in greenhouse gas emissions	• support current and proposed government requirements to achieve absolute reductions in greenhouse gas emissions
• support a 'cap-and-trade' regulatory system that creates market-based, least-cost approaches to achieving GHG emissions reductions	• support a 'cap-and-trade' regulatory system that creates market-based, least-cost approaches to achieving GHG emissions reductions	• support a 'cap-and-trade' regulatory system that creates market-based, least-cost approaches to achieving GHG emissions reductions
• support mandatory reporting of GHG emissions through the Greenhouse Gas Protocol or comparable accounting system	• support mandatory reporting of GHG emissions through the Greenhouse Gas Protocol or comparable accounting system	• support mandatory reporting of GHG emissions through the Greenhouse Gas Protocol or comparable accounting system
• demand forward-looking, time-referenced disclosure of climate change risks and opportunities in securities filings, pursuant to Regulation S-K	• demand forward-looking, time-referenced disclosure of climate change risks and opportunities in securities filings, pursuant to Regulation S-K	• provide forward-looking, time-referenced disclosure of climate change risks and opportunities in securities filings, pursuant to Regulation S-K
• ask the SEC to permit shareholder resolutions addressing material risks and benefits of climate change under Rule 14(a)-8	• ask the SEC to permit shareholder resolutions addressing material risks and benefits of climate change under Rule 14(a)-8	• do not challenge shareholder resolutions addressing material risks and benefits of climate change under Rule 14(a)-8
• seek sustained government support for energy efficiency and clean technology research and development to diversify the energy supply	• seek sustained government support for energy efficiency and clean technology research and development to diversify the energy supply	• seek sustained government support for energy efficiency and clean technology research and development to diversify the energy supply

Organizations and Collaborations Focused on Climate Change

Climate change investor networks and coalitions include:

Investor Network on Climate Risk (www.incr.com)

Carbon Disclosure Project (www.cdproject.net)

Institutional Investors Group on Climate Change (www.iigcc.org)

Other major investor networks with members addressing climate risk include:

Council of Institutional Investors (www.cii.org)

Interfaith Center on Corporate Responsibility (www.iccr.org)

International Corporate Governance Network (www.icgn.org)

Local Authority Pension Fund Forum (UK) (www.lapfforum.org)

National Association of State Treasurers (www.nast.net)

Social Investment Forum (www.socialinvest.org)

Social Investment Organization (Canada) (www.socialinvestment.ca)

Non-profit groups addressing investment and governance implications of climate change include:

CERES (www.ceres.org)

Global Reporting Initiative (www.globalreporting.org)

United Nations Environmental Programme Financial Initiative (www.unepfi.net)

World Resources Institute (www.wri.org)

Climate change industry partnerships include:

Business Council for Sustainable Energy (www.bcse.org)

Business Environmental Leadership Council (www.pewclimate.org)

Chicago Climate Exchange (www.chicagoclimatex.org)

Climate Leaders (www.epa.gov/climateleaders)

World Economic Forum (www.weforum.org)

Industry-NGO collaborations addressing climate change include:

CERES (www.ceres.org)

Environmental Defense Partnership for Climate Action (www.pca-online.org)

Greenhouse Gas Protocol (www.ghgprotocol.org)

World Resources Institute Green Power Market Development Group (www.thegreenpowergroup.org)

World Wildlife Fund Climate Savers (www.panda.org)

About the Author

Douglas G. Cogan is deputy director of the Social Issues Service for the Investor Responsibility Research Center (IRRC). Mr. Cogan is the author of several books on energy and environmental topics. In 2003, CERES commissioned him to write *Corporate Governance and Climate Change: Making the Connection*, which identified 14 specific actions that companies are taking to implement governance responses to climate change. Mr. Cogan's 1992 book, *The Greenhouse Gambit: Business and Investment Responses to Climate Change*, was one of the first to focus on the implications of climate change for the auto, electric power, agriculture and forest products industries. Since 1990, Mr. Cogan has covered the U.S. global warming shareholder campaign and has written approximately 50 company analyses on this topic. He has also written extensively on fiduciary issues related to social investing and shareholder activism, and has testified before Congress. Mr. Cogan is a graduate of Williams College, where he received highest honors in political economics.

The Investor Responsibility Research Center (IRRC) is an independent research firm that is the leading source of high quality, impartial information on corporate governance and social responsibility issues. For more than three decades, IRRC has provided research, software products and consulting services to institutional investors, corporations, foundations, religious organizations and others. IRRC offers complete solutions for proxy research and voting, screening and benchmarking, and corporate services. Because it does not advocate on any side of the issues it covers, clients can be assured that the information and analysis IRRC provides is objective and unbiased. IRRC has approximately 100 professional staff members and is based in Washington, D.C. For more information, visit www.irrc.org.

About CERES

CERES is a national coalition of investment funds, environmental organizations, and other public interest groups. Our mission is to move businesses, capital, and markets to advance lasting prosperity by valuing the health of the planet and its people. CERES represents more than $400 billion in assets. Investor members include state and municipal pension funds, socially responsible investment firms, religious groups, union funds, and foundations. Since its founding in 1989, CERES has persuaded dozens of companies to endorse the CERES Principles. CERES co-founded the Global Reporting Initiative (GRI) with the United Nations Environment Programme and is secretariat for the Investor Network on Climate Risk. CERES is currently bringing together the sustainability and corporate governance movements to improve corporate and public policies on climate change and other social, environmental and governance issues. For more information, visit www.ceres.org.

About This Guide

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A printed copy of this report can be obtained by contacting:
Chris Fox, CERES, 99 Chauncy St., Boston, MA 02111. Tel: 617-247-0700. • E-mail: fox@ceres.org