



CORPORATE GOVERNANCE AND CLIMATE CHANGE

CONSUMER AND TECHNOLOGY COMPANIES

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A Ceres Report



Authored by RiskMetrics Group

Doug Cogan
Megan Good
Geri Kantor
Emily McAteer

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Ceres is a national coalition of investors, environmental groups and other public interest organizations working with companies to address sustainability challenges such as global climate change. Ceres directs the Investor Network on Climate Risk, a group of more than 70 institutional investors from the US and Europe managing over \$7 trillion in assets.

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

RiskMetrics Group Inc.
One Chase Manhattan Plaza
44th Floor
New York, NY 10015
www.riskmetrics.com

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Acronyms

BOMA – Building Operators and Managers Association
BREEAM – Building Research Establishment Environmental Assessment Method
CaCX – California Climate Exchange
CCX – Chicago Climate Exchange
CDM – Clean Development Mechanism
CDP – Carbon Disclosure Project
CER – Certified Emission Reduction
CHP – Combined Heat and Power
CO₂ – Carbon Dioxide
CO₂e – Carbon Dioxide Equivalent
CR – Corporate Responsibility
CSR – Corporate Social Responsibility
ECX – European Climate Exchange
EHS – Environment, Health & Safety
EMS – Environmental Management System
EPA – Environmental Protection Agency
ESCO – Energy Service Company
ESG – Environmental, Social and Governance
EUA – EU Emission Allowance
EU ETS – European Union Emissions Trading Scheme
FTE – Full Time Equivalent
GHG – Greenhouse Gas
GRI – Global Reporting Initiative
HVAC – Heating, Ventilation & Air Conditioning
ICT – Information and Communication Technology
IETA – International Emissions Trading Association

IPCC – Intergovernmental Panel on Climate Change
IPO – Initial Public Offering
ISO – International Standards Organization
JI – Joint Implementation
KW – Kilowatt
KWh – Kilowatt hour
LEED – Leadership in Energy and Environmental Design
MDG – Millennium Development Goals
MTCE – Metric Tons Carbon Equivalent
MW – Megawatt
MWh – Megawatt hour
NASA – National Aeronautics and Space Administration
NGO – Non-Governmental Organization
PPM – Parts Per Million
REC – Renewable Energy Certificate
SME – Small & Medium Enterprise
SRI – Socially Responsible Investment
UNEP – United Nations Environment Programme
UNFCCC – United Nations Framework Convention on Climate Change
USCAP – United States Climate Action Partnership
USGBC – United States Green Building Council
VER – Verified Emission Reduction
WBCSD – World Business Council on Sustainable Development
WRI – World Resources Institute

Foreword

Consumer and technology companies are already feeling powerful ripples from climate change. Their massive operations and supply chains will be tested by global warming regulations that make fossil fuels more expensive — and clean energy, energy efficiency, and renewable energy much more attractive. These companies also face rising consumer demand for climate-friendly products, bringing enormous opportunities in the products they make, goods they put on store shelves and labels they use to inform customer choices.

The changing economic and political landscape should also make climate change a top priority for these companies. Consider:

- Energy prices are gyrating up and down, making energy savings a vital hedge against future operating costs;
- The sub-prime mortgage meltdown has catalyzed much-needed attention to corporate risk management practices, including hidden costs of climate change that are just now rising to the surface;
- President-elect Barack Obama is vowing to curb greenhouse gas (GHG) emissions and make clean energy a driver of future job creation and economic growth;
- Physical evidence is stronger than ever that human-induced global warming is profoundly altering our global environment and moving it toward a dangerous tipping point.

It's no wonder Wall Street is paying close attention to companies that are distinguishing themselves compared to their peers on these diverse and overlapping challenges.

"We expect the importance of climate change performance to rise further and extend to an increasing number of sectors," said Goldman Sachs, in a study issued in October. "Asking which sectors are most exposed is a far less relevant question than asking which companies are most effectively positioning themselves to establish competitive advantage relative to peers in each industry. No sector is immune from the implications of rising social awareness of climate change."

This Ceres report is the first comprehensive assessment of how 63 of the world's largest consumer and information technology companies are preparing themselves to face this colossal challenge. The report includes 11 industry sectors — Apparel, Beverages, Big Box Retailers, Grocery & Drug Retailers, Personal & Household Goods, Pharmaceuticals, Real Estate, Restaurants, Semiconductors, Technology and Travel & Leisure.

The report pays particular attention to how corporate executives and board directors are addressing their governance systems to minimize climate-related risks and maximize solution-oriented products and services that will help society mitigate and adapt to climate change.

The report employs a "Climate Change Governance Framework" to evaluate how 48 US companies and 15 non-US companies are addressing climate change through board oversight, management execution, public disclosure, GHG emissions accounting and strategic planning and performance.

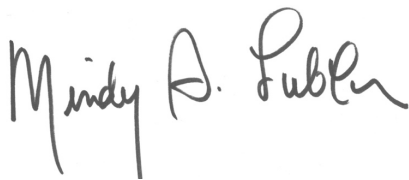
The results provide some basis for encouragement, with selected companies across all sectors beginning to address climate change in their operations, product development and supply chain management. Yet for all of the positive momentum, many companies have done little so far to elevate climate change as a governance priority — a trend that cuts across European, North American and Asian companies alike. For example, only 15 of the 63 companies have tasked board-level committees with environmental oversight, and only seven of the CEOs of these firms have taken leadership roles

on environment and climate change initiatives. More revealing, none of the companies have explicitly linked CEO or other C-level executive compensation to climate change goals.

While many of these companies are making progress, their actions to date are only the beginning of what is needed from these sectors to reduce GHG emissions consistent with targets scientists say are needed to avoid permanent damage to the climate. In this regard, more companies should:

- elevate climate change as a governance priority for board members and CEOs
- link the company's largest compensation packages – those of the CEO and other senior executives – to GHG reduction targets and other climate performance measures
- set company-wide energy efficiency goals and mandate energy efficiency evaluations for all major capital investments
- boost attention to supply chain management by including supply chain GHG emissions – emissions that result from raw material extraction, production, transport and packaging – in emissions inventories and setting emission standards for suppliers
- set renewable energy purchase targets
- expand programs to educate, empower and reward employees for their climate-specific initiatives.

As powerful market drivers that reach virtually every buyer and business, consumer and technology companies must be central players in mitigating climate change and its impacts. These companies have the reach, influence and capabilities to achieve even bigger changes that will help solve the climate crisis.

A handwritten signature in black ink that reads "Mindy A. Lubber". The signature is fluid and cursive, with the first name "Mindy" being larger and more prominent than the last name "Lubber".

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

Executive Summary

Volatile energy prices and growing environmental concerns have catapulted climate change to the top of corporate agendas of many industries. Until now, attention has focused on emissions-intensive industries, such as power generation and oil production. Yet climate change is a critical issue for all sectors of the economy. Climate-related business strategies are gaining ground more quickly due to unpredictable commodity markets, the current financial crisis and the arrival of a President-elect in the United States who intends to put clean energy and greenhouse gas (GHG) emissions controls on a fast track. At the same time, physical evidence is growing stronger that climate change is altering the global environment and that changes in consumer behavior must begin now to avoid bringing the climate to a dangerous tipping point.

New Sectors in the Spotlight

Given this rapidly changing landscape, it is particularly important to identify which companies are making climate change a transformational issue for their business – *across all industry sectors*. This report examines the corporate governance and strategic approaches to climate change of 63 of the world's largest consumer products and information technology companies in 11 industry sectors – apparel, beverages, big box retailers, grocery & drug retailers, personal & household goods, pharmaceuticals, real estate, restaurants, semiconductors, technology and travel & leisure.

While these companies represent a diverse group of industries – all with unique challenges in addressing climate impacts – they also share several important common characteristics. On the **operational** side, with manufacturing sites and vast real estate portfolios around the world, these companies are major energy consumers. Against this backdrop, energy conservation and efficiency measures are a first line of defense against rising energy costs and growing GHG emissions. At Wal-Mart, direct and indirect emissions from its massive global operations exceed 20 million tons a year – equivalent to a mid-sized power company.

These companies are also makers of leading brands that must build reputation and trust with their customers by demonstrating environmental commitment and by capturing growing opportunities to provide climate-friendly **products and services**. Tesco, for example, is already putting carbon footprint labels on many of its products and has quadrupled sales of energy efficient light bulbs in the past year. While the vast majority of consumers are still just beginning to change their buying patterns, emerging demand for product alternatives is transforming the marketplace and enhancing the role of companies with compelling “green” credentials. This trend extends beyond grocery stores and big box retailers to more unlikely industries, such as apparel and hotels, as well as technology companies that have made innovative product design a priority in introducing more energy-efficient computers and data centers.

Finally, for many companies the focus is on the large portion of their carbon footprints found in their **supply chains**. A case in point is Nike, whose extensive chain of footwear manufacturing sites accounts for 60 percent of its total carbon footprint. Because GHG emissions from raw materials, component suppliers and transportation of goods are difficult to measure and control, these companies cannot face the climate challenge alone; they must collaborate with one another and with suppliers. As one example, Coca-Cola and Molson Coors are implementing a common industry standard to measure product lifecycle emissions. Dell, Wal-Mart and several other companies are engaging directly with suppliers in China to ensure that GHG emissions are assessed and reported.

Ultimately, investors are looking to identify which companies have the best management systems in place to address climate risks before they become liabilities and which companies are finding

Investors are looking to identify which companies have the best management systems in place to address climate risks before they become liabilities.

competitive advantage by pursuing strategic opportunities in operational efficiencies, product development and supply chain management. While progress is being made – through green building construction and retrofits, deployment of smart technologies, innovative product design, better supplier engagement and logistical planning – the scale of climate change and its potential future costs cannot be ignored. The challenges ahead require much faster and more comprehensive responses from all sectors of the economy.

Key Findings

The 63 companies examined in this report all face climate- and energy-related challenges through their operations, products and supply chains. While all of the companies could do more to improve their governance responses, important progress is being made. Given the wide range of challenges and opportunities facing these 11 sectors, it is not surprising that their performance also varies (see the next section *How Companies were Scored* for details on how companies were evaluated). Among the report highlights:

- The **technology**, **pharmaceutical** and **semiconductor** sectors had the highest average climate governance scores (59, 57 and 56 points, respectively, out of 100 total possible points). While technology and semiconductor companies had particularly strong performance in product and service innovation, pharmaceutical firms also scored surprisingly well due to their strong governance structures.
- The **beverages** and **personal & household goods** sectors were relatively strong performers (averaging 43 and 40 points, respectively), which is noteworthy given their limited scope to adapt their products to address climate change opportunities. Nevertheless, leaders in the personal & household goods sector are beginning to introduce more green products, and the beverages sector is also starting to adjust its operations as climate risks to water and agricultural raw materials come to light.
- The **apparel** sector, **grocery & drug retailers** and **big box retailers** – all of which have large real estate carbon footprints – had lower average scoring results (35, 35 and 33 points, respectively). These sectors have yet to take full advantage of significant opportunities to maximize energy efficiency in their operations, market climate-friendly products and engage suppliers on emerging climate change standards. Still, each of these sectors includes at least one or two high-performing companies that stand out with regard to energy efficiency, product promotion and supply chain management.
- The **travel & leisure**, **real estate** and **restaurant sectors** (averaging 27, 27 and 17 points, respectively) had the lowest average scores among the sectors reviewed. This finding is particularly surprising, given that hotels, cruise lines, restaurants and property managers have extensive real estate portfolios that could be taking advantage of more energy efficient opportunities. These companies could also be making more concerted consumer appeals about their green strategies and climate mitigation efforts. Real estate developers and property managers, in particular, need to examine the environmental impact of their buildings, which account indirectly for upwards of 40 percent of US GHG emissions. It is also worth noting that while some companies in each of these sectors are pursuing green building initiatives, they are often doing so for only select or flagship properties, rather than throughout their full portfolios, where even greater savings could be attained. These companies also had generally weak governance structures, management leadership and public disclosure on climate-related issues.

Governance Leaders

Coca-Cola
Dell
Ecolab
IBM
Intel
Johnson & Johnson
Nike
Tesco

Climate Change Governance: Corporate governance is critically important in determining how companies are responding to climate change. Companies that integrate climate change into their board and executive structures, as well as their public reporting mechanisms, are far more likely to maintain the long-term commitment and comprehensive approaches needed to effectively address climate change risks and opportunities across their entire business structure.

- Only 15 of the 63 companies examined in this report have tasked board-level committees with environmental oversight, and only 11 companies specifically state that their board receives climate-specific updates from management.
- Only seven of the CEOs among the 63 firms reviewed have taken leadership roles on environment and climate change initiatives.
- None of these companies has taken the added step of linking C-suite executive compensation directly to progress on climate change initiatives.
- However, climate change issues are increasingly becoming a part of corporate annual reporting; two-thirds of the companies evaluated mention climate change in their annual report to shareholders. Sixteen companies also discuss climate change in their most recent securities filings.
- More than 60 percent of the companies evaluated have conducted a GHG emissions inventory. This is an essential step in developing strategies and evaluating progress in controlling GHG emissions in a company's operations, products and supply chain.

Operations Leaders

Coca-Cola
Dell
IBM
Johnson & Johnson
Marriott International
Sun Microsystems
Tesco
Wal-Mart

Operations: Energy efficiency is critical to a successful emissions reduction strategy, especially for the high energy-consuming companies evaluated in this report. For most companies this begins with their operations, where they have full control and can reap the benefits of reduced energy bills and lower operating costs.

- All but three companies reviewed have addressed their energy consumption practices in some way through building design or retrofits, process energy efficiency, equipment upgrades, facilities management and employee incentives.
- Yet only a half-dozen companies have prioritized capital allocation for energy efficiency projects by establishing dedicated funds, relaxing the normal requirements for return on investment or mandating an energy efficiency evaluation for projects above a certain cost threshold.

Products & Services Leaders

Applied Materials
IBM
Intel
Tesco
Wal-Mart

Products and Services: Climate-related product strategies vary by sector, although 30 percent of the companies reviewed, including at least one company in every sector, have identified climate change-related commercial opportunities for their products or services.

- Companies in the **technology** and **semiconductor** sectors have been the most active in the area of energy efficient product design, while a few **big box and grocery retailers** have assumed a lead role in energy efficient or climate friendly product promotion and sales.
- Two companies in the **pharmaceutical** sector are addressing the unique challenge of reducing non-carbon dioxide GHG emissions in their health care products. The emissions from consumer use of these pharmaceutical products account for a considerable portion of their GHG footprint, up to two-thirds of one firm's estimated total emissions. **Semiconductor** manufacturers and **beverage makers** are also addressing the challenge of reducing other greenhouse gases, such as hydrofluorocarbons and chlorofluorocarbons that are significantly more potent GHGs than CO₂, from their operations.

Supply Chain: For many large companies, GHG emissions embedded upstream in their supply chains account for the largest portion of their total carbon footprint. As investors and consumers increasingly look to evaluate companies' full life-cycle carbon exposures, supply chain reporting and management is becoming increasingly relevant for evaluation purposes.

- Only three companies in this report have included supply chain GHG emissions – emissions that result from raw material extraction, modification, transport, storage and packaging—in their emissions inventories. Ten others report that are beginning to measure the GHG emissions associated with their supply chain.
- Many more companies are taking some action to minimize their supply chain emissions, however. Approximately one-third are boosting their engagement with key suppliers, improving logistics or switching to alternate forms of transport. Some are also using life-cycle analyses to establish controls on supply chain GHG emissions.

Supply Chain Leaders

Carrefour
Dell
Hennes & Mauritz (H&M)
Hewlett-Packard
IBM
Molson Coors
Nike
Tesco
Wal-Mart

Overall, this report finds that consumer and technology companies are beginning to address climate risks more proactively, reduce operational emissions and seize new product and service opportunities. The leaders across all sectors are thinking creatively about how to transform their business models to meet changing customer preferences. However, much more needs to be done to strengthen governance of climate change issues, set and meet aggressive emission reduction targets and measure full supply chain GHG emissions to address the realities of a carbon-constrained world.

How Companies Were Selected

The sectors reviewed in this report were selected to highlight the climate change risks and opportunities facing firms that are relatively large energy and electricity consumers but are not likely to be directly regulated by most climate change legislation aimed at direct GHG emitters. At the same time, these leading brands are also under pressure to relate to customers and suppliers who are becoming increasingly conscious of climate change and energy concerns.

The 63 companies in this report are categorized into 11 sectors: **apparel, beverages, big box retailers, grocery & drug retailers, personal & household goods, pharmaceuticals, real estate, restaurants, semiconductors, technology and travel & leisure.** Within each sector, companies were selected based on market capitalization (as of May 2008) and annual revenue. Most sectors are represented by either five or six companies; however, big box retailers (nine companies) and technology (seven companies) were expanded to include major brand names that may be of particular interest to investors as well as consumers.

To analyze these companies, information was gathered and reviewed from securities filings, corporate reports, corporate websites, media accounts and third-party questionnaires, including the Carbon Disclosure Project. Each of the 63 companies was given the opportunity to comment on the draft profiles and 48 companies offered comments.

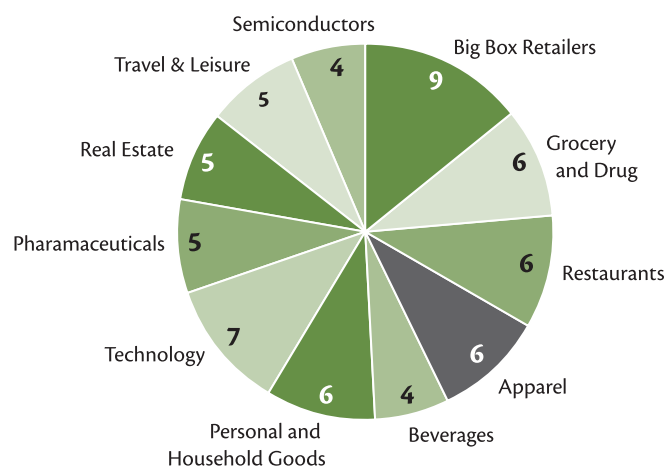


Exhibit 1: Sector Breakdown of Companies

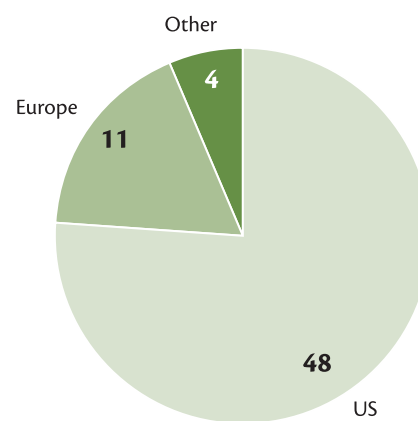


Exhibit 2: Regional Breakdown of Companies

How Companies Were Scored

RiskMetrics Group, in consultation with Ceres and the Investor Network on Climate Risk (INCR), developed the Climate Change Governance Framework in 2003 to analyze corporate responses to climate change. Three previous reports written by RiskMetrics for Ceres and INCR used the Framework as a guideline in scoring companies: *Corporate Governance and Climate Change: Making the Connection* (published in 2003 and updated in 2006) and *Corporate Governance and Climate Change: The Banking Sector* (published in January 2008).

The Framework uses five main areas to evaluate corporate climate change strategies: **board of director oversight; management execution; public disclosure; emissions accounting; and strategic planning and performance**. Within each of these areas, many sub-factors are evaluated to produce a final, scored assessment of corporate responses to address climate change.

