

*Climate change affects your company's competitive landscape in ways you might not realize. Here's how to map your risks—and opportunities.*

## Competitive Advantage on a Warming Planet

by Jonathan Lash and Fred Wellington

Included with this full-text *Harvard Business Review* article:

- 1 [Article Summary](#)
  - The Idea in Brief—*the core idea*
  - The Idea in Practice—*putting the idea to work*
- 2 [Competitive Advantage on a Warming Planet](#)
- 11 [Further Reading](#)

A list of related materials, with annotations to guide further exploration of the article's ideas and applications

---

# Competitive Advantage on a Warming Planet

## The Idea in Brief

Global warming is affecting your business, no matter what industry you're in. You face numerous climate-change risks—including tough emission-reduction legislation, damaging backlash from environmentally concerned consumers, and weather-related damage to physical assets. Consumers are increasingly taking your environmental record into account when they make purchasing decisions. And investors are already discounting share prices of firms poorly positioned to compete in a carbon-constrained world.

But the risks of climate change also offer new sources of competitive advantage, say Lash and Wellington. How to seize those opportunities? First, measure your firm's contribution to global warming. Then assess your climate-related risks *and* opportunities. Reinvent your business—before rivals do—to mitigate those risks and seize the opportunities.

GE, for instance, launched Ecomagination—a set of clean technologies serving the transportation, energy, water, and consumer product sectors. Revenues from Ecomagination reached \$8.5 billion in 2005, with orders and commitments nearly doubling to \$17 billion.

## The Idea in Practice

Lash and Wellington recommend this four-step process for mitigating climate-related risks and seizing new opportunities for competitive advantage:

---

### STEP 1: QUANTIFY YOUR CARBON "FOOTPRINT"

Using available reporting standards (such as the Greenhouse Gas Protocol), prepare an inventory that provides a true and fair account of your company's greenhouse gas emissions. Differentiate between direct (such as smokestack) emissions and indirect emissions (for example, those resulting from your firm's energy consumption and travel).

By quantifying your carbon "footprint," you signal to investors, customers, and employees your recognition that climate change is a crucial issue. And you begin gaining a broad view of the risks and opportunities presented by a carbon-constrained economy.

---

### STEP 2: ASSESS YOUR CARBON-RELATED RISKS AND OPPORTUNITIES

Consider how the following risks could hurt—or present opportunities to help—your business:

- **Regulatory**—mandatory emissions-reduction legislation
- **Supply chain**—suppliers' passing their higher carbon-related costs to you
- **Product and technology**—rivals' developing climate-friendly offerings before you do
- **Litigation**—lawsuits charging you with negligence, public nuisance, or trespass
- **Reputation**—destructive consumer or shareholder backlash
- **Physical**—damage to your assets through drought, floods, and storms

► Example:  
Forest products company Weyerhaeuser could ask itself questions such as: "Will

milder winters spur wood-beetle populations, damaging trees? Could climate change affect demand for our products, if customers require more energy efficient building materials—or increasingly choose wood over other materials?"

---

### STEP 3: ADAPT YOUR BUSINESS

Based on your assessment of how climate change could affect your company, develop and implement strategies for reducing energy consumption and carbon emissions. And consider how you might reinvent parts of your business to seize new opportunities.

► Example:  
Caterpillar is making its already relatively low emission diesel engines even more efficient. It is also building a new business: making particulate filter systems that can be retrofitted on its own and other manufacturers' engines. In addition, it's studying engines that run on bio-fuels.

---

### STEP 4: DO IT BETTER THAN RIVALS

"Doing well by doing good" isn't enough: You have to beat rivals at reducing your exposure to climate-related risk and finding business opportunities within those risks.

► Example:  
Honda and Toyota have bested competitors (including GM, DaimlerChrysler, and BMW) by making their fleets more fuel efficient than most rivals' *and* taking the lead in commercializing hybrid vehicles.