The Climate Change Governance Framework is designed to be flexible so it can be applied to a broad range of industries. It can be adapted in terms of weightings and specific areas of analysis to reflect the particular circumstances of an industry. Regardless of industry sector, geographic location or size, the Framework assumes that all companies have an opportunity to manage climate impact through good governance.

Ceres/RiskMetrics Climate Change Governance Framework		
Board Oversight		Weight
1	Board has explicit oversight responsibility for environmental affairs/climate change.	12%
2	Board conducts periodic review of climate change and monitors progress in implementing strategies.	
Management Execution		20%
3	Chairman/CEO clearly articulates company's views on climate change and GHG control measures.	
4	Executive officers are in key positions to monitor climate change and manage response strategies.	
5	Executive officers' compensation is linked to attainment of environmental goals and GHG targets.	
Public Disclosure		14%
6	Securities filings and/or MD&A identify material risks, opportunities posed by climate change.	
7	Public communications offer comprehensive, transparent presentation of response measures.	
Emissions Accounting		16%
8	Company conducts annual inventory of direct and indirect GHG emissions and publicly reports results.	
9	Company has set an emissions baseline by which to gauge future GHG emissions trends.	
10	Company has third party verification process for GHG emissions data.	
Strategic Planning & Performance*		38%
11	Company sets aggressive absolute GHG emission reduction targets for facilities, energy use, business travel, and other operations, and achieves these targets on schedule.	
12	Company has implemented company-wide programs to improve the energy efficiency of its operations.	
13	Company currently purchases renewable energy for a significant portion of its energy use and has set targets to increase future renewable energy purchases.	
14	Company pursues strategies to maximize opportunities from product and service offerings related to climate change.	
15	Company has assessed supply chain GHG emissions, engaged with suppliers on controlling emissions, addressed climate impacts of materials/packaging and improved logistics to reduce emissions.	

* Indicators adjusted from Climate Change Governance Framework to reflect focus on energy efficiency, renewable energy, products and services, and supply chain management.

Since the 11 sectors reviewed for this report face different challenges and opportunities to mitigate climate change impact, weights were adjusted by industry sector for the final Strategic Planning & Performance section. It is assumed that companies across all sectors can be addressing climate risks equally through board oversight, management execution, public disclosure and emissions accounting. Likewise, within the Strategic Planning & Performance section scores were weighted equally for setting emissions reduction targets and investing in renewable energy. However, the weights for three of the five themes in this section — Energy Efficiency, Products & Services and Supply Chain Management - vary by sector to acknowledge different sector impacts and opportunities.

For instance, **technology**, **semiconductors** and **real estate** have significant climate impact through end-use of their products. Therefore, Products & Services are emphasized for all three of these sectors (particularly for the real estate sector). In addition, sectors with significant climate impact in their supply chains—such as **big box retailers** and **grocery and drug retailers**—were evaluated with a greater emphasis on Supply Chain Management. Energy Efficiency was weighted more heavily for sectors with large real estate footprints. Due to these variations, comparative analysis of sector peers may be more useful than comparison of companies across different sectors.

To generate a total score, each of the five sections of the overall Climate Change Governance Framework has been assigned a percentage weight. Raw section scores were divided by the number of total possible points for that section to produce a normalized section score, which were then aggregated to generate a final score on a 0 to 100-point scale.

Checkmarks Indicate Emphasis for Variable Section Scores

Industry Sector	Key Climate Change Considerations	Energy Efficiency	Products & Services	Supply Chain Management
Apparel	<ul style="list-style-type: none"> • Energy efficiency of stores • Raw material production/sourcing 	✓		✓
Beverages	<ul style="list-style-type: none"> • Energy efficiency of manufacturing • Agricultural disruptions • Water supply and quality 	✓		✓
Big Box Retailers	<ul style="list-style-type: none"> • Energy efficiency of stores • Transport and logistics costs • Carbon labeling of products 	✓	✓	✓
Grocery & Drug Retailers	<ul style="list-style-type: none"> • Energy efficiency of stores • Transport and logistics costs • Carbon labeling of products 	✓	✓	✓
Personal & Household Goods	<ul style="list-style-type: none"> • Energy efficiency of manufacturing • Raw material sourcing • Demand for climate-friendly products 	✓	✓	✓
Pharmaceuticals	<ul style="list-style-type: none"> • Energy efficiency of manufacturing • Product distribution 	✓		✓
Real Estate	<ul style="list-style-type: none"> • Building portfolio energy efficiency 		✓	
Restaurants	<ul style="list-style-type: none"> • Energy efficiency of buildings • Supply chain management 	✓		✓
Semiconductors	<ul style="list-style-type: none"> • PFC emissions in manufacturing • Water supply and quality • Demand for new products – solar cells 	✓	✓	
Technology	<ul style="list-style-type: none"> • Energy efficiency of products • Energy efficiency of manufacturing/offices 	✓	✓	
Travel & Leisure	<ul style="list-style-type: none"> • Energy efficiency of hotels/cruise ships • Supply chain management • Changing customer preferences 	✓		✓

COMPANY SCORES – OVERALL RANKING

Company	Score	Company	Score
International Business Machines Corp.	79	Simon Property Group, Inc.	38
Tesco plc	78	CB Richard Ellis Group, Inc.	37
Dell Inc.	77	Target Corp.	37
Intel Corp.	72	Best Buy Co., Inc.	36
Johnson & Johnson	71	The Gap Inc.	34
NIKE, Inc.	71	Apple Inc.	28
Wal-Mart Stores, Inc.	69	adidas AG	28
Applied Materials, Inc.	67	Texas Instruments Inc.	28
The Coca-Cola Company	65	Brookfield Asset Management Inc.	27
Sun Microsystems, Inc.	63	Avon Products, Inc.	27
Hewlett-Packard Company	62	Whole Foods Market, Inc.	27
Molson Coors Brewing Company	58	McDonald's Corp.	26
GlaxoSmithKline plc	57	Limited Brands, Inc.	25
Taiwan Semiconductor Mfg. Co. Ltd.	56	The Estee Lauder Companies Inc.	24
Novartis AG	56	The Kroger Co.	23
Cisco Systems, Inc.	55	Walgreen Company	21
Hennes & Mauritz AB (H&M)	54	Starwood Hotels & Resorts Worldwide, Inc.	18
L'Oréal	54	Lowe's Companies, Inc.	17
Marriott International, Inc.	53	General Growth Properties, Inc.	16
Starbucks Corp.	52	Boston Properties, Inc.	16
Carrefour SA	52	The Home Depot, Inc.	15
Colgate-Palmolive Company	52	Costco Wholesale Corp	14
Canon Inc.	52	MGM MIRAGE	14
Pfizer Inc.	50	CVS Caremark Corp	12
Roche Holding Ltd.	49	Bed Bath & Beyond Inc.	10
Safeway Inc.	48	Darden Restaurants, Inc.	8
Diageo plc	48	Yum! Brands, Inc.	8
Ecolab Inc.	45	Las Vegas Sands Corp.	7
Carnival Corp.	44	Burger King Holdings, Inc.	6
Staples, Inc.	43	Tim Hortons Inc.	4
The Procter & Gamble Company	42	Abercrombie & Fitch Co.	0
Anheuser-Busch InBev	38		

Company Scores – By Industry Sector

Apparel	NIKE, Inc.	71	Household & Personal Goods	L'Oréal	54	Restaurants	Starbucks Corp.	52
	Hennes & Mauritz AB (H&M)	54		Colgate-Palmolive Company	52		McDonald's Corp.	26
	The Gap Inc.	34		Ecolab Inc.	45		Darden Restaurants, Inc.	8
	adidas AG	28		The Procter & Gamble Company	42		Yum! Brands, Inc.	8
	Limited Brands, Inc.	25		Avon Products, Inc.	27		Burger King Holdings, Inc.	6
	Abercrombie & Fitch Co.	0		The Estee Lauder Companies Inc.	24		Tim Hortons Inc.	4
Big Box Retailers	Wal-Mart Stores, Inc.	69	Beverages	The Coca-Cola Company	65	Semiconductors	Intel Corp.	72
	Carrefour SA	52		Molson Coors Brewing Company	58		Applied Materials, Inc.	67
	Staples, Inc.	43		Diageo plc	48		Taiwan Semiconductor Mfg. Co. Ltd.	56
	Target Corp.	37		Anheuser-Busch InBev	38		Texas Instruments Inc.	28
	Best Buy Co., Inc.	36	Pharmaceuticals	Johnson & Johnson	71	Technology	International Business Machines Corp.	79
	Lowe's Companies, Inc.	17		GlaxoSmithKline plc	57		Dell Inc.	77
	The Home Depot, Inc.	15		Novartis AG	56		Sun Microsystems, Inc.	63
	Costco Wholesale Corp.	14		Pfizer Inc.	50		Hewlett-Packard Company	62
Grocery & Drug Retailers	Bed Bath & Beyond Inc.	10	Real Estate	Roche Holding Ltd.	49		Cisco Systems, Inc.	55
	Tesco plc	78		Simon Property Group, Inc.	38		Canon Inc.	52
	Safeway Inc.	48		CB Richard Ellis Group, Inc.	37		Apple Inc.	28
	Whole Foods Market, Inc.	27		Brookfield Asset Management Inc.	27	Travel & Leisure	Marriott International, Inc.	53
	The Kroger Co.	23	Real Estate	General Growth Properties, Inc.	16		Carnival Corp.	44
	Walgreen Company	21		Boston Properties, Inc.	16		Starwood Hotels & Resorts Worldwide, Inc.	18
	CVS Caremark Corp.	12					MGM MIRAGE	14
							Las Vegas Sands Corp.	7

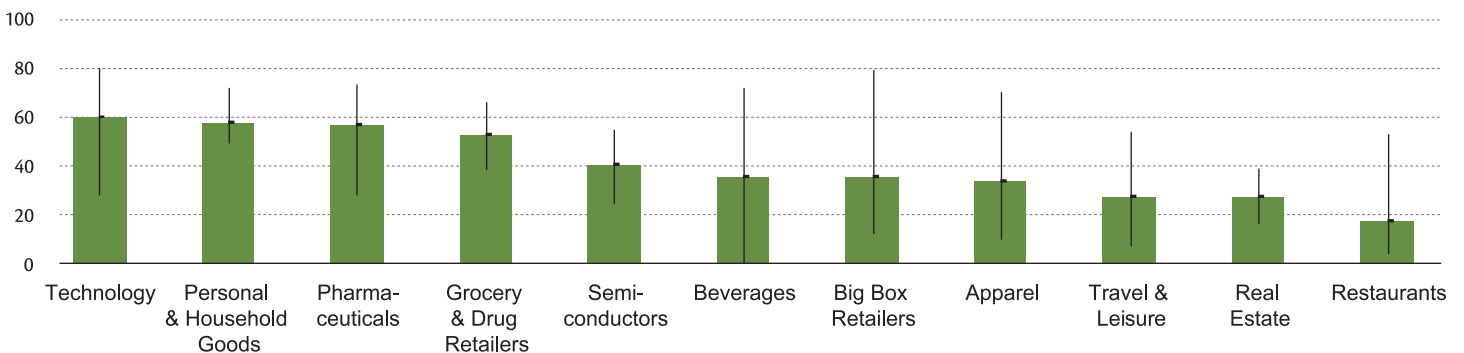


Exhibit 3: Average Scores and Ranges by Sector

Climate Change Governance Framework – Best Practices

Board Oversight

Board is actively engaged in climate change policy and has assigned oversight responsibility to board member, board committee or full board.

Nike's Corporate Responsibility Committee was established in 2001 to review significant policies and make recommendations regarding a wide range of corporate responsibility issues, including environmental and sustainability initiatives. The Committee meets three times each year to review strategies and plans for corporate responsibility, and either the Chairman or the CEO attends all meetings. In 2007, the Board of Directors also approved the company's new global corporate responsibility targets, which include GHG emissions reduction and climate neutrality goals.

Management Execution

Chairman/CEO assumes leadership role in articulating and executing climate change policy.

Applied Materials CEO Michael Splinter began chairing an internal steering committee on sustainability and climate change in 2007. Splinter was also a member of the steering board to the World Economic Forum's CEO Climate Policy Recommendations to the G8 Leaders, to which Applied Materials is a signatory.

Top executives and/or executive committees assigned to manage climate change response strategies.

Dell's Sustainability Council meets quarterly to review and approve strategies, monitor progress and address risk on all sustainability issues, including climate change. The Council is led by Dell's Corporate Sustainability Director and is represented by leaders from Dell's Product Group, Facilities and Manufacturing operations, Logistics, Services and Worldwide Procurement organizations. CEO Michael Dell also sits on the Council. Examples of topics recently reviewed include the company's carbon neutrality strategy and its multi-year plan to reduce the carbon intensity of its operations.

Executive officers' compensation is linked to attainment of environmental goals and GHG targets.

In 2008 every **Intel** employee will have a part of their bonus linked to environmental performance as measured by product energy efficiency, Intel's environmental reputation and specific projects and targets. Managers with specific responsibility for certain climate or energy goals have a larger portion of their remuneration tied to progress on such goals.

Public Disclosure

Securities filings and/or MD&A disclose material risks and opportunities posed by climate change.

Canon includes in the Environmental Regulations section of its 2007 Form 20-F a discussion of the Kyoto Protocol and Japan's commitment for emission reductions. In the Risk Factors section, Canon also states, "Canon is endeavoring to reduce carbon dioxide emissions by increasing its use of railroad transportation and ocean transportation to ship its products. Failure by Canon to meet its targets may adversely affect Canon's brand and image and its business."

Public communications offer comprehensive, transparent presentation of response measures.

In its Sustainability Report, **Johnson & Johnson** states that climate change is real and is a potential threat to human health. The report highlights GHG emissions reduction measures and discusses J&J's view on climate regulation in a question and answer format with Dennis Canavan, Senior Director of Global Energy. The company has responded to the Carbon Disclosure Project, and estimated the business impact of a 25, 50 or 100 percent increase in energy costs to its business. J&J is also a member of USCAP, and has engaged with government leaders on the US state, federal and international level in support of climate change regulation.

Climate Change Governance Framework – Best Practices (continued)

Emissions Accounting

Company conducts annual inventory of direct and indirect GHG emissions and publicly reports results.

Company has an emissions baseline by which to gauge future GHG emissions trends.

Company has third party verification process for GHG emissions data.

Carrefour began its GHG emissions inventory by examining the company's activity within the wider context of upstream production, transport of finished goods and downstream use and disposal of goods and services. The company has calculated Scope 1, Scope 2 and travel, logistics and products Scope 3 emissions. Carrefour's emissions inventory has also been externally verified by accounting firm KPMG.

Strategic Planning & Performance

Company sets aggressive absolute GHG emission reduction targets for facilities, energy use, business travel and other operations, and achieves these targets on schedule.

IBM has set a number of second generation GHG emission reduction goals after surpassing its original goal. The company's main goal is to reduce CO₂ emissions associated with energy use by 12 percent between 2005 and 2012. In addition, IBM has set a goal to complete energy conservation projects that would save, on an annual basis, the equivalent of 3.5 percent of that year's energy usage. Between 1990 and 2005, IBM reduced or avoided CO₂ emissions by an amount equivalent to 40 percent of its 1990 emissions. The company also achieved its initial US EPA Climate Leaders goal by reducing total global energy-related GHG emissions by an average of 6 percent per year and PFC emissions by 58 percent from 2000 to 2005.

Company has implemented company-wide programs to improve the energy efficiency of its operations.

Tesco plans to spend £500m over the next five years on initiatives to reduce the company's energy use. This year the company invested £86 million in energy-saving technology for its stores, including low-energy lighting, energy-efficient bakery ovens, wind turbines, combined heat and power (CHP), tri-generation and hanging curtains on freezer doors. Tesco has built energy efficient prototype stores in seven countries to "trial new leading-edge technology." In the UK, the company recently opened its fourth prototype, which achieves a 60 percent reduction in GHG emissions compared to the company's standard stores.

Company currently purchases renewable energy for a significant portion of its energy use and has set targets to increase future renewable energy purchases.

Safeway began its renewable energy program in 2005. The company is currently developing approximately two dozen solar projects across California. When complete the projects should provide approximately 7,500 MWh of solar energy per year, or 20 percent of those stores' annual electricity use. The company hopes to expand the solar program to supply 40 stores. In addition, Safeway has committed to purchase 90 million kWh of renewable wind energy in 2008. This is enough energy to power 100 percent of Safeway's more than 300 fuel stations, its corporate facilities and all of its San Francisco and Boulder stores. Safeway is also a member of the EPA Green Power Partnership Program.

Climate Change Governance Framework – Best Practices (continued)

Company pursues strategies to maximize opportunities from product and service offerings related to climate change.

Hewlett-Packard has worked on product energy efficiency since 1992, when the company launched its Design for Environment program. Today, HP is developing new IT solutions that can help reduce GHG emissions, and has categorized these solutions into three broad areas: Reduce, Substitute and Enable. HP has also developed technologies relating to solar energy and fuel cells that are available for licensing by other companies. In June 2008, HP announced that Xtreme Energetics, a solar energy system developer, will license HP's transparent transistor technology designed to generate electricity at twice the efficiency and half the cost of traditional solar panels.

Company has assessed supply chain GHG emissions, engaged with suppliers on controlling emissions, addressed climate impacts of materials/packaging and improved logistics to reduce emissions.

Dell has set expectations for its suppliers to manage, improve and report publicly on their GHG emissions as a consideration for awarding business. In addition, the company has set business requirements for its Tier 1 suppliers to publicly disclose their GHG emissions during Quarterly Business Reviews. In 2007, Dell hosted an Asia Climate Impact Supplier Summit in Taipei to educate its suppliers on the company's climate change strategies. Dell is also working through the Electronic Industry Citizenship Coalition (EICC) to develop a common approach for the electronics industry to measure emissions in the supply chain.

Key Findings: Climate Governance

Corporate governance is critically important in determining how companies respond to climate change. Emerging GHG emissions regulations, both in Europe and the United States, are elevating the material financial risks of climate change. As Europe debates a successor plan for the European Union Emissions Trading Scheme for post-2012, the election of President-Elect Barack Obama in the US has increased certainty of federal climate change legislation. Furthermore, emerging regional, state, and city-wide climate change legislation in the US is becoming a key driver for corporate action on climate change. The launch of the Regional Greenhouse Gas Initiative in the northeast US on September 25 paved the way for regional cap-and-trade schemes which will force companies to reduce GHG emissions regardless of national legislation.

This increase in climate change legislation—coupled with unprecedented consumer awareness on the issue and a growing demand for improved corporate performance on climate change—is in turn prompting companies to work toward product and process transformations that result in new and innovative ways of doing business. Companies at the leading edge of tackling climate change are embedding environmental considerations into their capital planning, employee recruitment and incentive structures, and making this a core part of their reputation and brand strategies. Successful companies are seeing gains in resource and supply chain efficiency, employee retention, customer loyalty and bottom-line returns.

Companies at the leading edge of tackling climate change are embedding environmental considerations into their capital planning, employee recruitment and incentive structures.

As discussed in the previous section (How Companies Are Scored), this report utilizes a *Climate Change Governance Framework*, developed by RiskMetrics and Ceres, to rate companies' overall governance and performance on climate change on a 100-point scale. **The Board Oversight, Management Execution and Public Disclosure sections of this Framework particularly address corporate governance issues and make up 46 percent of a company's total possible score.** The remaining two sections, Emissions Accounting and Strategic Planning & Performance, are more performance-oriented and hold a slightly heavier weight (54 percent). Accordingly, a company cannot score well without having a good governance strategy in place, as this heightens the prospects that energy efficiency and GHG reduction targets will be met. In other words, good climate governance is key to an effective corporate climate change strategy; companies who integrate climate change into their board and executive structures, as well as their reporting mechanisms, are more likely maintain long term commitment and take the comprehensive approach needed to effectively implement a strong climate change strategy.

Board Oversight

Because the companies analyzed in this report are in sectors that do not produce large amounts of direct (Scope 1) GHG emissions, they are not as likely to have established board-level oversight structures for climate change as large GHG emitters, such as utilities and other heavy industries examined in the 2006 edition of *Corporate Governance and Climate Change: Making the Connection*. Nevertheless, involvement of the board of directors is an essential element of sound corporate governance on climate change. Assigning a board member or committee to oversee climate change risks and strategies signals a company's strong commitment to the issue and increases the likelihood of a proactive response to the potential regulatory, financial, reputation and legal risks posed by climate change as well as the potential business opportunities.

This report's examination of 63 companies finds:

- Fifteen companies have a board committee that is responsible for oversight of general environmental affairs;
- Eleven companies report that their boards receive periodic reports from management on climate-related issues and are regularly reviewing associated company policies;
- Eight companies have identified a board-level committee or member with specific climate change oversight responsibilities (these are often corporate responsibility, nominating and governance, public policy or audit committees);
- No companies say their boards have conducted independent reviews of comprehensive climate risks. Similarly, none of the companies have offered training for their boards on climate change or overall sustainability issues.

Yet there still are a few companies with relatively active boards. Not surprisingly, some of the highest scorers in this study were those with board-level oversight of climate change issues.

- **Nike's** board-level Corporate Responsibility Committee, established in 2001, meets three times a year to review corporate responsibility and environmental strategies and plans. In 2007, the board of directors also approved Nike's new GHG emissions reduction and climate neutrality goals.
- **IBM's** Directors and Corporate Governance Committee, formed in 1993, reviews the company's energy conservation and climate protection goals and performance annually. The full board of directors also receives an annual report on these issues.

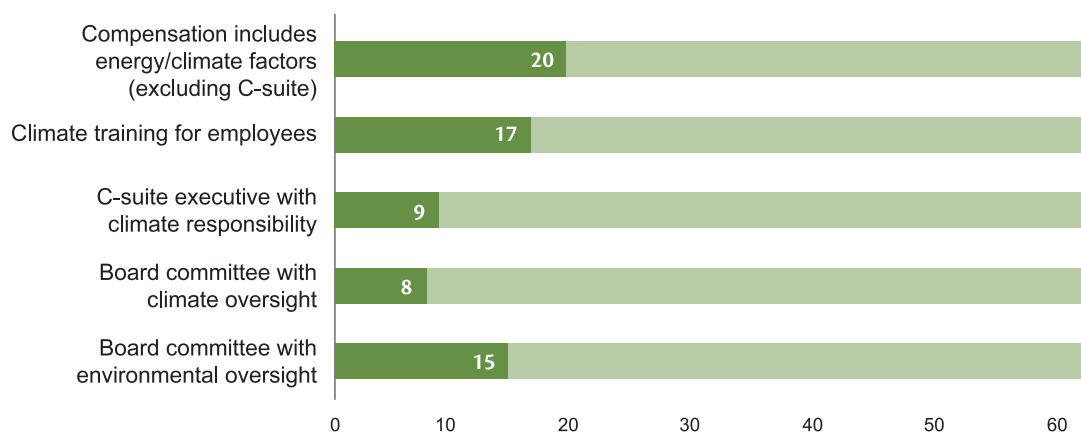


Exhibit 4: Key Performance Indicators of Climate Change Governance

Management Execution

CEO leadership: For many of the leading companies analyzed in this report, commitment to climate change comes from the top. Since climate change risks and opportunities are increasingly viewed as connected to all elements of a business – from operations and product design to supply chain management – it is important that companies align their strategies and develop incentive mechanisms to maximize employee involvement across departments. Often this company-wide strategy is set by the chief executive officer. Some CEOs have taken on climate change as a personal priority and driven change throughout their companies and industry sectors.

One prominent example of CEO leadership on climate change is Tesco's CEO Sir Terry Leahy. In February 2008, Sir Terry Leahy announced the company's commitment to emissions reduction as a key component to the company's overall business goals, stating: "Our work to deliver sustainable consumption is not some add-on extra...Cutting carbon emissions is now locked into our business strategy." **Nike** CEO Mark Parker has also framed climate change as a key business strategy, stating that "tackling climate change is a catalyst for growth and innovation" in the company. Parker has driven internal policies and written to the US Congress in support of climate change legislation. Several other CEOs of companies examined in this report head sustainability or corporate responsibility committees:

"Our work to deliver sustainable consumption is not some add-on extra...Cutting carbon emissions is now locked into our business strategy."

— Tesco's CEO Sir Terry Leahy

- **Dell** CEO Michael Dell sits on the company's Sustainability Council;
- **Starbucks'** CEO Howard Schultz heads its CSR Executive Committee;
- **Diageo** CEO Paul Walsh is chair of the company's Corporate Citizenship Committee;
- **L'Oreal** CEO Jean-Paul Agon chairs an Executive Sustainable Development Committee;
- **Applied Materials** CEO Michael Splinter chairs an internal steering committee on sustainability and climate change.

Integrated management: Another growing trend among companies is for senior managers to integrate climate change across business functions to allow for a more comprehensive approach to the issue. Whereas in the past climate change matters were often delegated to potentially silo-prone environmental affairs or corporate social responsibility units, today an increasing number of companies are pushing responsibility down through all of their lines of business. Fourteen companies say they have achieved a fully integrated management approach in their climate change strategies, and nine companies have identified a C-suite level executive with ultimate responsibility for climate-related affairs.

For example:

- **Dell's** Sustainability Council, which addresses climate change, includes leaders from the company's Product Group, Facilities and Manufacturing operations, Logistics, Services and Worldwide Procurement organizations.
- **Cisco** formed an EcoBoard in 2007, a cross-functional, executive-level body responsible for its environmental and climate change vision and strategy with representatives from 14 key business units. This is complemented by a Green Task Force that manages implementation and progress monitoring.

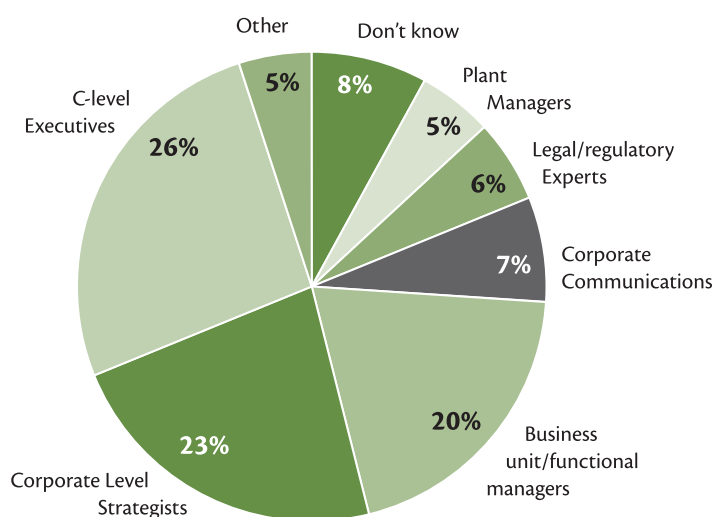


Exhibit 5: McKinsey Global Survey: Climate Change Responsibility

2,192 global executives answered the question: "Which group of managers has the most responsibility for ensuring that climate change is taken into consideration?"

Source: How Companies Think About Climate Change: A McKinsey Global Survey, February 2008

Employee engagement: Companies are also reaching out across all levels of employees to encourage more environmentally friendly behavior and tap into the green ideas of these large pools of talent. For employees who feel passionate about the environment, these opportunities can increase job satisfaction, allowing employees to contribute to company strategy on a larger scale. Engaging employees in environmental initiatives can also help to give companies a leg up in attracting and retaining a talented employee base. A 2007 survey by employment website MonsterTRAK found that 80 percent of young workers surveyed are interested in a job that has a positive impact on the environment and 92 percent would choose to work for an environmentally friendly company.¹

Employee involvement strategies now go beyond basic intranet sites and personal carbon footprint calculators to more focused employee education programs. Some companies, like **Tesco**, are identifying specific employees to serve as “green champions” in each office or factory; other companies are conducting intensive trainings for all employees. **Taiwan Semiconductor Manufacturing**, for example, hosted 16 hours of professional lectures on climate and environmental issues by external speakers in 2007. **Best Buy** has implemented extensive US EPA ENERGY STAR employee training programs across the US, which earned the company the ENERGY STAR Excellence in Appliance Retailing Award in 2008. Altogether, 17 companies in this study are offering climate change-specific training and education to employees.

Compensation incentives: One of the most effective ways to engage both line-level employees and senior managers is to link climate-related goals directly to compensation. This study finds that 20 companies have factored energy and/or climate change performance into employee compensation at some level, mostly for facilities managers and EHS professionals. While this is a step in the right direction, no company in this study reported to explicitly link the CEO or other C-level executive compensation to climate change goals. However, **Intel** did include environmental performance (as measured by product energy efficiency) in the bonuses of all employees for 2008. The true test will be whether or not companies take the important step of linking the company’s largest compensation packages – those of the CEO and other senior executives – to GHG emissions reduction targets or other measures of climate change performance. More detailed reporting on the integration of environmental performance into incentive structures will also help to build investor confidence in a company’s ability and commitment to address climate change risks and opportunities.

No company in this study explicitly links the CEO or other C-level executive compensation to climate change goals.

Public Disclosure

How companies communicate with investors and stakeholders about their climate change and energy efficiency programs is vitally important from a governance standpoint. Disclosure on the material risks of climate change is of growing interest to investors, and pressure is mounting to compel more routine disclosure in securities filings. In September 2007, members of the Investor Network on Climate Risk, a \$7 trillion coalition of investors coordinated by Ceres, sent a petition to the US Securities and Exchange Commission asking that it require publicly held companies to assess and fully disclose their material financial risks and opportunities from climate change. The petition was submitted by a group of investors with \$1.5 trillion in assets along with Ceres and several other nonprofit organizations. In response to the petition, US Senator Jack Reed (D-RI) convened a Congressional hearing last winter on the role of the SEC in addressing climate change. While the SEC has not acted on these requests, in July 2008 the Senate Appropriations Committee approved language in the Financial Services Appropriations bill calling on the SEC to issue new guidance on climate-related disclosures.

1. Odell, Anne Moore. “Working for the Earth: Green Companies and Green Jobs Attract Employees.” SocialFunds.com, October 17, 2007.

Our marketplace cannot properly function, our retirees' pensions cannot be protected, unless investors' right to know is fully enforced. We're asking the SEC to vindicate that right so investors can ensure their portfolios reflect the risks and benefits related to climate change.

— California State Treasurer Bill Lockyer, a board member of both California's Public Employees' Retirement System (CalPERS) and State Teachers' Retirement System (CalSTRS)

The INCR initiative for mandated climate change disclosure by the SEC is reflective of a broader trend of growing investor interest in climate change. Long-term investors are realizing the significant implications climate change may have on their portfolios, and are seeking further information from companies about their preparedness to address climate risks and opportunities. Investors are beginning to use this information to inform their investment decisions, as they reassess their portfolios to uncover hidden risks and identify industry leaders who are ahead of the curve in addressing climate change.

Companies have many outlets available to them to discuss climate change, including annual reports, sustainability reports, corporate websites and securities filings, as well as external reporting mechanisms, such as the Carbon Disclosure Project.

Annual reports and securities filings: While this study finds a growing number of companies including climate change information in their annual reporting to shareholders, the majority of this disclosure highlights internal carbon mitigation programs or commercial opportunities but does not discuss potential climate-related risks. Furthermore, while two-thirds of companies in this study mention climate change in their annual reports, just 16 discuss climate change in their most recent annual securities filings (Forms 10-K or 20-F). Even among these 16, mentions of climate change are often in the context of addressing general environmental risks or again highlighting commercial opportunities, with little discussion of material risk. More robust disclosures in recent securities filings include the following:

- **Canon** stated in the Risk Factors section of the company's 2007 Form 20-F that the company is "endeavoring to reduce carbon dioxide emissions by increasing its use of railroad transportation and ocean transportation to ship its products. Failure by Canon to meet its targets may adversely affect Canon's brand and image and its business."
- **General Growth Properties** stated in its 2007 Form 10-K that its coastal properties could be vulnerable to sea level rise as well as increased hurricane and storm activity resulting from climate change.

Carbon Disclosure Project: Many companies are asked to fill out an annual questionnaire from the Carbon Disclosure Project, which has backing from 385 institutional investors with \$57 trillion in assets under management. Forty-two companies analyzed in this report provided a public response to the most recent CDP questionnaire, with results issued in September 2008 (two companies included in this study were not part of the survey universe). Of these 42 respondents, 33 provided details on their exposure to regulatory, physical or other risks related to climate change.

Given the predominance of US companies in this study, many of their discussions centered on the merits of alternative regulatory proposals under consideration at the federal level, such as cap-and-trade allocation schemes vs. carbon taxes, and how this might affect their costs of energy.

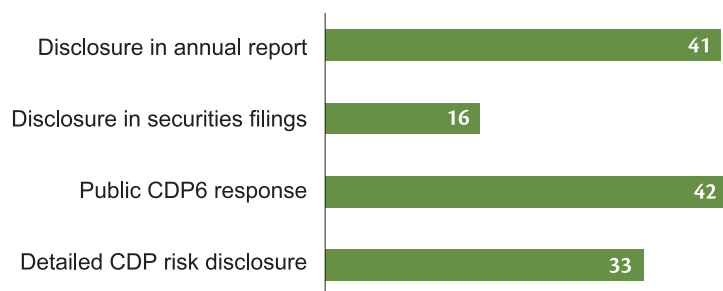


Exhibit 6:
**Securities Filings Disclosure Still Lags
Behind Other Forms of Reporting**

Others described how the physical impacts of climate change, such as changing weather patterns, might affect their supply chains and customer preferences. **Molson Coors** went so far as to identify specific physical risks for individual corporate locations, such as its Golden facility in Colorado, which is dependent on mountain snow pack for process water, and its Burton brewery in the United Kingdom, which has been subject to flooding risk due to recent record rainfall in the region.

Translating climate change performance metrics into meaning and accessible indicators for investors can be a real challenge, but several companies are headed in this direction.

Real-time reporting: More investors are seeking sustainability reporting from companies in line with quarterly financial reporting or even real-time reporting. Translating climate change performance metrics into meaningful and accessible indicators for investors can be a real challenge, and it is important for companies to be clear about the assumptions they use as part of real time data modeling. **Dell** has an energy savings meter displayed on its Dell Earth website that calculates in real time CO₂ emissions avoided and customer dollar savings generated by the company's new OptiPlex desktop systems with Energy Smart settings. **Anheuser-Busch InBev** recently launched an Ecological Meter on its website to present "eco indicators," such as volume of recycled water and rates of solid waste reuse, in real time. These metrics can be monitored minute by minute or over longer periods of time. Such metrics could be extended to GHG emissions.

Public Policy Support

In addition to making disclosures on their own climate change strategies, companies also need to be transparent about their views on climate change regulatory action and what kinds of policies and regulations they support. Even companies that are not themselves large GHG emitters may be subject to rising energy costs as a result of such legislation. Others may be subject to increasingly stringent energy efficiency standards for buildings and products, while renewable portfolio standards that require electric utilities to add more alternative energy to their portfolio could raise end-user energy costs.

Europe is ahead of the United States in this respect. The debate there now centers on how to shape the future of the European Union's emissions reduction and renewable energy goals for 2020. Many corporate leaders in Europe are questioning whether Europe can maintain its commitments under the Kyoto Protocol, particularly since the onset of the credit crisis. They are also looking ahead to the post-2012 Kyoto negotiations and whether a deal can be struck at a meeting to be held in Copenhagen in December 2009. Several European companies in this report are taking active policy engagement roles:

- **Tesco** is working with the European Commission and European Parliament on policy development for climate-related issues such as carbon-labeling. According to Tesco, "Business taxes and incentives must be redirected from a high-carbon to a low-carbon economy, with a greater focus on promoting demonstration, early deployment and development of low carbon technologies."
- **adidas** has cooperated with government institutions such as the German National Environmental Agency for a project to harmonize and define CO₂ calculation systems across Europe. In November 2007, adidas signed the Bali Communiqué calling for a comprehensive, legally-binding United Nations framework to tackle climate change (other signatories include **Coca-Cola, Sun Microsystems, Nike, Johnson & Johnson, L'Oréal, Diageo, and Hewlett-Packard**).

In the US, all eyes are on what actions the next US Congress might take under the leadership of President-elect Barack Obama, who supports substantial reductions in US and global GHG emissions. For many US companies, federal climate change legislation would be welcome news; current state and local mandates have created a complex patchwork of climate change regulatory policy. Most

important is the establishment of a common market price for carbon emissions that will provide increased confidence in long-term investment decisions. With the economic downturn companies are also more vocally supporting clean tech investment and green job creation.

US companies that have also been particularly active in supporting climate legislation include:

- **Cisco** actively supported the data center energy efficiency and smart grid provisions, which passed in the US Energy Independence and Security Act of 2007, through its membership in the Information Technology Industry Council, the Green Grid and the GridWise Alliance.
- **Johnson & Johnson** has written numerous letters to the US Congress in support of the Federal Production Tax Credit for Renewable Energy and the Lieberman-Warner Climate Security Act. The company also wrote to European Union President José Manuel Barroso expressing support for the European Energy Strategy, and it signed the Bali Communiqué in December 2007.
- **Wal-Mart** executives testified before the US Senate on two occasions, in April 2006 and May 2007, to advocate for a well-designed federal cap-and-trade system. The company has also advocated for involving consumers as part of an eventual regulatory solution and said in a letter to the US Senate in June 2008, “Retailers often have the greatest impact on consumer choice through promotion, display and, of course, pricing.”

GHG Emissions Inventories

As the United States and its global trading partners move closer to binding controls on GHG emissions, it is becoming increasingly vital for companies to begin inventorying emissions associated with their operations. Forty companies in this study are already tracking and reporting their Scope 1 (direct) emissions and Scope 2 (purchased energy) emissions. Thirty-seven of these companies are using an international standard for emissions accounting—typically the World Resources Institute and the World Business Council for Sustainable Development’s GHG Protocol. It is important to note, however, that a number of companies are continuing to use various methodologies for calculating and measuring GHG emissions, so comparability of inventories remains a challenge. Some companies exclude certain regions or facilities from their inventories, while others make estimates based on country-level electricity use figures.