*Climate change affects your company's competitive landscape in ways you might not realize. Here's how to map your risks—and opportunities.*

---

# Competitive Advantage on a Warming Planet

by Jonathan Lash and Fred Wellington

Whether you're in a traditional smokestack industry or a "clean" business like investment banking, your company will increasingly feel the effects of climate change. Even people skeptical of the dangers of global warming are recognizing that simply because so many others are concerned, the phenomenon has wide-ranging implications.

Investors already are discounting share prices of companies poorly positioned to compete in a warming world. Many businesses face higher raw material and energy costs as governments around the globe increasingly enact policies placing a cost on emissions. Consumers are taking into account a company's environmental record when making purchasing decisions. There's a burgeoning market in greenhouse gas emission allowances (the so-called carbon market), with annual trading in these assets valued at tens of billions of dollars. Even in the United States, which has lagged the rest of the developed world in the regulation of greenhouse gas emissions, the debate is rapidly shifting from whether climate change

legislation should be enacted to when and in what form.

Companies that manage and mitigate their exposure to climate-change risks while seeking new opportunities for profit will generate a competitive advantage over rivals in a carbon-constrained future. We offer here a guide for identifying the ways in which climate change can affect your business and for creating a strategy that will help you manage the risks and pursue the opportunities. We cite examples of very different companies—from Caterpillar to Wal-Mart to Goldman Sachs—that are responding to the various forces unleashed by the growing awareness among business leaders and consumers of the importance of climate change. Our message: It's not enough to do something; you have to do it better—and more quickly—than your competitors.

## **The Effects of Climate Change on the Planet**

Let us stop here for a second and state our belief that climate change does in fact pose a se-

rious problem for the world. The buildup of greenhouse gases in the atmosphere is changing the earth's climate at a rate unprecedented in history. The year 2005 was the warmest on record, and the ten warmest years have all occurred since 1980. Ice in the Arctic, the Antarctic, and Greenland is melting, and virtually all of the world's glaciers are shrinking.

Numerous studies suggest that the warming of the earth's oceans has resulted in more-powerful tropical storms, which generate their energy from warm ocean waters. For example, a U.S. government study released in May 2006 found that the warming of the tropical North Atlantic will contribute to more and stronger hurricanes. In fact, global data show that storms, droughts, and other weather-related disasters are growing more severe and more frequent.

These observed effects are the result of a roughly one-degree-Fahrenheit warming of the planet, an increase that would accelerate under current emission trends, thereby increasing the pace of physical and biological changes. (See the sidebar "How Much Warmer Will It Get?") Half of the fossil fuels ever burned have been used since the end of World War II, and emissions continue to rise rapidly. In order to halt the buildup of greenhouse gases in the earth's atmosphere, global emissions would have to stop growing at all in this decade and be reduced by an astonishing 60% from today's levels by 2050.

The consequences for the planet of inaction on climate change are becoming clear. But what exactly are the business implications?

### The Effects of Climate Change on Your Company

Executives typically manage environmental risk as a threefold problem of regulatory compliance, potential liability from industrial accidents, and pollutant release mitigation. But climate change presents business risks that are different in kind because the impact is global, the problem is long-term, and the harm is essentially irreversible. Furthermore, U.S. government policies have offered companies operating in the United States little guidance as to how environmental policy may change in the future. Ignoring the financial and competitive consequences of climate change could lead a company to formulate an inaccurate risk profile.

While this obviously has been the case for utilities and energy-intensive industries like chemical manufacturing, it now holds true for most industries. In fact, the most important distinctions to be made when considering environmental risk assessment aren't between sectors but within sectors, where a company's climate-related risk mitigation and product strategies can create competitive advantage.