Not only is developing an emissions inventory a critical step in implementing a GHG emissions reduction strategy, but publicly disclosing this inventory is equally important. In the US, there remains little doubt that a cap-and-trade system for carbon emissions will be implemented in the next few

New Initiatives: The Business for Innovative Climate and Energy Policy

In November 2008, President-elect Barack Obama renewed his promise to make climate change a chief priority for his administration, promising aggressive targets to cut GHG emissions. As the question shifts away from whether or not the US will adopt legislation to how this regulation will shape up, companies across all sectors of the economy are weighing in. On November 19, 2008, five US companies joined with Ceres to launch The Business for Innovative Climate and Energy Policy (BICEP), a new business coalition calling for strong US climate and energy legislation in early 2009 to spur the clean energy economy and reduce GHG emissions. The coalition, whose founding members include **Nike**, **Sun Microsystems**, and **Starbucks**, are promoting policy recommendations based on a set of eight energy and climate principles:

- set short- and long-term greenhouse gas reduction targets;
- stimulate ‘green’ job growth;
- adopt a national renewable portfolio standard;
- capture vast energy efficiency opportunities;
- boost investment in renewable energy, energy efficiency and carbon capture and storage technologies;
- establish cap-and-trade system with 100% auction of carbon allowances;
- encourage transportation for clean energy economy; and
- limit construction of new coal plants to those that capture and store CO₂.

The coalition’s goal is to work directly with key allies in the business community and members of Congress to pass meaningful energy and climate change legislation consistent with these eight core principles.

Spotlight on External Verification of Emissions Inventories

The range of options for auditing a GHG emissions inventory can be dizzying. Beyond official emissions registries and voluntary government programs, several private-sector players are involved in this growing business. Large accounting firms and specialist environmental consultancies are building up expertise in this area. Many companies also have their inventories checked through the International Organization for Standardization's ISO 14001 for environmental management systems or ISO 14064 for GHG emission quantification and reporting.

Today, verification methods vary from reviewing utility bills provided by the company to on-site reviews of how inventory data is being collected. An audit may cover corporate or facility-level data. In general, there has been a trend over the past several years from more customized verification processes to standardized and mandatory methods.

One option is to have an inventory verified as part of a mandatory or voluntary emissions trading scheme. In Europe, the EU ETS requires emissions verification for covered industrial sites. In the US, companies that sign up for voluntary targets as members of the Chicago Climate Exchange have their inventories audited by the Financial Industry Regulatory Authority (FINRA). The audit involves selecting a sample of inventory data points and reviewing electricity billing data to verify that the bill data matches the submitted inventory data.

The US EPA Climate Leaders program provides technical assistance to member companies in order to complete and document emissions inventories. The program also performs desktop reviews of inventory data and risk-based on-site reviews to ensure that companies are implementing inventory management plans at the facility level.

SGS Group and Bureau Veritas are two of the largest standards and quality verification firms, both with specialized practices relating to climate change. Services are wide-ranging, but as one example Bureau Veritas has worked with companies to establish audit protocols for facility energy management systems so that energy data is correctly reported.

Challenges remain in auditing some sources of corporate GHG emissions, such as through co-generation and shipping. This means that standards for how emissions inventories are verified are becoming increasingly important. Verifier accreditation processes have already been established in the United Kingdom and California. In April 2007, ISO launched a new standard, ISO 14065:2007 with requirements for use in accrediting or recognizing GHG verifiers. The International Auditing and Assurance Standards Board (IAASB) is also working on a standard for assurance of carbon emissions information.

years—and it won't be long before a company's GHG emissions turn up as regulatory costs on its balance sheets. In the absence of a formal GHG emissions registry in the US, investors are looking to companies to self-report their GHG emissions to help them gauge a company's preparedness for climate legislation.

The next challenge for companies with emissions inventories is to measure their Scope 3 emissions, which under the GHG Protocol include emissions from business travel, logistics, product use/disposal and a company's supply chain. Scope 3 emissions often comprise a significant portion of a company's total GHG footprint, but are also often the most difficult to measure.

Fifteen companies in this study report Scope 3 emissions from business travel only, while only five companies – **Apple, Canon, Carrefour, Diageo and GlaxoSmithKline** – provide data on emissions associated with the use and disposal of their products. But given that these companies are in a wide range of industries, it suggests that firms in most, if not all, sectors could calculate their product emissions eventually. Finally, only three companies are reporting supply chain inventories – **Canon, Diageo and Taiwan Semiconductor Manufacturing**. But these companies may be joined by more peers soon. Ten other companies – **Tesco, H&M, Nike, Coca-Cola, Molson Coors, Johnson and Johnson, Pfizer, IBM, Wal-Mart and Hewlett Packard** – report that they have begun to measure their supply chain emissions.

External verification of inventories is also becoming increasingly important, particularly as the prospect of climate legislation looms in the United States (see box). Of the 40 companies that have disclosed their GHG emissions, 29 also reported using an external auditor or government program to verify that inventory. A recent AccountAbility and Consumers International study found that 70 percent of respondents in the US and UK believe that corporate climate change reporting should be verified by independent parties.²

2. *Assure View: The CSR Assurance Statement Report*, CorporateRegister.com, July 2008.

Key Findings: Operations

A company’s first line of defense in combating climate change is typically its own operations. This study highlights a broad range of strategies that are being employed to control operational emissions — everything from setting emission reduction targets to retrofitting buildings and using information technology in new ways to improve energy efficiency. For the high energy-consuming companies evaluated in this report, energy efficiency is critical to a successful emissions reduction strategy. Leading companies recognize that energy efficiency programs offer solid investment returns, sustained operating results and opportunities for innovation and competitive advantage in a carbon-constrained world. In addition, many companies are investing in renewable energy through direct renewable energy purchases, on-site generation at stores and warehouses and support of research and development programs.

Setting Emission Reduction Targets

Setting targets to reduce GHG emissions is becoming a norm for corporate climate change strategies; roughly half of the 63 companies evaluated in this report have established quantitative emission reduction targets for their Scope 1 and 2—and occasionally even some Scope 3—GHG emissions. Many companies are even taking the extra step of setting both emissions and energy use targets – of the 33 companies who have set emission reduction targets, nearly two-thirds (20 companies) have also set energy use or energy efficiency targets.

Quantitative emission targets are a key component to an effective climate change strategy. Clearly, the strength and timeframe of the target determines the aggressiveness of the target and demonstrates the level of commitment the company is making to achieving real, measurable progress in addressing climate change. Equally important is the distinction between absolute and intensity targets. Companies setting absolute targets commit to reduce emissions by a specific quantifiable amount (often expressed as a percentage below a baseline year level). Intensity targets, on the other hand, seek to improve a company’s emissions efficiency, reducing emissions per employee, dollar of revenue, square foot, or other metric.

While intensity targets can be useful for evaluating the efficiency of a company’s operations and processes, they allow for total emissions to increase with organic growth or acquisitions made by the company. Absolute emission targets, however, put companies more on track to making the types of absolute emission reductions that will be required globally to stabilize atmospheric levels of carbon dioxide. Of the 63 companies evaluated in this report, one-third have set absolute emission reduction targets.

Some companies have also set carbon neutrality targets, in which they commit to achieving zero net emissions through an array of emission reduction and offset strategies, including renewable energy purchases and investment in carbon offset projects. While carbon neutrality can be an appealing concept to companies and their consumers, how companies design and implement their carbon neutrality strategies has come under scrutiny. Some companies have been criticized for using investments in carbon offset projects to avoid making operational efficiency improvements. Furthermore, there continues to be much inconsistency in the carbon offset market, generating uncertainty about the actual emission reductions certain offset projects yield.

Roughly half of the 63 companies evaluated in this report have established quantitative emission reduction targets. One third of these companies have set absolute emissions targets, and nearly two-thirds of all companies with targets have established energy use or energy efficiency targets in addition to their emissions reduction goals.

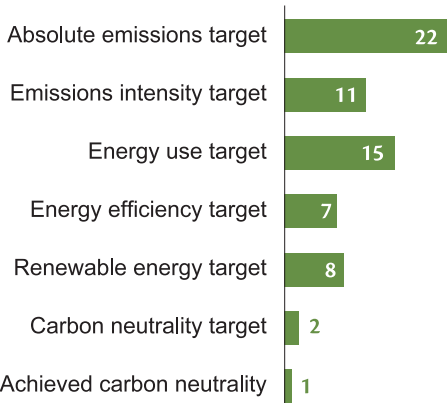


Exhibit 7: Company GHG Emissions and Energy Use Reduction Targets

Other companies, like **Dell** and **CB Richard Ellis**, have used carbon neutrality targets as a means of implementing a multi-pronged strategy that includes a range of emission reduction initiatives. For **Dell**, carbon offsets are the last component to a strategy that prioritizes maximizing energy efficiency and renewable energy purchases. Dell has pledged to offset remaining Scope 1 and 2 emissions and business air travel emissions once opportunities to employ other emission reduction strategies have been exhausted. Furthermore, Dell has committed to purchasing only “certified or other high quality, renewable energy credits and validated offsets.” Like Dell, **CB Richard Ellis** set a carbon neutrality target and has elected to only use carbon offsets as a last resort after energy efficiency and renewable energy. The carbon neutrality target is for the office buildings where CBRE staff work, not client-occupied properties.

Addressing Energy Efficiency in Property Management

Buildings are responsible for a large share of corporate GHG emissions. By some estimates, 40 percent of US GHG emissions come from lighting, heating, cooling, ventilation and other power needs of the nation’s homes, offices, factories, shopping centers and warehouses. Energy use also typically accounts for the highest proportion of a building’s operating expenses—about 28 percent on average in 2007.³

Companies are employing a wide variety of approaches to reduce the energy consumption of both new and existing buildings by setting stricter efficiency standards for new building construction, launching large retrofit initiatives and changing energy use practices in stores and offices. Enhanced energy management systems (EMS) are particularly critical to achieving significant buildings-related energy efficiency gains. Even greater savings will be achieved as more companies shape their energy use profiles around the load demand characteristics of their local power suppliers, with an emphasis on reducing the most costly energy use at times of peak demand.

While all 11 industry sectors examined in this report face common challenges in reducing their buildings-related energy use and subsequent GHG emissions, companies are finding sector-specific approaches to achieving significant cuts in energy consumption. Companies in the real estate sector, for example, are looking to optimize existing energy efficiency standards for the buildings in their property portfolios, while leading companies in sectors such as big box retail, grocery and restaurants are searching for new store designs that maximize efficiency gains.

Real Estate: With regard to energy efficiency cost-savings and other business opportunities, the real estate sector is in a class by itself. According to the Clinton Climate Initiative of the William J. Clinton Foundation, buildings are the source of more than half of most cities’ GHG emissions, and in large, concentrated urban areas like New York and London that number can exceed 70 percent.⁴ This puts building developers, owners, managers and tenants on the front lines of finding ways to reduce energy use and associated GHG emissions.

Addressing energy efficiency on a portfolio-wide scale is the key challenge in achieving a successful climate change strategy in the real estate sector. Companies’ property portfolios are many orders of magnitude larger than their own operations; at **Boston Properties**, for example, employees work out of six office buildings, but the company manages a portfolio of some 142 properties. This report finds that real estate companies are beginning to improve the energy efficiency of their buildings on a portfolio-wide scale:

- **Brookfield Asset Management** subsidiary Brookfield Property has taken on Building Owner and Management Association’s 7-Point Challenge to raise the efficiency of energy use in its property portfolio by 30 percent by 2010.

3. Building Owners and Managers Association. Experience Exchange Report, 2007.

4. <http://www.clintonfoundation.org/what-we-do/clinton-climate-initiative/our-approach/major-programs/making-buildings-green>; accessed on October 15, 2008.

Company Targets and Achievements

Energy Use Reduction Targets

	Target	Baseline Year	Target Year	Region
Avon	10% per unit production	2000	2008	Global manufacturing operations
Brookfield Asset Management	30%	—	2012	Brookfield Properties real estate portfolio
CB Richard Ellis	5%	2007	2008	United Kingdom
	10%	—	2008	CBRE Asset Services building portfolio
Colgate-Palmolive	20% per unit production	2002	2010	Global
Dell	Varies	—	—	Individual targets by region
IBM	3.5% in savings	—	Annual	Global
Anheuser-Busch InBev	10% per hectoliter of product	2008	2010	Global production
Intel	5% annual reduction per chip	2007	2012	Global
Kroger	30%	2000	2010	All Stores
L'Oreal	5% per unit of production	2007	2008	Factories and distribution centers
Marriott International	25% per available room	2007	2017	Fuel consumption
Molson Coors	4%	2007	2008	Global
Proctor & Gamble	40% per unit production	2002	2012	Global
Roche	10% GJ/employee	2005	2010	Global
Starbucks	25%	2008	2010	Company-operated and international stores

Energy Efficiency Targets

	Target	Baseline Year	Target Year	Region
Carnival	0.25 to 2.5%	—	Annual	By operating line
Carrefour	20% (kWh/m ²)	2004	2015	Global
Coca-Cola	40-50%	2000	2010	Cold drink equipment
H&M	20%	TBD	2020	All stores
Novartis	10%	2006	2010	Global
Sun Microsystems	3%	FY2007	FY2008	All buildings
Wal-Mart	100%	2005	2015	Truck fleet

GHG Emission Reduction Targets (Absolute)

	Target	Baseline Year	Target Year	Region
Applied Materials	50,000 mtCO ₂ e	2006	2012	Global
Canon	10%	2000	2008	Operational site emissions
Cisco Systems	25%	2007	2012	Global
Coca-Cola	No CO ₂ growth	2004	2015	System-wide manufacturing operations
Colgate-Palmolive	5%	2002	2010	Global
Diageo	50%	2007	2015	Global
GlaxoSmithKline	10%	2006	2010	Global
Hewlett-Packard	16%	2005	2010	HP-owned and leased facilities worldwide
IBM	12%	2005	2012	Global
Intel	20%	2007	2012	Global
Johnson & Johnson	7%	1990	2010	Global
L'Oreal	2%	2007	2008	Global
Marriott International	1 million tons CO ₂ e	2000	2010	Company's carbon footprint
Novartis	5%	1990	2012	Global Scope 1
Pfizer	20%	2007	2012	Global
Safeway	6%	2000	2011	United States
Staples	7%	2001	2010	United States
Sun Microsystems	20%	2007	2015	Global
Taiwan Semiconductor Manufacturing	10%	1997 & 1999 average	2010	Taiwan
Tesco	50%	2006	2020	Global existing stores and distribution centers
Texas Instruments	10% PFC reduction	1995	2010	Global
Wal-Mart	20%	2005	2012	Existing stores and all distribution centers

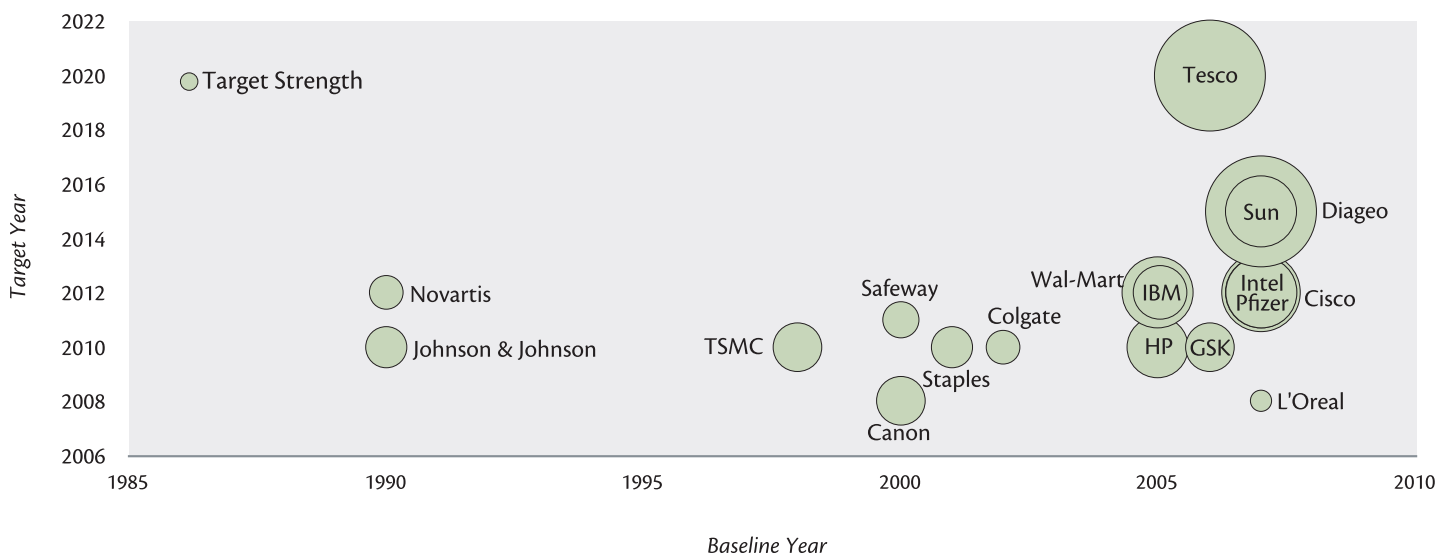


Exhibit 8: Absolute Emissions Reduction Targets

GHG Emission Reduction Targets (Intensity)

	Target	Baseline Year	Target Year	Region
Avon	5% per unit production	2002	2012	Global manufacturing operations
CB Richard Ellis	Carbon neutral	—	2010	Global
Colgate-Palmolive	25% per ton of production	2002	2010	Global
Dell	15% carbon intensity and carbon neutral	2006	2012	Global
EcoLab	15% per ton production	2007	2012	US only
GlaxoSmithKline	45% per unit net operating revenue	2006	2015	Global
H&M	10% relative to sales	2004	2009	Global
Anheuser-Busch InBev	10% per hectoliter of product	2008	2010	Global production
Molson Coors	12% indexed to production	2005	2010	US only
NIKE	Carbon neutral	—	FY15	All facilities and business travel
Proctor & Gamble	40% per unit production	2002	2012	Global
Roche	10% per million CHF sales	2003	2008	Global
Gap Inc.	11% per square foot	2003	2008	United States

Target Achievements

	Target	Baseline Year	Target Year	Region
Avon Products	30% energy use reduction	2000	2007 (1 year early)	Global manufacturing
Canon	12% GHG reduction per unit of net sales	2000	2007	Operational site emissions
Colgate-Palmolive	28% energy efficiency improvement	1998	2007	Global
Dell	Carbon neutral	—	2008	Global
Hewlett-Packard	20% energy use and GHG reduction	2005	2007 (3 years early)	Products & Operations
H&M	21% GHG reduction relative to sales	2006	2007 (2 years early)	Global
IBM	40% of 1990 GHG emissions reduction	1990	2005	Global
Johnson & Johnson	12.7% absolute GHG reduction	1990	2007 (3 years early)	Global
L'Oreal	5% reduction in Scope 1 & 2 emissions	2005	2007	Global
Nike	18% absolute GHG reduction	1998	2005	Global
Novartis	1 st generation energy efficiency target	2004	2006	Global
Pfizer	43% CO2 reduction per million \$ revenue	2000	2007	Global
Roche	10% GHG reduction per million CHF sales	2003	2008	Global
Sun Microsystems	20% GHG reduction	2002	2008 (4 years early)	United States
Tesco	50% energy use reduction per square foot	2000	2008 (2 years early)	United Kingdom
Texas Instruments	48% PFC reduction	1998	2007	Global

Water as an Emerging Climate Change Issue

Water use is an emerging operational issue that presents both risk and opportunity for businesses. The not-for-profit Pacific Institute highlights several water-related business risks that require corporate attention including pricing, availability, quality and the heightened sensitivity required of companies that operate in water scarce areas¹. In a 2007 report on corporate water reporting, the Pacific Institute noted that even firms in high water-risk sectors have limited disclosure on water and often overlook certain business risks such as the potential for water-related supply chain interruption².

Several companies in this study mentioned the risk of increasing water scarcity due to climatic changes in their most recent responses to the Carbon Disclosure Project. Beverage companies are the most specific with firms such as **Molson Coors** specifying regional differences in water risk that its facilities face. Several firms have water conservation programs, but only a few have set quantitative reduction targets for water consumption or wastewater generation. **Coca-Cola** and **Anheuser-Busch InBev** both have water use targets, while **Canon** has set a goal for 2008 to reduce water use per unit of net sales by 25 percent from 2000 levels.

IBM's semiconductor manufacturing operations have annual water conservation targets. IBM is also researching how technology solutions can be used for water management and preservation efforts. The company hopes to partner with other technology firms with remote sensing, IT and modeling expertise to form an educational organization that would enable the water industry to take advantage of existing technology for improved water management.

1. Morrison, Jason and Gleick, Peter, Freshwater Resources: Managing the Risks Facing the Private Sector, Pacific Institute for Studies in Development, Environment and Security, August 2004.
2. Morikawa, Mark, Morrison, Jason and Gleick, Peter, Corporate Reporting on Water: A Review of Eleven Global Industries, Pacific Institute for Studies in Development, Environment and Security, May 2007.

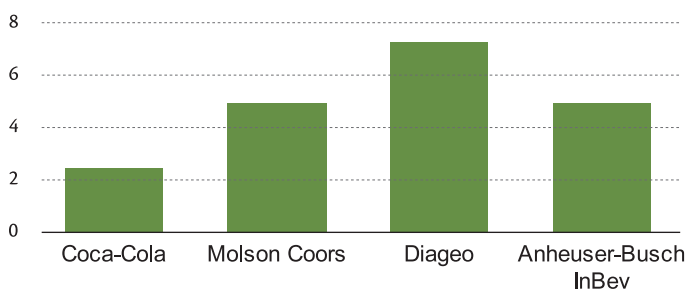


Exhibit 10: Beverage Producers' Water Use:

Ratio of Liters of Water Used Per Liter of Product Produced

* Ratios are not directly comparable between companies due to variable product mixes. Data sourced from companies' most recent public sustainability reports.

Exhibit 9: Water Risks for Key Sectors

Sector	Potential Water Risks
Apparel	<p>Availability of water and quality of water for:</p> <ul style="list-style-type: none"> • Washing and processing <p>Increased variability in patterns of precipitation and temperature leading to seasonal stocking risks</p>
Beverages	<p>Availability of water and quality of water used as/in:</p> <ul style="list-style-type: none"> • Solvent and process carrier • Coolant (mixing equipment) • Feedstock • Process aid • Effluent dilution • Steam feedstock for cooking processes
Grocery Retailers	<p>Water quantity and quality for washing and processing</p>
Personal & Household Goods	<p>Water resource availability affecting:</p> <ul style="list-style-type: none"> • Water prices • Legislative drivers for improving project design ahead of industry capacity to cope or consumers to afford
Pharmaceuticals	<p>Availability of water and quality of water used in:</p> <ul style="list-style-type: none"> • Cleaning • Process solvent and carrier • Feedstock • Coolant (fermentation and chemical processes) • Steam feedstock for evaporation, separation, reaction and fermentation processes • Safety agent (emergency diluents for releases)
Real Estate	<p>Availability of water resource:</p> <ul style="list-style-type: none"> • Requirement to build into new and existing developments the ability to harvest and store rainwater to prevent over exploitation of water resources in drier climate <p>Flooding risks</p>
Semiconductors	<p>Availability of water and quality of water used in:</p> <ul style="list-style-type: none"> • Cleaning; process carrier (etching) • Coolant • Safety agent (emergency diluents for releases)
Travel & Leisure	<p>Availability of water and quality of used water in:</p> <ul style="list-style-type: none"> • Construction • Processing aid (cooking) • Laundry facilities • Land drainage • Irrigation for golf courses, lawns, swimming pools <p>Changes to disease vector populations due to temperature changes or increased variability in precipitation</p>

Adapted from *Half full or half empty?*, a report prepared for United Nations Environment Programme Finance Initiative by Dr. Olivia Jensen and Dr. Ceema Namazie, ICF International, October 2007.

Energy efficiency presents a significant—and largely untapped—opportunity for the restaurant sector. Restaurants on average use five times more energy per square foot than any other type of commercial building.

- **Simon Property Group** sets its own annual energy reduction targets for properties under its operational control. This has resulted in \$12 million in annual cost savings at its shopping malls since 2004. The company also helps its tenants manage energy use by installing meters and by obtaining the US Green Building Council (USGBC)'s Leadership in Energy and Environmental Design (LEED) Core and Shell certification for its malls.

Some of this increase in focus on energy efficiency in the real estate sector has been spurred by investor pressure. Since 2005 investors have filed shareholder resolutions to urge property managers and homebuilders to adopt formal energy efficiency targets and GHG reduction goals. These resolutions have been widely supported, with voting support reaching as high as nearly 40 percent. Two companies in this report – **Boston Properties** and **Simon Property Group** – are among the companies receiving such shareholder resolutions.

Big box and grocery retailers: Due to the sheer number and size of the stores they operate around the globe, the largest big box retailers and grocery stores are particularly motivated to find energy efficiency solutions that can be applied across their entire network of stores. **Tesco** and **Wal-Mart** are both developing energy efficient designs that can be rolled out to stores around the world.

- For **Tesco**, 67 percent of the company's carbon footprint is attributable to electricity and natural gas use. The company has built energy efficient prototype stores in seven countries, and a new store in the UK has achieved a 60 percent GHG emission reduction compared to the company's standard stores.
- **Wal-Mart** is working on several prototype generations and recently opened its High Efficiency (HE.5) prototype in Las Vegas that features improvements in heating, cooling, refrigeration and lighting systems that are up to 45 percent more efficient than Wal-Mart's baseline Supercenters. Wal-Mart has set a goal to design and open a viable prototype by 2009 that is up to 25 or 30 percent more energy efficient than its 2005 baseline store.

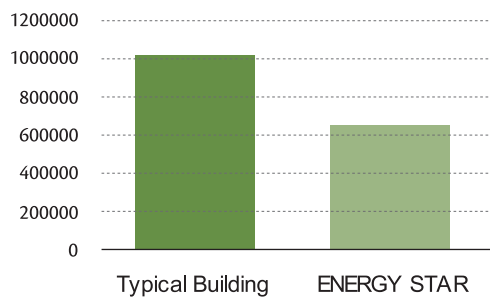
Restaurants: Energy efficiency also presents a significant—and largely untapped—opportunity for the restaurant sector. Restaurants on average use five times more energy per square foot than any other type of commercial building. According to Pacific Gas & Electric (PG&E), however, nearly 80 percent of the \$10 billion spent annually on energy by the commercial food service sector is lost through inefficient cooking methods, refrigeration and storage.⁵ Some of the companies evaluated in this report have taken steps to address these inefficiencies:

- **Burger King**, for example, has introduced a new restaurant design, known as the Return On Capital design, focused on energy efficiency to reduce heating and cooling costs. The company has already constructed 110 buildings according to this design.
- **McDonald's** has launched an interactive software program for its French chain that will help monitor and reduce energy consumption in restaurants. Furthermore, both companies are experimenting with new cooking equipment, such as efficient broilers and fryers, to improve cooking efficiencies.

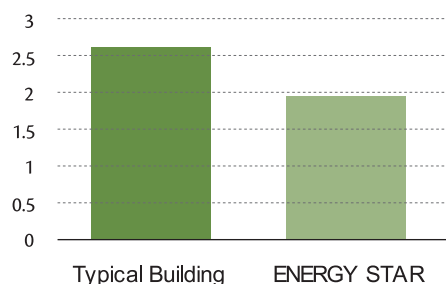
Such efforts at greening restaurant chains to improve energy efficiency—perhaps in combination with local sourcing of organic foods—might attract more customers looking for new, innovative dining options. Still, the restaurant sector has a long way to go in this area; of the six restaurants analyzed in this report, three were found to have taken minimal or no actions to improve the energy efficiency of their buildings.

5. "Can restaurants go green, earn green?" *USA Today*, May 15, 2008.

Average Building Energy Operation Cost
(\$ per Year)



Average Building Energy Operation Cost
(\$ per square foot per year)



Average CO₂ Emissions
(1,000 lbs per year)

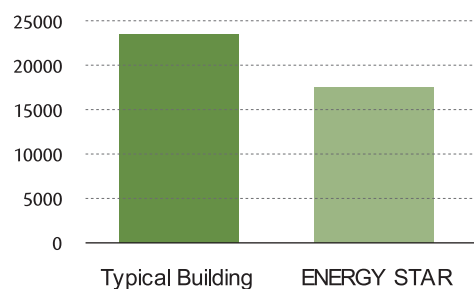


Exhibit 11: Energy Cost Comparison: Energy Star-Labeled v. Typical Building

Source: Costar Group, 2008

Building Certification Programs

The introduction of standards and certification programs are helping companies to introduce energy efficiency gains across their property portfolios. Real estate firms are taking advantage of these programs to benchmark their performance, set reduction targets and attract new clients. Popular US recognition programs include ENERGY STAR from the Environmental Protection Agency, the Leadership in Energy and Environmental Design (LEED) program from the US Green Building Council and awards from the Building Operators and Managers Association (BOMA). Other standards and certification programs globally include Green Globes in North America and the BRE Environmental Assessment Method (BREEAM) developed in the United Kingdom.

- In the hotel industry, **Marriott International** has the most properties with ENERGY STAR certification – more than 200 of its 3,000 plus properties – and plans to increase this number by 33 percent in 2008.
- In the real estate sector, **Simon Property Group** is collaborating with ENERGY STAR to develop energy use benchmarks for shopping malls. Simon Property believes that the benchmarks will be critical in an eventual cap-and-trade system to manage carbon emissions.
- **CB Richard Ellis** was named an ENERGY STAR Partner of the Year in both 2007 and 2008. The firm is benchmarking its office building portfolio through ENERGY STAR tools and seeking the ENERGY STAR label. It has also enrolled 100 US office buildings in the USGBC Portfolio Program to attain LEED certification.

Since LEED launched in 2000, the number of certified and registered projects has grown as much as 700 percent a year. The challenge now for large companies is to be able to simplify the application and approval process and move toward certification of entire property portfolios.

- **Safeway** and **Walgreens** are both working with the USGBC on the LEED Retail Portfolio Program, a portfolio approach to create two new rating systems specific to the retail sector. Safeway also plans to integrate LEED criteria into its standard design and construction practices.
- Similarly, **Tesco** and **Starbucks** are working with the USGBC on the LEED Volume Certification Program, which would allow companies to submit store prototypes one time for the certification process.
- **Intel** is working with the USGBC to set certification standards for wafer fabrication facilities.

Some companies are moving ahead with a portfolio approach on their own.

- **Starwood Hotels & Resorts** announced its first LEED-mandated brand, **ELEMENT**, in April 2008, which will include several energy efficiency features.
- **L'Oreal** has established a new Sustainable Buildings Policy that requires all new major construction and significant renovation projects to meet LEED standards or equivalent local certifications.

Unique Governance Approaches to Managing Internal Energy Efficiency

Specialized task forces: EHS and facilities managers often lead a company's energy efficiency and conservation efforts. Companies across industry sectors also are forming specialized task forces to address energy reduction goals.

- **Colgate-Palmolive** has tasked a Global Energy Reduction Team to come up with new energy-saving opportunities. Since 1998, the company has improved overall energy efficiency by 28 percent, saving an estimated \$5.6MM in energy costs.
- **Sun Microsystems** has given a Global Lab & Datacenter Design Services group the authority and budget to improve IT infrastructure with environmental considerations in mind.

Employee programs: Transforming employee behavior is also a key component of the energy conservation challenge. Companies have gained ground through specialized recognition and training programs.

- **McDonald's USA** has started a recognition program to showcase "Energy All-Stars" – franchisees, restaurant managers, corporate staff and suppliers who excel at applying the company's best practices to control energy usage.
- **Nike** has launched the Nike Energy Challenge, a competition among company facilities to determine which can be the most energy efficient.
- **Tesco** has "Energy Champions," employees that are trained specifically to motivate and educate colleagues on saving energy.

Capital allocations: Another strategy employed by some companies is to establish a dedicated capital fund for energy efficiency and conservation projects. This assures that such projects can go ahead even if other areas of the business slow down and budgets become constrained. Such allocations also help companies establish guidelines for what types of projects should be pursued and what investment returns can be expected.

- **Johnson & Johnson** established a CO₂ Reduction Capital Funding Process in 2004 with a target to make available \$40 million annually for energy and GHG reduction projects.
- **Dell** has established a similar capital fund, approved by its Facilities Steering Committee, and the company's Global Energy Management Program office selects projects and monitors carbon savings.
- **Intel, IBM and GlaxoSmithKline** also have dedicated funding streams for energy conservation projects.
- **Novartis** has set a rule that new investments or asset purchases exceeding 20,000 Swiss francs require an assessment of the energy implications.

Addressing Energy Efficiency through Information and Communication Technology

Information and communication technology (ICT) lies at the core of both the challenges and solutions for corporate strategies to reduce operational GHG emissions. On the one hand, as demand for data centers, computer networks, mobile communications systems and other ICT technology grows, the GHG emissions associated with these technologies are rapidly increasing, expanding the carbon footprint of companies across all industries. On the other hand, ICT offers some of the most significant and promising solutions to achieving GHG emission reductions. As McKinsey & Co. succinctly put it in a recent report, "Information and communications technologies will become a major source of greenhouse gas emissions but can abate far more of them."⁶

Information and communication technologies currently account for roughly two percent of all GHGs emitted globally each year, and, due to increasing need for computation, data storage and communication technology, these emissions are projected to increase to three percent of all emissions by 2020.⁷ The energy demands of increased use of ICT technology on companies are profound; the research firm Gartner estimates that large businesses now spend between 4 and 8 percent of their ICT budgets on energy, and that continued rising demand at data centers could lead to local power supply disruptions in coming years.⁸ According to **IBM**, for every dollar spent on computer hardware, 50 cents are now spent on power and cooling needs for the hardware; the company expects this ratio will increase to 1:1 by 2012.⁹

But as much as ICT technology is part of the problem, it is an even more critical component to the solution. According to the Climate Group and a coalition of technology firms called Global eSustainability, the biggest potential for GHG reductions by companies—some 2 billion metric tons (MMT) of CO₂ annually by 2020—will come from technology solutions, such as increased use of data networking inside smart electric grids to manage energy demand and reduce unnecessary consumption.¹⁰ This will be followed by more use of computers to enhance logistics of

6. Giulio Boccaletti, Markus Löffler, and Jeremy M. Oppenheim. *How IT can cut carbon emissions*. The McKinsey Quarterly. October 2008.
7. Ibid.
8. Gartner Press Release (November 7, 2006), 'Gartner says look beyond power issue as pressure mounts for 'greener' IT', <http://www.gartner.com/it/page.jsp?id=498224>.
9. *IBM 2007 Corporate Responsibility Report*, http://www.ibm.com/ibm/responsibility/dwnlds/2007_CorporateCitizenshipReport.pdf.
10. Global eSustainability Initiative and the Climate Group. *Smart 2020: enabling the low-carbon economy in the information age*. 2008.

Possible ICT-enabled savings in emissions by 2020 (GtCO₂e)

Smart grid:	2.03
Smart buildings:	1.68
Smart logistics:	1.52
Smart motors and industrial processes:	0.97
Transport optimization:	0.60
Telecommuting:	0.22
Videoconferencing:	0.14
Other:	0.66

Source: Global eSustainability Initiative and the Climate Group

transportation systems and product delivery, smarter buildings that turn off lighting and ventilation systems when they are not in use and smarter motors and more efficient industrial processes. More videoconferencing and telecommuting to reduce business travel will also play a role. As McKinsey estimates, by 2020 information and communication technologies could abate up to five times more emissions than they are estimated to generate—an amount equal to 15 percent of today's global emissions.

Not surprisingly, this study finds that a growing number of companies are beginning to look to technology solutions to reduce emissions from internal operations – and the technology firms are stepping up to the plate to meet the demand.

- **Dell** offers Energy Smart Data Center Assessment and Design services to optimize customers' data center facilities for power consumption, performance, reliability and availability. Dell also performs assessments and develops remediation plans to reduce energy use in customer HVAC and power delivery systems.
- **IBM** offers several products specific to energy management and technology. Beyond virtualization services, Active Energy Manager is a hardware/software tool that enables customers to meter and control power usage on an individual server, while Tivoli management software allows for energy management across a data center.
- **HP** also offers products to help customers reduce the energy requirements of data centers with products such as Dynamic Smart Cooling, an approach to reduce the power needed to cool data centers.
- In April 2008, **Sun Microsystems** launched the Sun Eco Advantage Program, providing partner companies tools and training to build their own eco IT practices. The program includes training on datacenter efficiency, technical assessment services, assistance in modeling investment returns and carbon savings scenarios as well as implementation methodologies.
- **Cisco** has launched several new product offerings to drive energy efficiency, including its Efficiency Assurance Program (EAP). This centralized web-based tool helps customers analyze power use and establish efficiency benchmarks across datacenter infrastructure and facilities.

Furthermore, a number of technology companies are increasing their product offerings for telecommunication and video conferencing, helping their customers to reduce the GHG emissions associated with employee business travel.

Despite recent advances in green IT technology to cut energy use and emissions, there is still much progress to be made. As noted in a recent issue of *The Economist*:

*"None of this will be easy. The IT industry can supply the hardware and software, but the bigger problem is the 'wetware' — people, economics and politics. The right skills are often scarce. Incentives are lacking for businesses to invest in carbon-reducing technology. There need to be new technical standards. For transport, power grids and buildings to become more efficient, there must be rules on how, for instance, refrigerators should talk to electric meters, and thermostats to heating systems."*¹¹

In any case, information and communications technology will be at the center of much of this activity.

11. The Economist. *Computing Sustainability*. July 19, 2008.

Employee Travel

Employee commuting and business travel is another major focus of company energy management programs.

- More than 100,000 **IBM** employees participate in the company's work at home and mobile employee programs. IBM estimates this saved approximately 64,000 metric tons CO₂ in 2007 in the US alone.
- Through **Sun Microsystems'** "Open Work" program more than 16,000 employees work from home or from a flex office a few days each week. This has allowed Sun to reduce its real estate holdings by 15 % in FY2007.
- To reduce business air travel, **Cisco** has invested more than \$20 million in TelePresence units to promote remote collaboration. The company has also committed to reducing Scope 3 emissions from air travel 10 percent by 2010 using a 2006 baseline.

Other popular programs include company subsidies to take public transit, carpooling and other alternative transport programs, and video-conferencing as a means of cutting down on business travel.

Renewable Energy

Of course, there are limits on how much GHG savings companies can achieve through reductions in their own energy use. In order to further reduce climate change impacts, many companies have looked to renewable energy sources – both through on-site generation and the purchase of renewable energy, either directly from utilities or through credits and offsets. This study finds that a wide range of industry sectors are pursuing some kind of on-site renewable generation, ranging from solar and wind to bio-waste and fuel cells. Companies are not only investing in proven technologies, but are also putting money behind new technology development.