Government regulators aren't the only ones monitoring individual companies for inadequate climate-related practices. Big investors are beginning to demand more disclosure from companies. For example, the Carbon Disclosure Project, a coalition of institutional investors representing more than \$31 trillion in assets, annually requests information from large multinational companies about their climate-risk positioning. Its most recent report, released in 2006, showed a marked increase not only in the awareness of climate change on the part of the respondents but also in the best practices being developed to manage exposure to climate risk.

Similarly, investor coalitions are filing shareholder resolutions requesting more climate risk disclosure from companies. More than two dozen climate-related resolutions were filed with companies in the 2004 to 2005 period, triple the number from 2000 to 2001.

As Wal-Mart CEO Lee Scott told us, a corporate focus on reducing greenhouse gases as quickly as possible is a good business strategy: "It will save money for our customers, make us a more efficient business, and help position us to compete effectively in a carbon-constrained world."

The far-reaching effects of climate change on business become clearer when you start to think about the different kinds of risk—most of which can be transformed into opportunities—and how they could affect the value of your company.

**Regulatory risk.** This is the most obvious area of impact, whether it takes the form of regulating emissions of the products you make (for example, automobile emission limits for carmakers) or of the manufacturing process you use in creating those products. Companies in much of the world are already subject to the Kyoto Protocol, which aims to reduce carbon dioxide and other greenhouse gases by requiring developed countries—and, by extension, companies operating within those countries—

---

**Jonathan Lash** ([jlash@wri.org](mailto:jlash@wri.org)) is the president and **Fred Wellington** ([fwellington@wri.org](mailto:fwellington@wri.org)) is a senior financial analyst at the World Resources Institute, an environmental think tank based in Washington, DC. The organization receives financial support from corporate foundations and companies, some of which are mentioned in this article.

to limit greenhouse gas emissions.

To meet Kyoto targets, the European Union's Emissions Trading Scheme, for example, grants companies *allowances* that authorize them to emit certain amounts of specified greenhouse gases. If a company's emissions are higher than its allotted allowances, it has to buy additional allowances from other companies. If its emissions are lower than its allotment, it can sell its unneeded allowances on the market. Companies can earn *credits*, which also give the holder the right to emit certain amounts of gases, by investing in emissions abatement projects outside their own organizations and even countries—as when, say, a French company invests in a wind-powered electricity generation project in Brazil. These credits can either be used to offset companies' own emissions or be sold on the market.

Even in the United States, which withdrew from the Kyoto Protocol, various regional, state, and local government policies increasingly affect companies. Seven northeastern states have adopted an agreement to cap carbon emissions from utilities and establish a carbon-trading scheme. (See the sidebar "A U.S. Carbon Market.") California has enacted regulations requiring that from 2008 to 2016, greenhouse gas emissions from new cars be reduced by 30% and has passed legislation to re-

duce total emissions to 1990 levels by 2020. A 2007 executive order also requires a reduction in the carbon content in motor fuels. Twenty states require utilities to obtain a percentage of the power they sell from renewable sources, and more than 218 U.S. cities have adopted programs to reduce emissions.

The U.S. government seems increasingly likely to take some sort of action, possibly in the near future. One 30-country survey, conducted by GlobeScan, shows that 76% of Americans believe global warming is a serious problem, and half believe it is a very serious one. (All the other countries surveyed except Kenya and South Africa reported even greater concern on the part of residents.) Numerous emission-reduction bills have been introduced in the U.S. Congress, and, although federal legislation is still at least several years away, U.S. companies' investments in capital equipment—from power plants to new buildings—represent financial commitments to carbon dioxide emissions that may become very costly under future regulatory regimes.