While some investment has been aggressive, it should also be noted that only eight of the 63 companies evaluated in this report have set actual targets for renewable energy purchases (see box below). These targets range from commitments for direct renewable energy purchase from utilities, the purchase of renewable energy certificates (RECs) or the on-site installation of solar or other renewable energy technologies. The voluntary market in RECs still faces some challenges in verifying the authenticity of credits bought and sold. In addition, it is unclear to what extent RECs will be considered for emission allowances in pending US climate legislation. Still, some companies are continuing with REC purchases as a way to demonstrate commitment.

- **Starbucks** is purchasing RECs in order to offset 20 percent of its North America retail store electricity consumption in 2007.
- In 2008 **Intel** announced it would purchase 1.3 billion kWh per year worth of RECs in a multi-year contract. The RECs will be Green-e certified by the Center for Resource Solutions. This makes Intel the largest renewable energy purchaser in the US according to the US EPA Green Power Purchase Program.

Renewable Energy Targets

	Target	Baseline Year	Target Year	Region
Applied Materials	15%	—	2012	Global
H&M	20%	—	2020	All stores
Hewlett-Packard	50 million kWh/year	2006	2007	United States
Marriott International	Install solar power	—	2017	40 hotels
Pfizer	35%	—	2010	Global
Safeway	2.5%	2005	2009	United States
Starbucks	50%	—	2010	All stores
Wal-Mart	100%	—	TBD	All stores

Pharmaceutical Companies and their Vehicle Fleets

Pharmaceutical companies typically own or lease a large fleet of vehicles for sales and other personnel. Moreover, a typical corporate vehicle has double the miles of a family-owned vehicle.* For three of the four pharmaceutical firms reviewed in this report, emissions from vehicle fuel use were sufficiently large that the companies set emission reduction targets for their vehicle fleets. The companies largely aim to meet their targets by increasing the numbers of hybrid or other fuel efficient vehicles in their fleets.

- **Roche** established a hybrid car initiative in 2004, when it began incorporating hybrid cars into its 1400 strong US pharmaceutical sales fleet. By 2007, the company's fleet numbered 15,630 cars globally and Roche calculated that the fleet accounted for 10 percent of its total energy consumption and 9 percent of total CO₂ emissions. Of these, 650 were hybrids, and 500 were part of the US sales fleet. The initiative is part of their Group Directive on energy conservation.
- **Johnson & Johnson**, as part of its Healthy Planet 2010 goals, set a target for a 30 percent reduction in emissions per kilometer driven for the company's vehicle fleet, relative to 2003. To achieve this goal, the company set minimum fuel efficiency requirements for its fleet by category, and ordered an additional 508 hybrid cars. According to Automotive Fleet Magazine, the company's current fleet of hybrid cars (978) is the largest of any corporation.
- **Novartis** set a target to reduce CO₂ emissions from its vehicle fleet by 10 percent by 2010 from a 2005 baseline. The company has also chosen to lease hybrid vehicles for its US fleet and diesel vehicles for its European fleet as part of its USD 23 million investment to improve the energy efficiency of its vehicle fleet.

* Source: "In quest to go green, US firms retool car fleet," The Christian Science Monitor, June 22, 2007

Companies are also investing in on-site renewable generation across a range of technologies. While these projects still tend to make up a small portion of a company's total electricity use, they are helping to build confidence in renewable energy markets and bring down costs. Some prominent investment examples include:

- **Nike's** European distribution center in Laakdal, Belgium, which has six wind turbines. This makes the company the first of its size in Belgium to operate solely on green energy that is produced on-site.
- **Diageo** is making the largest single investment in renewable technology by a non-utility in the UK at its grain distillery in Cameronbridge, Scotland, to exploit the energy potential of waste materials, including wastewater.
- **Whole Foods** has opened a store in Glastonbury, Connecticut, that will be the first supermarket to generate most of its power on-site with an ultra-clean fuel cell from UTC Power.
- **Safeway** is currently developing approximately two dozen solar projects across California and hopes to expand its solar program to 40 stores.
- **Johnson & Johnson** has installed more than 4.1 MW of solar photovoltaic generation at ten locations in the US, making it the 2nd largest corporate user of on-site solar energy in the United States according to the World Resources Institute as of May 2008.

Other companies are funding the development of new technologies:

- **Applied Materials** has a venture capital arm which is making early round investments in companies that produce renewable or related energy products or technologies such as fuel cells, batteries and energy storage and low-cost methods of producing silicon wafers for photovoltaic systems.
- **Tesco** has established a Sustainable Technology Fund to support large-scale carbon reduction technologies for its stores, distribution centers and supply chain. The fund is solely dedicated to investment opportunities in technologies that are not yet economically viable and projects have ranged from biomass initiatives to ground source heat pumps.

In the technology sector, companies are focusing less on reducing their own operational impact through renewable energy, but instead are seizing commercial opportunities around the development of renewable energy technologies. Companies such as **IBM**, **Applied Materials**, and **Sun Microsystems** are now offering solar photovoltaic equipment and other renewable energy products.

- In 2007, **Applied Materials** created its Energy and Environmental Systems group, which will mainly develop and sell equipment to produce solar photovoltaic modules and cells. The group's focus is on thin film silicon for large-scale applications and crystalline silicon technologies intended for residential use. The group also sells equipment to produce low-emissivity and solar control architectural glass.

- In June 2008, **Hewlett-Packard** announced that Xtreme Energetics, a solar energy system developer, will license HP's transparent transistor technology designed to generate electricity at twice the efficiency and half the cost of a traditional solar panel.

Ideally, renewable energy investment would serve as one component in a range of corporate strategies to reduce operational emissions. For some companies, however, there is a trade-off between investing in on-site renewable energy or carbon offsets and pursuing energy efficiency projects. **Carrefour**, for example, says that it has reviewed on-site generation opportunities and concluded that current solar technology is not sufficiently mature to produce enough electricity for its stores. Jean-Francois Brunet, Group Assets Manager, states in the company's sustainability report: "We prefer to direct our resources toward efficient investment in the short-term and reducing our consumption rather than toward this [on-site generation] solution, which is simple to implement but less efficient for the environment. Better environmental efficiency comes from the energy we don't use." This debate will surely continue; the good news is that large energy-consuming companies are facing these tough choices and in many cases are making dramatic progress.

Key Findings: Product Design and Promotion

Companies are beginning to extend their climate mitigation measures beyond reducing operational GHG emissions to reducing the emissions or energy consumption associated with product use and disposal. Savvy companies are capitalizing on product efficiency improvements to increase market share among customers with a strong environmental conscience or a limited pocketbook. Private labels, marketing campaigns and special price offers are some of the tactics that companies in this study hope will capture consumers' attention. Not surprisingly, product focus varies by sector with some industries reviewed in this report emphasizing products and services and others neglecting it altogether.

Molson Coors: From Waste Stream to Revenue Stream

Molson Coors saw so much opportunity in creating saleable products from its brewing waste that it established a Co-Products division, led by Rick Paine. Paine manages the Golden, Colorado ethanol facility, operated by Coors and owned by Merrick & Company. Coors is the nation's first major brewer to convert its waste beer into ethanol. The company began recycling waste beer — beer lost during packaging or deemed below quality standards — and converting it to fuel-grade ethanol in 1996.

In 2007, Coors produced 2.7 million gallons of ethanol for sale in Denver, a 68 percent increase from 2005. The company sees a competitive advantage in that its ethanol production process does not divert raw materials from the food supply. Coors is considering the viability of expanding this business to additional production facilities.

Product Design

The technology and semiconductor sectors are especially focused on new opportunities for designing energy efficient products for customers, including silicon chips, computers and related IT technologies. Meanwhile, personal and household goods companies are just starting to see the link between designing greener products and climate change impacts. At the other end of the spectrum, restaurants, beverages, pharmaceuticals and apparel generally have limited scope for product modification in the name of emissions reductions or energy use. Despite this, at least one company in all 11 industry sectors examined in this study either anticipates climate change related commercial product opportunities or has already taken concrete steps to achieve them.

Technology and semiconductor companies have been working for many years on designing more energy efficient products. Most companies have specialized product design teams working on environmental initiatives and are collaborating with peers and governments on developing product standards. As one example, members of the non-profit Standard Performance Evaluation Corporation (SPEC), **Dell, Intel, Hewlett-Packard, IBM and Sun Microsystems**, along with other industry partners not reviewed in this report, helped established a benchmark for server-class computers known as SPECpower, which was released in December 2007.

Other examples include:

- **Dell's** Design for Environment (DfE) program looks at energy efficiency at each stage of the product life cycle. This has led to Energy Smart, a Dell program similar to ENERGY STAR that covers many product categories. The company's latest OptiPlex desktop systems are preconfigured with the Energy Smart settings and Dell estimates that applying these settings to all of its desktops sold in the last year could avoid approximately 12.5 million tons of CO₂ emissions.
- **Hewlett-Packard's** Design for Environment program was established in 1992. The company has integrated energy saving features into its desktop PCs, servers and disk storage systems.
- **IBM** through its formal Product Stewardship program is working to improve product energy efficiency. New generations of hardware products have attained 14 to 73 percent improvement

in computing performance per unit of energy in 2007.

- **Intel's** desktop, mobile and server processors are now all duo and quad core processors that are more energy efficient for system throughput compared to single core processors. Intel is also working with ENERGY STAR to develop new computer energy efficiency standards and is collaborating with the European Commission and others to develop similar specifications under an EU directive.

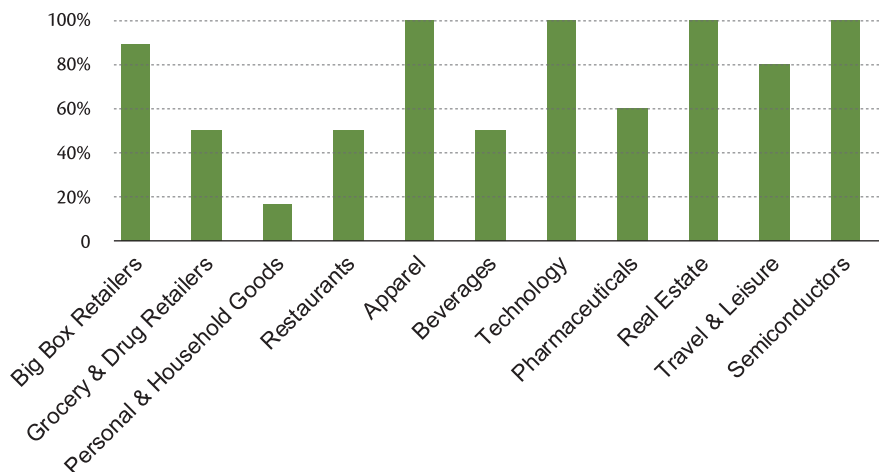


Exhibit 12: Companies Developing Climate-related Products and Services

However, technology companies are not the only ones greening their products.

- **The Proctor & Gamble Company** has set a goal of \$20 billion in sales of “sustainable innovation products” by 2012. Such products include laundry detergents designed to be used in cool or cold water, and Braun electric shavers that feature “Smart Plugs” that use 64 percent less energy than conventional shavers. The shaver battery chargers carry the ENERGY STAR label.
- **Ecolab** has also found opportunity in laundry detergent. The company’s Formula 1 laundry program has been designed to help hotel chains reduce hot water usage by 25 percent and laundry cycle times by 12 to 18 minutes, resulting in significant energy savings. The company says its product formulations, packaging and dispensing methods are its biggest source of opportunity in helping customers reduce their climate impact.

Product Promotion

According to a 2007 survey by consulting firm McKinsey & Co., consumers say they are very concerned about climate change and connect the issue to their own purchases. McKinsey found that out of 7,751 people surveyed in Brazil, Canada, China, France, Germany, India, the UK and the US, 87 percent of consumers worry about the environmental and social impact of the products they buy.¹² However, only 33 percent say they are ready to buy or have bought green products.

Why the divergence? The study found that consumers hesitate because they are unaware a specific green product exists, they are skeptical of product performance or of its green claims, it costs too much, or they cannot find it. McKinsey asserts that companies need to do more to educate consumers on eco-friendly product availability, performance and positive environmental characteristics. Prominent in-store product placement, advertisements, educational displays and clear, concise labels, such as a carbon footprint label, can all help. Companies must make green purchasing easy and ensure that they are credible.

Companies in the retail sector are reacting to these trends with big box retailers and grocers leading the way. These sectors have the opportunity to educate and attract customers as well as often flex their size power by giving preference and prominent placement to more climate-friendly products in their stores.

Companies must make green purchasing easy and ensure that they are credible.

12. “Helping ‘green’ products grow.” Sheila M. J. Bonini and Jeremy M. Oppenheim, McKinsey & Co., October 2008.

Reducing Emissions of Other Greenhouse Gases

While carbon dioxide is the principal GHG responsible for human contributions to climate change, some other manmade chemicals are much more potent GHGs that also contribute to the problem. These include compounds used by a wide range of industries. On a molecular basis, some of these chemicals have 20,000 times more global warming potential than carbon dioxide. Many also contribute to depletion of the Earth's ozone layer. As a result, companies are being prompted to find replacements for these chemicals under the Montreal Protocol and European regulation banning fluorinated gases, as well as pending climate change regulations.

Apparel: Until 2006, Nike used two potent GHGs, sulfur hexafluoride (SF₆) and perfluoropropane (PFP), in its air-cushioned footwear. Through its product design program called Considered Design, Nike launched a large research and development effort, with 60 experts from more than 50 external organizations providing their expertise. Nike delivered an all-nitrogen alternative to the fluorinated gases used in its air-cushioned shoes in 2006, ahead of European regulation banning these compounds.

Beverages and restaurants: In 2004, Coca-Cola, McDonald's and Unilever launched an industry initiative for sustainable refrigeration known as Refrigerants Naturally. The group is working to phase out hydrofluorocarbons (HFCs) and advance the energy efficiency of refrigeration units. Coca-Cola owns more than nine million coolers and vending machines that use HFCs as a refrigerant. Depending on the specific compound, HFCs have thousands of times more potency as a GHG than carbon dioxide. That makes HFCs the largest source of GHG emissions for Coca-Cola – more than three times the emissions from manufacturing and more than five times the emissions

from the company's vehicle fleet. Coca-Cola has invested nearly \$40 million over the past eight years to identify and test alternative refrigerants. It has identified carbon dioxide as a replacement for HFCs. Although still a GHG, carbon dioxide technology should reduce refrigerant emissions by 75 percent. The company plans to deploy more than 100,000 CO₂ coolers by the end of 2010.

Pharmaceuticals: Companies like GlaxoSmithKline and Roche that produce asthma and other respiratory disease medication delivered via inhalants typically use chlorofluorocarbons (CFCs) as a propellant. CFCs are an ozone-depleting substance regulated internationally by the Montreal Protocol, but also happen to be a class of GHGs that are 4,740 to 14,400 times more potent than CO₂ over a 100 year span. This explains why GlaxoSmithKline's emissions associated with patient inhaler use were more than three times greater than emissions from company electricity use in 2007. Consequently, the company has set a separate product target to phase out CFC use in its inhalers by 2010.

Semiconductors: Semiconductor manufacturers typically use perfluorocarbons (PFCs) to maintain an ultra-clean working environment for the manufacture of wafers and chips. This potent GHG is also covered by the Kyoto Protocol. Intel and Texas Instruments have committed to reduce PFC emissions by 10 percent from a 1995 baseline by 2010 and have joined the voluntary US Environmental Protection Agency's PFC Reduction/Climate Partnership. Applied Materials and Taiwan Semiconductor Manufacturing have also set their own PFC emission reduction goals and made significant strides in this area.

- In the United States, retail giant **Wal-Mart** leads its peers in pitching climate-friendly products. For example, in 2005, it set a goal to achieve sales of 100 million compact fluorescent light bulbs through aggressive promotion and product placement efforts. As of June 2008, it had almost doubled that sales target. Wal-Mart also has goals to double sales of other energy efficient home products and to raise the efficiency of the most energy intensive products sold in its stores by at least 25 percent in three years.
- Home improvement products retailer **Home Depot** launched its Eco Options labeling program in 2007 to help customers easily identify products with a low environmental impact. Through Eco Options, Home Depot promotes a number of ENERGY STAR labeled appliances, lights and windows as well as Forest Stewardship Council certified wood products. The company has introduced a label for nearly 3,000 products but expects this number to grow to 6,000 products by 2009. An Eco Options website provides consumers with an ongoing count of the number of products sold, electricity saved and carbon dioxide emissions prevented.

Carbon Footprint Assessment for Products and Services

To facilitate green purchasing, consumers need to know that eco-friendly product claims can be trusted. The UK government decided to help.

The UK's Department of Environment, Food and Rural Affairs (Defra) and the Carbon Trust sponsored the development of a universally applicable standard for measuring the carbon footprint of a product or service to address public confusion over carbon footprints and to establish a credible standard. The standard, called Publicly Available Specification (PAS) 2050, was developed by the British Standards Institute in a multi-stakeholder process and released in October, 2008. It sets detailed guidelines for calculating life cycle greenhouse gas emissions for any product or service including raw material extraction and modification, manufacturing, waste production, direct land use change, transport, storage, end use and disposal.

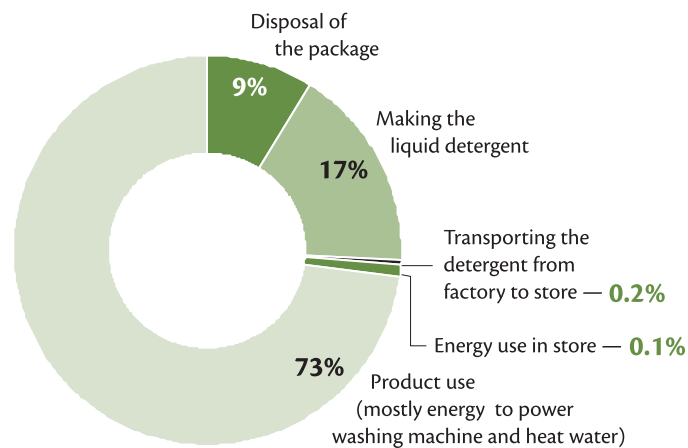
Use of the standard is voluntary but companies that profess to apply PAS 2050 must meet its requirements for setting system boundaries, data quality and the use of primary or secondary data, and for transparency. The result must be expressed in CO₂e per unit of product or service, but there are no further requirements on how to communicate the results of the assessment or the format of a label. The results are valid for two years.

PAS 2050 includes all six GHGs regulated under the Kyoto Protocol and it can be used by organizations and businesses of all types and sizes. Organizations that provide a product or service to an end user assess cradle-to-grave emissions from raw materials to use and disposal. Organizations that supply the product or service to an intermediate organization can measure emissions up to the point it delivers the product or service to another organization, known as cradle-to-gate.

Embodied GHG emissions are differentiated by life cycle and use phase. PAS 2050 requires that all emissions that may materially contribute to embodied GHG emissions must be included. In addition, at least 95 percent of the emissions for both the life cycle and use phases must be included, but if not all emissions are measured, emissions must be scaled up to represent 100 percent of embodied emissions.

The system boundary and function unit for analysis will differ by product; however the standard can be universally applied. The standard is very detailed. For instance, emissions from the use of capital goods such as machinery in producing a product are included, but the emissions from the production of that machine are not. Emissions from direct land modification such as chopping down trees are included; emissions from indirect land use change such as soil tilling are not. Emissions from consumer product use are included; emissions from consumer transport to the store to buy the product or use the service are not. GHG offset mechanisms may not be used to decrease embodied emissions.

- In the United Kingdom, grocery retailer **Tesco** has worked with the Carbon Trust and utilized the PAS 2050 standard (see box above) to provide customers with information on embedded product emissions via a full carbon footprint label. The company started with a pilot project for 20 products sold in its UK stores, including potatoes, orange juice, washing detergent and light bulbs. Now Tesco intends to expand the labeling program to other products and collect information on how its customers are using the information. Tesco also identifies products shipped by air with a "By Air" sticker. It has set and achieved a goal to have air shipped items comprise less than 1 percent of its total grocery stock. Tesco also set a target to sell 10 million energy efficient light bulbs in a year. The company slashed prices by half to attract customers, which led to a quadrupling of sales and attainment of its target.



**Exhibit 13: Carbon Footprinting:
Tesco Laundry Detergent**

Based on 1.5-liter bottle (about 1.5 quarts) of Tesco non-biological liquid wash, 20 loads per bottle and 9.9 pounds of laundry per load.

Source: Ball, Jeffrey. "Six Products, Six Carbon Footprints."
The Wall Street Journal: October 6, 2008

Key Findings: Supply Chain Management

McKinsey & Co. estimates that consumer goods companies have between 40 and 60 percent of their total carbon footprint embedded in their upstream supply chain—including everything from raw materials and energy use to transport and packaging; for retailers, the figure is closer to 80 percent.

The majority of companies evaluated in this study are reporting their Scope 1 and 2 emissions, upgrading the energy efficiency of their stores and offices, and/or taking greater advantage of renewable energy options. But as companies look to expand their efforts into new areas of emission reductions, they are increasingly recognizing that supply chain emissions present a major opportunity to reduce carbon exposure.

For most large companies, the supply chain comprises the largest slice of their overall carbon footprint. McKinsey & Co. estimates that consumer goods companies have between 40 and 60 percent of their total carbon footprint embedded in their upstream supply chain—including everything from raw materials and energy use to transport and packaging; for retailers, the figure is closer to 80 percent. In a survey of 2,000 global executives conducted by McKinsey, more than half said they now recognize the importance of managing their supply chain's carbon emissions, although fewer than a quarter have implemented formal response strategies.¹³

These findings point to the hurdles that companies still face in integrating emissions reductions into supply chain management (SCM). As **IBM** notes in a recent study on carbon management in the supply chain, reducing supply chain emissions requires a “holistic perspective” that involves reassessment of a number of options, including distribution, transportation, components, inventory, design and packaging.¹⁴ Compounding the challenge, there is no established international protocol for calculating supply chain emissions.

Despite these obstacles, this study finds that a growing number of companies are taking actions to reduce their overall carbon footprint. Roughly a third of the evaluated companies are taking some steps to shift to a lower-carbon supply chain. In addition, leading companies are demonstrating some of the tools needed for successful supply chain management. These include:

- Using product life cycle analyses (LCAs) to measure GHG emissions across the supply chain;
- Re-setting supplier standards and supplier engagement tactics to directly address energy efficiency and other climate-related issues;
- Adjusting distribution and other logistics processes to maximize efficiencies.

As IBM concludes in its report, “Incorporating carbon reduction into [a company's] overall SCM strategy... can help reduce [its carbon] emissions footprint, strengthen their brand image and develop competitive advantage... Reducing the supply chain's carbon footprint will become an inescapable obligation.”¹⁵

13. Chris Brickman and Drew Ungerman. *Climate Change and Supply Chain Management*. July 2008. The McKinsey Quarterly.

14. IBM. *Mastering Carbon Management*. 2008. IBM Global Services: Somers, NY.

15. IBM. *Mastering Carbon Management*. 2008. IBM Global Services: Somers, NY.

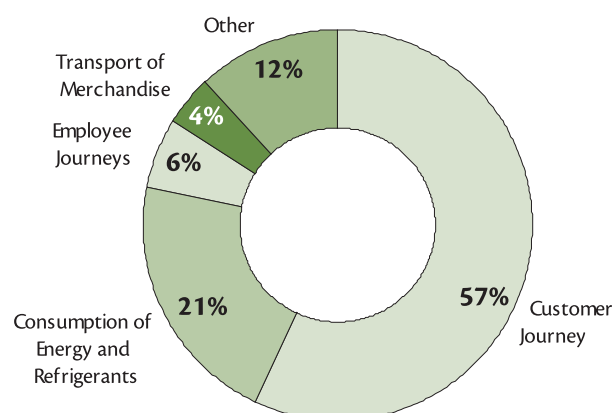


Exhibit 14: Supply Chain GHG Emissions: Carrefour's Chambourcy Hypermarket

Source: Carrefour Group 2007 Sustainability Report

Setting the Standard

If measuring basic Scope 3 emissions remains a challenge, it will be harder still to measure GHG emissions throughout the entire supply chain—upstream as well as downstream. In both regards, the need to establish a consistent reporting methodology is paramount. The World Resources Institute and the World Business Council on Sustainable Development, which created the international emissions accounting standard known as the GHG Protocol, recently stated that “a broad assessment of the full climate impact of corporate activities has great potential to enable new GHG reductions throughout corporate supply chains worldwide.” In light of this finding, they launched an initiative in 2008 to develop further guidelines for measuring and reporting GHG emissions across corporate and product supply chains.

If measuring basic Scope 3 emissions remains a challenge, it will be harder still to measure GHG emissions throughout the entire supply chain—upstream as well as downstream.

But as international organizations work to develop such a global standard, many companies have taken matters into their own hands. These companies have taken leadership roles in collaborating to develop sector-specific standards for conducting product lifecycle analyses and measuring the carbon impact upstream and downstream of their products.

- In the beverage sector, **Coca-Cola** has undertaken a variety of actions to measure the carbon footprint of its supply chain. In September 2007, it joined eight other companies—including Coors Brewers of **Molson Coors**—to implement a draft product carbon footprinting tool known as PAS 2050, which was developed by the Carbon Trust, Defra, and the British Standards Institute (see sidebar on Carbon Footprint Assessment, pg 40). The companies agreed to use the tool to calculate the lifecycle carbon emissions of several products. In addition, **Molson Coors** is working with the Beverage Industry Roundtable to define boundaries and methodologies for calculating lifecycle GHG emissions specific to the beverage industry.
- In the technology sector, companies such as **Dell**, **Hewlett-Packard** and **IBM** (as well as **Applied Materials** from the semiconductor sector) are working through the Electronic Industry Citizenship Coalition (EICC) to develop a common approach for the electronics industry to measure emissions in the supply chain.

In addition to their collaboration with the EICC, **Hewlett-Packard** and **IBM** have developed internal and client-focused tools to measure supply chain emissions, making supply chain management a central focus of their climate change strategies.

- **Hewlett-Packard** announced in September 2008 that it has collected emissions data associated with all of its largest suppliers, which represents more than 80 percent of the company's cost for materials, manufacturing and assembly of its products worldwide. HP is the first major technology company to achieve this goal.
- **IBM** has developed a new supply chain carbon analysis tool, the Carbon Tradeoff Modeler, which allows companies to tweak their operations and see how changes to packaging, transportation and inventory would affect their carbon footprints. The tool helps companies evaluate tradeoffs in supply chain decisions between GHG emissions reductions and other factors such as on-time delivery or high inventory levels.

Engaging with Suppliers

Measuring GHG emissions in the supply chain is just the start. While there are many steps companies can take to cut supply chain emissions, they cannot do everything alone. As with all supply chain management initiatives, suppliers themselves must play an active role in achieving effective emission reductions and supplier engagement is critical. As McKinsey & Company notes in a recent study, “Top companies regard climate change as an opportunity to get closer to suppliers—effectively reducing both costs and carbon in their supply chains.”¹⁶

Engaging with suppliers offers companies the opportunity to form closer relationships and better manage reputation risk across a range of issues.

Many of the companies analyzed in this study are making strides in managing their supply chain emissions by sharing knowledge with suppliers on how to achieve further GHG emission reductions. Altogether, 14 of the companies have set environmental standards for their suppliers. Of these companies, nine have integrated climate-specific factors, such as energy efficiency and GHG emissions reporting, into their supplier standard policies.

- **Dell** has set expectations for its suppliers to manage, improve and report publicly on their GHG emissions as a consideration for awarding business. In addition, the company has set business requirements for its Tier 1 suppliers to publicly disclose their GHG emissions during Quarterly Business Reviews. In 2007, Dell hosted an Asia Climate Impact Supplier Summit in Taipei to educate its suppliers on the company's climate change strategies.
- **H&M** has set specific requirements for all suppliers to meet minimum emissions standards for road transport. In addition, the company requires that 75 percent of all drivers must have received theoretical and practical training in fuel-efficient driving.
- **Taiwan Semiconductor Manufacturing** announced in 2008 that it would require all key suppliers to conduct a GHG emissions inventory and implement GHG emissions reduction measures.
- **adidas** surveyed its suppliers on their environmental priorities in 2005. After determining that energy consumption was a major concern among suppliers, the company held a series of energy efficiency training workshops in 2007 for more than 100 suppliers in China and Vietnam.
- **Nike** is performing audits of its key footwear manufacturing factories – also located mainly in Vietnam and China—to identify energy-intensive processes and potential areas of savings.
- **Applied Materials** has added factors such as energy usage, energy efficient products, and carbon inventories to its existing supplier scorecards to evaluate suppliers on their climate change performance.
- Similarly, **McDonald's** uses a Supplier Quality Index to evaluate its suppliers. The company recently included guidelines related to energy efficiency and renewable energy to these evaluation parameters.

Supply Chain Leadership Collaboration: In September 2007, **Wal-Mart** announced that it was partnering with the Carbon Disclosure Project to launch a pilot program of the CDP Corporate Supply Chain Programme. The retail giant announced that it would use the CDP survey methodology to engage its suppliers on a range of climate change-related issues, focusing initially on seven of its main supply sectors. (See box on Wal-Mart for further details.) Growing out of this announcement has been the formation of a CDP Supply Chain Leadership Collaboration, now heading into its second year, which has been pivotal in driving corporate engagement with suppliers on climate change. Of the companies evaluated in this study, 10 have joined the initiative: **Tesco, Procter & Gamble, Colgate-Palmolive,**

16. Chris Brickman and Drew Ungerman. *Climate Change and Supply Chain Management*. July 2008. The McKinsey Quarterly.

Carrefour, Wal-Mart, Hewlett-Packard, Dell, IBM, Johnson & Johnson and L’Oreal. In addition to Wal-Mart, both Tesco and Procter & Gamble were founding members of this program.

Logistics/Distribution

While suppliers are hugely important, the changes companies make to their own logistics systems are also critical in the shift to a low-carbon supply chain. Procedural changes such as shipment consolidation, localized sourcing, employment of alternative information sources and network optimization can all significantly reduce a company’s carbon footprint. Just under a third of the companies in this study have made system-wide improvements to their logistics to reduce GHG emissions. An additional six companies have made minor changes to reduce the GHG emissions associated with their logistics systems. Companies in the **grocery and drug retailers, big box retailers and technology** sectors have on average done the most to make system-wide improvements to their logistics and distribution processes in order to reduce GHG emissions.

Focus on transportation: For companies operating their own truck fleets, much of the opportunity to reduce embedded GHG emissions in their supply chain rests on fleet efficiency upgrades and use of alternative fuels. **Whole Foods**, for example, is converting its entire truck fleet to bio-diesel fuels and retrofitting vehicles with aerodynamic aprons to cut down on wind resistance and lower fuel consumption. Roughly half of Whole Foods’ distribution centers use trucks that run on bio-diesel fuel.

Other companies have made significant strides in reducing the number of miles traveled by distribution fleets through shipment and warehouse consolidation, more efficient routing and encouragement of pooling among their suppliers.

- **Carrefour** is actively working with its suppliers to reduce the number of “empty kilometers” traveled by promoting pooling among suppliers for warehouse deliveries and using consolidation warehouses where goods are delivered by suppliers and then re-distributed by Carrefour in fully-loaded trucks.
- **CVS** decreased the total miles driven by its fleet 2.2 percent in 2007 through efficiency improvements in its distribution centers, despite a rise in the number of products transported. For example, the company’s logistics group consolidated its distribution centers into one location for its core stores in Arizona, Nevada and California, improving the efficiency of its distribution system in the region.
- In 2008 **Best Buy** made improvements to its logistics operations, decreasing the number of trucks on the road and eliminating over 18,000 trips for its transportation vendors.

Focus on Wal-Mart

While a number of companies in this study have taken steps to work with suppliers in implementing emissions reduction strategies, most have employed one—or at most a couple—supplier engagement strategies, such as conducting trainings, developing supplier scorecards or auditing suppliers’ operations. Wal-Mart, however, has done all three of these things.

In January 2008, Wal-Mart CEO Lee Scott announced his company’s commitment to build the “Supply Chain of the Future.” This announcement followed Wal-Mart’s agreement with the Carbon Disclosure Project in September 2007 to measure the energy use and emissions of the entire supply chain of seven product categories, including beer, DVDs, milk, soap, soda, toothpaste and vacuum cleaners. The company plans to use this information to develop energy efficiency and emissions management strategies for the supply chain of these products. In addition, Wal-Mart has announced its commitment to develop supplier scorecards to evaluate the carbon footprint of its suppliers and products.

In addition, Wal-Mart has implemented a Supplier Energy Efficiency Program through which the company conducts energy efficiency audits and retrofits of participating suppliers’ buildings. The purpose of the program is to facilitate information sharing between Wal-Mart and its suppliers, giving suppliers the opportunity to learn from Wal-Mart’s own experiences in lowering its energy consumption in its vast array of stores and warehouses.

In October 2008, Wal-Mart launched a China-focused supplier engagement program, called the China Initiative. The company convened 900 leading suppliers, Chinese officials and other key stakeholders for a Sustainability Summit in Beijing to launch the initiative. Wal-Mart is developing metrics by which to measure the progress of its Chinese suppliers on integrating climate change and other environmental and social considerations into their business.

As the largest retailer in the world, much of Wal-Mart’s climate impact lies in its massive global supply chain. The company has made many steps in the right direction towards addressing the GHG emissions associated with its supply chain; the true test will be whether these initiatives are carried through to result in effective supply chain management practices and measurable GHG emissions reductions.

Examples of Company Best Practices: Moving to a Low-Carbon Supply Chain

Logistics	<ul style="list-style-type: none"> • Warehouse consolidation • Truck fleet efficiency upgrades • Alternative transport • Supplier pooling • Minimization of “empty miles” (co-deliveries, backhauling, etc.) • Shipment consolidation • Minimization of employee and customer travel – store locations • Local sourcing • Inventory management
Materials/Packaging	<ul style="list-style-type: none"> • Packaging reduction • Material replacement • Returnable/reusable packaging • Product carbon labeling • Product life cycle assessment
Supplier Engagement	<ul style="list-style-type: none"> • Supplier trainings • Supplier standards or scorecards • Mandatory GHG emissions reporting • Supplier collaborative programs • Factory energy audits

A number of companies have also committed to using alternative methods of transportation, such as by waterway or rail, to reduce emissions. **Canon** reports that in 2007 the company was able to reduce CO₂ emissions by 3,840 tons by shifting to rail transport in Japan. **Carrefour** has set a goal to transport 40 percent of its import flows in France by waterway or rail.

Clearly, GHG emissions management across the supply chain will play an increasingly important role in corporate climate change strategies going forward. Engaging with suppliers offers companies the opportunity to form closer relationships and better manage reputation risk across a range of issues. Transforming transportation and logistics systems offer companies the chance to find significant cost savings, particularly during a period of volatile fuel prices. Companies are also looking closely at the raw materials that make up their products as well as packaging materials to reduce embedded emissions and shipping weight, which in turn lowers fuel use and emissions.

There is much more that can be done in this area. Collaboration within and across industry sectors on supply chain emissions measurement standards and supplier engagement programs will be critical. This study also finds that the leadership of a few companies can quickly spur others into action.

Overall, the consumer and technology companies examined in this report are realizing that effective energy and GHG emissions management is now fundamental to sound business policy, no matter what sectors or regions they operate in. Companies with consumer-facing products and services are beginning to take actions to mitigate climate risks and seize related commercial opportunities, but much more needs to be done to strengthen governance of climate change issues, set and meet aggressive emission reduction targets and transform business models to address the realities of a carbon-constrained world.

Appendix I: Company Profile Key

Please see the next section for a sample company profile.

All 63 company profiles can be accessed online at: www.ceres.org/publications

Board Oversight (Total possible points: 12)

Board Committee/Member: Names board-level committee or member with explicit oversight of company's climate change response strategies.

Board Role: Describes Board of Director's role in developing, approving and/or monitoring the company's climate change response strategies.

Board Training: Describes if the Board of Directors has received training and education addressing climate change and/or sustainability issues.

Management Execution (Total possible points: 20)

CEO Leadership: Describes CEO's role in the company's climate change response strategies, including possible public statements, involvement in policy development and external initiatives.

Company Strategy: Describes overall company strategy to address climate change risks and opportunities, including any published environment or climate-specific internal policy statements.

Executive Responsibility: Describes management structure and delineation of responsibility to execute climate change response. Include names and titles of key executives with climate change responsibility.

External Initiatives: Describes company participation in external coalitions, working groups or initiatives to mobilize action on climate change.

Employee Training: Describes training and education for employees on climate change and/or sustainability issues.

Executive Compensation: Describes criteria used to link executive officer compensation to attainment of environmental and/or climate-related goals.

Public Disclosure (Total possible points: 14)

Annual Report: Summarizes discussion of climate change risks, opportunities and initiatives in most recent Annual Report.

Securities Filings: Summarizes discussion of material climate change risks and opportunities in Form 10-K, 20-F or equivalent securities filings.

Other Disclosure: Summarizes disclosure of climate change risks, opportunities and initiatives in sustainability report and/or on website.

Carbon Disclosure Project: Indicates whether company has publicly answered the most recent Carbon Disclosure Project (CDP) questionnaire. CDP is a nonprofit organization that conducts an annual climate change survey on behalf of institutional investors.

CDP6 Risk Disclosure: Summarizes assessment of climate change-related physical, regulatory, material and/or other risks in CDP6 response.

Public Policy: Describes support for climate change regulatory proposals and related public policy measures.

Emissions Accounting (*Total possible points: 16*)

GHG Emissions Inventory: Outlines most recent inventory of greenhouse gas (GHG) emissions from company operations and supply chain. Provides year, facility/region covered and reporting protocol used.

Scope 1: Direct GHG emissions from combustion in company-owned or controlled sources (boilers, furnaces, vehicles, etc.)

Scope 2: Indirect GHG emissions from generation of electricity purchased for use by company facilities.

Scope 3: Other indirect GHG emissions from company activities (e.g., employee commuter travel; business travel by air, rail or motor vehicles; other indirect emissions from product use or supply chain).

Accounting Methods: Describes accounting methods used for GHG emissions inventory.

External Verification: Describes third-party audit and/or verification of GHG emissions data.

Certified CO₂ Offsets: Describes purchase of certified carbon offsets/credits to offset company emissions.

Strategic Planning (*Total possible points: 38*)

Emissions Reduction Targets: Outlines targets set by company to reduce GHG emissions or related energy use. Includes breakdown of total emission, energy efficiency and renewable energy targets, as applicable.

Target Details: Includes any additional information on target schedules or scope, as well as more specific targets relevant only to certain business lines or regions of operation.