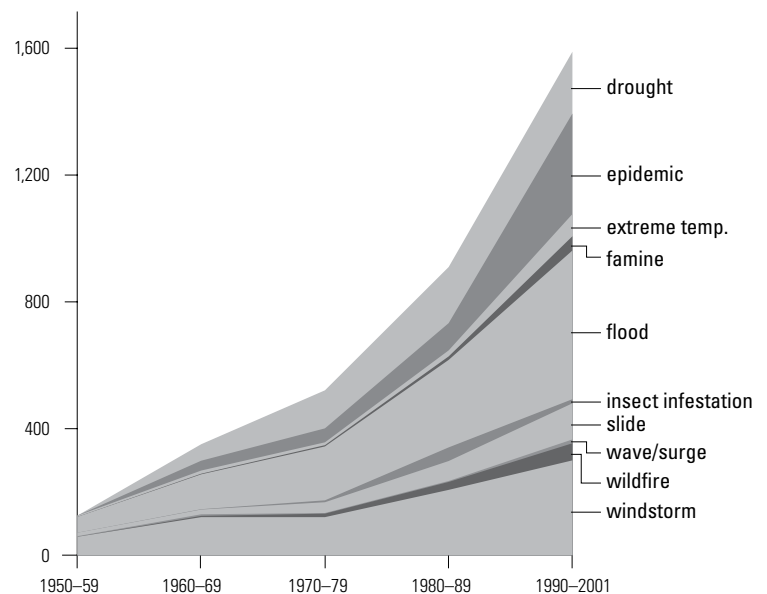
For most businesses, a comprehensive federal policy concerning climate change is preferable to a patchwork of state and local regulations. Consequently, U.S. companies are beginning to shift their political position; more than 40 *Fortune* 500 companies have an-

## How Much Warmer Will It Get?

According to NASA, 2005 was the warmest year in over a century, and the ten warmest years have all occurred since 1980. The shrinking polar ice caps aren't the only apparent consequence: Storms, droughts, and other weather-related disasters—for example, epidemics, whose spread is correlated with temperature and moisture rates—are growing more severe and more frequent.

All that, and the planet has warmed only by roughly one degree Fahrenheit. Most climate models predict a three- to eight-degree rise in global average temperatures if atmospheric concentrations of greenhouse gases reach twice preindustrial levels, something that will happen by 2050 if current trends continue. All of those models show some risk (between 5% and 15%) that the temperature will rise significantly more than that. Furthermore, there is a risk of unknown magnitude that positive feedback mechanisms in the climate system—for instance, the release of methane from melting permafrost in northern Canada, which could contribute to global warming and further melting of the permafrost—will create sudden, nonlinear accelerations in warming.

Frequency of weather-related disasters



Source: Swiss Re

nounced that they favor mandatory federal regulation of greenhouse gases. In January 2007, a group of leading companies, including Lehman Brothers, Alcoa, and Pacific Gas and Electric, called for rapid enactment of mandatory, economy-wide regulatory programs to support a 10% to 30% reduction of greenhouse gases over 15 years in the U.S. At a Senate hearing in 2006, representatives of companies such as General Electric, Duke Energy, and Exelon made the case that it was time to move forward with legislation. They would rather know the rules soon, they said, than be surprised by sudden political urgency.

By immediately initiating an assessment of how future legislation might affect them, companies can manage the regulatory risk and, crucially, gain an advantage over less prescient rivals.

**Supply chain risk.** As they assess their susceptibility to future regulations, companies should also evaluate the vulnerability of their suppliers, which could lead to higher component and energy costs as suppliers pass along increasing carbon-related costs to their customers. Auto manufacturing, for instance, relies heavily on suppliers of steel, aluminum, glass, rubber, and plastics, all of whom are likely to be seriously affected by emissions regulations or—as in the case of aluminum manufacturing, a big consumer of energy—by regulations on their suppliers' suppliers.

A company should also take into account the geographical distribution of its supplier

network. Executives should be aware of how many of their suppliers operate in, say, the European Union, where regulatory structures are already in place. In addition, executives must be mindful that the other climate-related risks discussed here could affect not just their own companies but their suppliers as well.

**Product and technology risk.** Some companies will fare better than others in a carbon-constrained future, depending on their ability to identify ways to exploit new market opportunities for climate-friendly products and services.

For example, a technology for converting coal into energy (IGCC, or integrated gasification combined cycle), while currently more expensive than traditional methods used in pulverized-coal plants, can lower aggregate carbon emissions through better efficiency and possibly carbon dioxide capture and storage. In doing so, IGCC would reduce the significant costs that coal-fired plants would face under stricter emissions standards. Companies at the forefront of commercializing such technologies could see significant revenue growth as demand for low-carbon products increases.

Opportunities are not limited to the manufacturing sector. An investment management firm in the United Kingdom, Generation Investment Management, offers investment products that factor in the climate risks facing companies held in its portfolios. The insurance company AIG offers brokerage and greenhouse gas management services to clients participating in markets, such as the one operating in the European Union, for the buying and selling of greenhouse gas emissions allowances and credits.

Indeed, these new carbon markets create all kinds of opportunities for professional services firms, particularly financial institutions. Among other things, financial services firms can help companies craft the complex hedging and trading strategies needed to minimize costs in such markets.

**Litigation risk.** Companies that generate significant carbon emissions face the threat of lawsuits similar to those common in the tobacco, pharmaceutical, and asbestos industries. For instance, in an unprecedented case spearheaded by the former New York attorney general Eliot Spitzer and currently being considered by the U.S. Second Circuit Court of Appeals, eight states and New York City have sued five of America's largest power compa-

## A U.S. Carbon Market

The European Union's market that allows companies to buy and sell greenhouse gas emission credits granted under the Kyoto Protocol has received considerable attention. A similar kind of GHG market is beginning to form in the United States, at least on a regional basis, largely owing to the success of long-standing emissions trading systems for other kinds of air and water pollutants. The Regional Greenhouse Gas Initiative is a multistate government program aimed at reducing carbon dioxide emissions from power plants in the north-eastern U.S. through a mix of emissions

caps and the trading of emissions allowances. The initiative will govern GHG emissions from most electricity-generating units in the region that use more than 50% fossil fuel. Starting in 2009, and at the end of each three-year compliance period thereafter, each regulated source must own allowances equaling its aggregate carbon dioxide emissions during the period. Generating plants can buy, sell, bank, and trade allowances or purchase offset credits from other companies in ways that will keep their compliance costs as low as possible.

nies, demanding that they cut carbon emissions. In a federal district court case in Mississippi, plaintiffs are suing oil and coal companies for greenhouse gas emissions, arguing that they contributed to the severity of Hurricane Katrina. The claims in that case include unjust enrichment, civil conspiracy (against the American Petroleum Institute), public and private nuisance, trespass, negligence, and fraudulent misrepresentation.

Companies that don't adequately address the issue of climate change also can create personal liabilities for directors and officers who become vulnerable to shareholder-related litigation. Swiss Re, for example, has found that such suits constitute a potential exposure in the company's directors and officers insurance portfolio.

**Reputational risk.** Companies also face judgment in the court of public opinion, where they can be found guilty of selling or using products, processes, or practices that have a negative impact on the climate. The potential for consumer or shareholder backlash is particularly high in environmentally sensitive markets or in competitive sectors where brand loyalty is an important attribute of corporate value. In a recent study analyzing the impact of climate change on brand value, The Carbon Trust, an independent consultancy funded by the UK government, found that in some sectors the value of a company's brand could indeed be at risk because of negative perceptions related to climate change. As is the case in other risk areas, companies can turn reputational risk into an opportunity by leveraging practices that show them to be good citizens of the planet.

**Physical risk.** Finally, there is the direct risk posed by the changing climate itself: physical effects such as droughts, floods, storms, and rising sea levels. The insurance, agriculture, fisheries, forestry, real estate, and tourism industries are particularly exposed because of their dependence on the physical environment and the elements. Physical climate risk can also affect sectors such as oil and gas through higher insurance premiums paid on assets located in vulnerable areas. Munich Re, for instance, raised its rates for insuring Gulf Coast oil rigs by 400% in the days after Hurricane Katrina struck. And ripples of physical risk can extend into some unexpected areas: For instance, Coca-Cola studies the linkages

between climate change and water availability and how this will impact the location of its new bottling facilities.