Target Achievement: Describes if company has achieved a previous emissions target and/or quantified progress toward achievement of current target.

Energy Efficiency: Describes measures taken to improve energy efficiency of company's own operations. Any energy efficiency measures related specifically to products (including property portfolios for real estate developers) is included in the section below, Products & Services.

Renewable Energy: Describes purchases of renewable energy for company operations, on-site generation of renewable energy and/or investment in renewable energy technology development.

Emissions Trading: Describes engagement in voluntary or mandatory GHG emissions trading programs to offset company's GHG emissions.

Products and Services: Describes pursuit of strategic business opportunities associated with climate change, including measures to reduce emissions associated with products/services, marketing of these products/services and development of new products/services.

Research & Development: Describes investment in research & development for low-carbon products, technologies or services.

Supply Chain Management: Describes measures taken to reduce emissions associated with company's supply chain, including: a) supplier engagement; b) material replacement/packaging reduction; c) logistics improvements.

Appendix II. Sample Company Profile

INTERNATIONAL BUSINESS MACHINES CORP.

NEW YORK STOCK EXCHANGE – IBM
Technology

IBM has had a long track record of environmental protection, reporting publicly on the company’s impact and innovating to find new solutions for customers, particularly in the area of energy efficiency. The company has already met a suite of first generation greenhouse gas (GHG) emission reduction and energy conservation targets and has announced a set of new targets through 2012. Of particular note are IBM’s innovations in product development – from data centers to microprocessors – but also the company’s research collaborations on issues ranging from traffic congestion pricing systems to solar cell technology.

Summary Score: 79

Company Information

International Business Machines (IBM) is the world’s largest provider of computer products and services. The company makes mainframes and servers, storage systems and peripherals. In addition, IBM’s growing services business now accounts for more than half of its sales. Its IT services arm is the largest in the world and the company is also one of the largest providers of both software and semiconductors. The company had approximately 420,000 employees as of December 2007.

Contact Information

Chairman/CEO: Samuel J. Palmisano
Website: www.ibm.com
Address: New Orchard Rd., Armonk, NY 10504, United States

Board Oversight

Score: 8

Board Committee/Member	Directors and Corporate Governance Committee
Board Role	IBM’s Directors and Corporate Governance Committee, formed in 1993, is responsible for reviewing the company’s policies and practices on corporate public responsibility, including protection of the environment. This committee reviews IBM’s energy conservation and climate protection goals and performance annually. In addition, the entire Board of Directors receives a report on energy and climate goals and performance annually.
Board Training	None identified.

Management Execution

Score: 17

CEO Leadership	CEO Samuel Palmisano agreed to invest in the company’s “Project Big Green” initiative (discussed below in Products & Services), following an online brainstorming session in November 2006 that included thousands of employees, business and university partners.
Company Strategy	IBM established its first corporate policy on environmental protection in 1971. The company has a comprehensive global environmental management system that governs IBM’s operations worldwide, as well as specific programs and goals on energy conservation and climate protection. The company’s 2006 <i>Environmental Report</i> states, “IBM has applied its technical and engineering expertise to voluntarily reduce emissions associated with its own operations and to help its clients by creating products and offering solutions that are increasingly energy efficient.”

INTERNATIONAL BUSINESS MACHINES CORP.

IBM's "carbon management hierarchy" starts with energy efficiency and resource conservation efforts, followed by the use of renewable, low CO₂-emitting energy sources and the use of abatement technology to manage PFC emissions. A similar focus on energy efficiency is found across the company's product design efforts. In addition, in 2006, IBM updated its corporate-wide energy conservation goal, decoupling the measurements for energy conservation from renewable energy sourcing.

Executive Responsibility

IBM's Corporate Environmental Affairs staff has responsibility for setting the company's overall environmental strategy and goals, including those for energy conservation and climate protection. IBM's Vice President, Corporate Environmental Affairs & Product Safety reviews the company's strategy, goals and performance with the Directors and Corporate Governance Committee of IBM's Board of Directors annually. Additionally, within operating units, IBM employees serve as team leaders for environmental affairs and all product design and development groups have an assigned employee to manage integration of product stewardship and environmental considerations.

External Initiatives

IBM has been a member of the Business Environmental Leadership Council of the Pew Center on Global Climate Change since 2000. The company is also a charter member of the WRI Green Power Market Development Group, World Wildlife Fund's Climate Savers Program, US EPA Climate Leaders program, the Chicago Climate Exchange, and participates in the EPA Green Power Partnership and SmartWay Transport Partnership programs. IBM is also a founding member of the Green Grid and in April 2007 established the Intelligent Utility Network Coalition to accelerate the adoption of systems for monitoring and managing electric grids. Finally, the company has formed with The Nature Conservancy the Great Rivers Partnership, which will produce a new computer-modeling framework for major river basins around the world, also enlightening climate change adaptation considerations.

In January 2008, IBM also announced it was joining with the World Business Council for Sustainable Development and other companies to establish Eco-Patent Commons. The initiative will make public a suite of patents focused on innovations in environmental protection in manufacturing and business processes, including energy efficiency and pollution prevention technologies.

Employee Training

IBM recently held an internal *Innovation that Matters* video contest for which employees submitted videos related to energy and environment practices with clients, at work and in their homes.

Executive Compensation

IBM employees who have responsibility for the company's energy conservation and climate protection programs have the attainment of energy and GHG goals included as part of what IBM calls their "personal business commitments" and in their annual performance evaluations. These performance evaluations are used to determine both annual salary increases and bonus pay.

In addition, IBM has an IBM Chairman's Environmental Award recognition program, which it established in 1991. The purpose of this annual award is to encourage environmental leadership and strengthen integration of environmental affairs throughout IBM's business. In 2006, the program was modified to focus solely on energy conservation, energy efficiency and climate goals in IBM's operations, products and services. IBM's Chairman presented the 2007 award to the company's Systems & Technology Group.

INTERNATIONAL BUSINESS MACHINES CORP.

Public Disclosure

Score: 8

- Annual Report* In the introduction to IBM's 2007 Annual Report, the company mentions its green data center and energy efficiency solutions as a differentiator for the company in terms of infrastructure leadership.
- Securities Filings* In IBM's 2007 Form 10-K the company lists the following as Innovation Initiatives: "the design of smaller, faster and energy-efficient semiconductor devices; systems virtualization, Green Data Centers and the design of 'grid' computing networks that allow computers to share processing power."
- Other Disclosure* IBM has been producing an annual "IBM and the Environment Report" since 1990, including information on energy conservation and climate protection programs and performance. Similar information is also included in the company's annual corporate responsibility report and on IBM's Energy & Environment website (www.ibm.com/ibm/environment).

Sustainability Report: 2007 Corporate Responsibility Report, December 2007

URL: http://www.ibm.com/ibm/environment/annual/IBM_CorpResp_2006.pdf

GRI Accordance: G3 – A Self Declared

- Carbon Disclosure Project* Answered Questionnaire (Public)
- CDP6 Risk Disclosure* IBM expects to be less affected by GHG regulations compared to other companies and industries. The company mentions the EU 20/20 energy efficiency objective and the Australia Energy Efficiency Law as examples of regulations that may affect the cost and availability of energy for IBM's operations and supply chain. On the other hand, the company does not see itself exposed to any "unusual physical risks" due to climate change. One area that could be impacted is the company's semiconductor manufacturing, which is water intensive; however, the company has implemented water conservation programs.
- Public Policy* IBM says it does not engage directly in advocating for particular regulatory schemes on climate change, given the nature of its business and relative low exposure to GHG control measures compared to other industries. Instead, IBM says in its most recent Carbon Disclosure Project response that the company believes it "can best contribute by taking actions to demonstrate the feasibility and benefits of increasing efficiency, reducing emissions, and designing energy efficient products." The company shares its best practices in these areas with other companies, NGOs and policymakers.

INTERNATIONAL BUSINESS MACHINES CORP.

Emissions Accounting

Score: 11

GHG Emissions Inventory

Year: 2007

Facility/Region: Global

Protocol: GHG Protocol

Emissions	CO ₂ e (Metric Tonnes)
Scope 1 (Direct)	599,470
Scope 2 (Indirect –Electricity)	2,265,648
Scope 3*	—
Travel	—
Logistics	—
Products	—
Supply Chain	—

* While IBM has business travel, logistics, products and supply chain programs in place to reduce GHG emissions, the company has not specifically quantified any Scope 3 emissions to date.

Accounting Methods

IBM's emissions inventory applies to all facilities owned and leased globally which support operations. The company uses the GHG Protocol and the US EPA Climate Leaders GHG Inventory Guidance. Factors for PFC global warming potentials are taken from the IPCC 2nd assessment protocol.

External Verification

IBM's emissions inventories are audited three ways: 1) by FINRA (formerly NASD) under participation in the Chicago Climate Exchange (Canada, Mexico and the US), 2) by the US EPA Climate Leaders program (Global), and 3) by Bureau Veritas Certification as part of IBM's ISO 14001 global facility audits.

Certified CO₂ Offsets

None identified.

Strategic Planning

Score: 35

Emissions Reduction Targets

	Target	Baseline Year	Target Year	Region
GHG Emissions (Absolute)	12%	2005	2012	Global
Energy Use	3.5% in savings	—	Annual	Global

Target Details IBM has set a number of second generation GHG emission reduction goals after surpassing its original goal. The company's main goal is to reduce CO₂ emissions associated with energy use by 12 percent between 2005 and 2012. Other goals include:

- Reduce PFC emissions, which are potent greenhouse gases, from semiconductor manufacturing 25 percent by 2010 against a base year of 1995, consistent with that of the World Semiconductor Council goal. This is a second generation goal after the company met a goal in 2002 to reduce PFC emissions by 40 percent also against a 1995 baseline.
- As part of the US EPA Climate Leaders (Phase II) goal, reduce total global GHG emissions by 7 percent from 2005 to 2012.
- As part of the Chicago Climate Exchange Phase II program, reduce CO₂ and PFC emissions in North America by 6 percent by 2010 as measured against the annual average direct and indirect emissions for the period of 1998 to 2001.

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In addition, IBM has set a goal to complete energy conservation projects that would save, on an annual basis, the equivalent of 3.5 percent of that year's energy usage by the company. This goal had been in place since 1996 and was updated for 2007; it also only recognizes real reductions and not downsizings or cost avoidance actions, such as fuel switching and off-peak load shifting. The company's semiconductor manufacturing operations have also established annual water conservation targets.

Target Achievement

Between 1990 and 2005, IBM reduced or avoided CO₂ emissions by an amount equivalent to 40 percent of its 1990 emissions through its global energy conservation program. The company also achieved its initial US EPA Climate Leaders goal by reducing total global energy-related GHG emissions by an average of 6 percent per year and PFC emissions by 58 percent from 2000 to 2005. However, between 2006 and 2007 IBM's net CO₂ emissions increased by 5 percent as a result of business growth. Against the 2005 base year, IBM has increased its CO₂ emissions by 1.7 percent to date.

Energy Efficiency

IBM's energy management team is responsible for driving energy efficiency initiatives across the company's operations. Energy conservation efforts saved \$19.3 million in 2007 while conserving energy equal to 3.8 percent of total consumption versus the corporate goal of 3.5 percent. These projects avoided approximately 77,000 metric tonnes of CO₂e. In 2006, energy conservation projects reduced or avoided 3.9 percent of consumption, saving \$18.6 million and avoiding 98,000 metric tonnes of CO₂e. Over the longer term, from 1990 to 2007 energy conservation projects at IBM cumulatively reduced or avoided 10.4 million metric tons of CO₂ emissions and saved approximately \$1 billion.

Key energy efficiency initiatives in 2007 include:

- Establishing global best practices teams and checklists for lighting, HVAC, Central Utility Plant, and data center systems. Based on the checklist analysis, IBM committed \$9 million, in each of 2007 and 2008, of dedicated capital to identified energy conservation projects.
- Expanding its re-commissioning program for existing facility building management systems. From 2003 to 2006, IBM re-commissioned 2.6 million square feet of space, achieving annual savings of 17,000 MWh and \$917,000. In 2007, an additional eight locations were evaluated and 25 new sites will be evaluated in 2008.
- Performing thermal profiling and assessment using the IBM-developed Mobile Monitoring Technology (MMT) at three data centers in the US and Canada. These assessments identified opportunities for over 0.6 MW (6 percent capacity reduction) demand reduction and a corresponding usage reduction of over 5500 MWh per year (11 percent use reduction).

For the company's own data centers, the IBM technology delivery team also announced plans to double their computing capacity within the next three years without increasing power consumption or their carbon footprint. Compared to doubling the size of its data centers by building out new space, IBM expects this will help save more than five billion kWh of energy per year. IBM will also consolidate about 3,900 computer servers onto about 30 System z mainframes running the Linux operating system, which is expected to reduce energy consumption by approximately 80 percent.

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IBM also has several programs in place to reduce employee travel. Over 100,000 employees participate in the company's work at home and mobile employee programs. In the US alone, IBM estimates that its work at home program avoided approximately 64,000 metric tons CO₂ in 2007. Globally, the company also provides support for the use of public transit, alternative transport and high mileage leased vehicles. Finally, IBM uses several IT collaboration tools, such as web and video conferencing, to reduce employee business travel. IBM has received numerous awards dating back to 1998 from the US EPA and others for its energy efficiency and climate protection efforts.

Renewable Energy IBM is a charter member of the WRI Green Power Market Development Group and through this group purchased over 96,000 MWh of Renewable Energy Certificates (RECs) in the US in 2006 and 2007. The company ranked 12th on the US EPA's Fortune 500 list of Green Power Partners for 2007. The company also reports in its most recent Carbon Disclosure Project response that global purchases of renewable energy grew by 24 percent between 2006 and 2007, increasing from 368,000 MWh to 455,000 MWh. These purchases represented 8.5 percent of the company's 2007 global electricity use.

Emissions Trading IBM became a charter member of the Chicago Climate Exchange in 2003 and registered its North American GHG inventory in order to gain practical experience in a cap and trade system. The company has extended its membership through 2010 and engaged in limited trading on the exchange, but expects to meet its voluntary CCX emission reduction commitment without having to trade any credits. In addition, IBM has one facility in Ireland and four facilities in the UK covered under Phase I of the EU ETS. The company says that management of the EU ETS allocation has not had a material impact on facility operating costs.

Products & Services IBM established a formal Product Stewardship program in 1991, focusing on product design for environment and product energy efficiency. The company's innovations have ranged from energy efficient hardware and software solutions and intelligent transportation and utility systems to solar farm technology and consulting services on carbon management. In May of 2007, IBM announced "Project Big Green" to further expand its data center and product energy efficiency goals, as well as to leverage IT expertise for water management projects. The initiative is redirecting \$1 billion per year across the company's businesses to increase energy efficiency in IT. As one example, new generations of hardware products have achieved improvements ranging from 14 to 73 percent in computing performance per unit of energy in 2007.

IBM offers several products specific to energy management and technology. Beyond virtualization services, Active Energy Manager is a hardware/software tool that enables customers to meter and control power usage on an individual server, while Tivoli management software allows for energy management across a data center. In its Cool Blue portfolio, technology solutions include Calibrated Vector Cooling and Rear Door Heat Exchanger for server systems, as well as high efficiency power supplies. The company also continues to innovate in processor level power management and energy efficiency solutions. IBM's newest POWER6 chip doubles performance at virtually unchanged power usage.

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The company's Data Center Power Management solutions combine hardware/software solutions with IT and facilities integration and control systems. Services for existing and new data center planning include:

- Data center thermal assessment
- Data Center and Facilities Strategy Services
- IT Facilities Assessment, Design and Construction Services
- IT Facilities Consolidation and Relocation Services
- Specialized Facilities Services – includes intelligent and green building construction and facility management control systems

Research & Development

IBM is applying its research and IT expertise to several environmental challenges, including the intelligent energy grid, smart transportation systems, biofuel development, energy and material use optimization and logistics planning. As one example, the company worked with the city of Stockholm, and previously with Singapore, to provide traffic management and congestion pricing systems. IBM also has a specific "Alternative Energy Research Program" currently working on photovoltaic research and low energy membranes for batteries, water filtration and other applications. In May 2008, the company announced a breakthrough in using its nanotechnology and semiconductor expertise to cool concentrator photovoltaic (CPV) cells, a technology that could significantly reduce the cost of generating solar electricity if commercialized.

Supply Chain Management

In conjunction with its participation in the Electronics Industry Citizenship Coalition, IBM is participating in a working group to develop a common approach that the electronics industry could use to encourage suppliers to inventory and reduce their GHG emissions. IBM is also participating in the Carbon Disclosure Project Supply Chain Leadership Collaboration by querying a selected sample of its suppliers on energy use and GHG emissions. In May 2008, IBM introduced the Carbon Tradeoff Modeler analysis tool that allows companies to analyze and manage the climate impact of their supply chains. The tool allows organizations to understand the outcome of critical tradeoffs to make smarter energy choices and better economic decisions by optimizing on service levels, quality, cost and CO₂ emissions.

In terms of logistics, the IBM Global Logistics team has been working on optimizing operations through several initiatives. IBM is a participant in the US EPA SmartWay Transport program and more than 80 percent of North American shipments are transported by SmartWay partners. Specific SmartWay requirements have also been extended to global distribution operations. The team has also reduced warehouse space and shifted some shipments to more efficient ground and ocean transport.

IBM's package design team now factors transport modes, fuel efficiencies and other options resulting in fewer CO₂ emissions into the early stages of the package development cycle. The team has introduced new packaging systems reducing weights for three product types by over 180 tonnes. The team is focusing on the packaging design for both IBM products and those of its suppliers.



About the Authors

The authors of this report are members of RiskMetrics' Climate Risk Management Team. Doug Cogan leads this team and has more than 20 years of experience in studying investment responses to climate change. Prior to joining RiskMetrics Group, he worked with the Investor Responsibility Research Center and Institutional Shareholder Services, where he wrote several other publications for Ceres and the Investor Network on Climate Risk, including two prior editions of Corporate Governance and Climate Change: Making the Connection. His co-authors on this report are climate change senior analysts Megan Good and Geri Kantor and research analyst Emily McAteer.

About RiskMetrics Group

RiskMetrics Group is a leading provider of risk management products and services to financial market participants. By bringing transparency, expertise and access to the financial markets, RiskMetrics helps investors better understand and manage the risks inherent in their financial portfolios. Solutions address the market, credit, portfolio, governance, accounting, legal and environmental risks of clients' financial assets. Headquartered in New York with 19 offices worldwide, RiskMetrics Group serves more than 2,300 institutions and 1,000 corporations in 50 countries. For more information, please visit www.riskmetrics.com.

About Ceres

Ceres is a national coalition of investors, environmental groups, and other public interest organizations working with companies to address sustainability challenges such as climate change. Ceres also directs the Investor Network on Climate Risk, a group of more than 70 institutional investors from the US and Europe managing over \$7 trillion of assets. INCR was launched at the Institutional Investor Summit on Climate Risk at United Nations Headquarters in 2003. The purpose of INCR is to promote better understanding of the risks of climate change among institutional investors. For more information, visit www.ceres.org and www.incr.com.

For more information, contact:

Anne Kelly
Director of Governance Programs
Ceres, Inc.
99 Chauncy St., 6th Floor
Boston, MA 02111
kelly@ceres.org

www.ceres.org
www.incr.com



Ceres
99 Chauncy Street
Boston, MA 02111
T: 617-247-0700
F: 617-267-5400
www.ceres.org

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