Because companies' exposure to each of these six aspects of climate risk differs greatly, it is essential to generate tailored climate-risk profiles and strategies to mitigate the risk. Of course, companies in a given sector will have similar exposure to certain risks. For example, regulatory risks are more important in the power sector, while supply chain risks are critical in retail industries. But there also are differences within sectors—for example, varying levels of reputational risk.

It's important to remember that for some industries there is a direct upside to climate change, because government policy and public concern will create new needs and new markets. For instance, the "green buildings" market has historically occupied a tiny niche in the construction industry. Now, rising energy prices and resurgent public concern about sustainability have transformed the markets for environmentally friendly materials and technologies into explosive growth areas. The National Association of Homebuilders, for instance, estimates that green buildings will account for 5% to 10% of housing starts in 2010, up from 2% in 2005.

The venture capitalist John Doerr was recently quoted as saying that green technology could match information technology and biotechnology as a significant money-making opportunity. He called climate change "one of the most pressing global challenges" and said that the resulting demand for innovation would create the "mother of all markets."

## Improving Your Company's Climate Competitiveness

In working with firms as they assess their exposure to climate change and begin to develop climate strategies, we have found that the most successful efforts include four key steps, each of which requires strong leadership at the top and involves significant learning across the organization.

**Step 1: Quantify your carbon footprint.** Since you can manage only what you measure, companies need to first understand the source and level of their own greenhouse gas emissions and begin tracking those emissions over time. This quantitative and relatively straightforward task can lead to heightened conscious-

*The consequences for the planet of inaction on climate change are becoming clear. But what exactly are the business implications?*

ness of climate change issues within a company and set the stage for a broader look at the strategic risks and opportunities they pose.

In quantifying their carbon footprint, companies need to create an accurate inventory of their greenhouse gas emissions. They should differentiate between direct and indirect emissions—that is, between their own “smoke-stack” emissions and those resulting from their energy consumption, travel, and other activities. They should also establish and adjust emissions baselines and evaluate best practices in reporting this information. The aim is to identify and prioritize emission reduction opportunities and establish strategies for participating in greenhouse-gas-trading markets.

One method for performing this kind of accounting is the Greenhouse Gas Protocol, which our organization developed with the World Business Council for Sustainable Development. This tool, which has been taken up by the International Standards Organization, has been used by several hundred companies to measure and track their own greenhouse gas emissions and by industry groups, including the International Aluminum Institute and the International Council of Forest and Paper Associations, to develop complementary industry-specific calculation tools. (For a detailed explanation of how to use the protocol—along with a tool to help assess the value of emissions reduction initiatives and to factor climate-related costs into decisions on new capital projects—go to [www.ghgprotocol.org](http://www.ghgprotocol.org).)

The pharmaceutical giant Pfizer has set guidelines requiring it to reduce its environmental footprint by lowering energy consumption. But that goal would be meaningless unless the company first created a systematic audit of its current activities that have a direct and indirect impact on greenhouse gas emissions. Having done that, the company can now identify possible conservation and emissions efficiency projects, which it reports through a companywide energy database. Pfizer has identified more than 600 such projects at all levels of the company.

Companies that quantify their footprints send a strong signal that they recognize the importance of climate change as a business risk—and an opportunity. We know of companies that began by conducting a carbon audit to uncover inefficient and costly energy practices and then moved on to identify opportunities for brand enhancement around the issue of climate change. As we’ll see, these companies eventually leveraged their knowledge about climate-related issues to develop new and profitable products.

**Step 2: Assess your carbon-related risks and opportunities.** The emissions footprint tells only part of the story. After determining the direct and indirect impact your company is having on the climate, you need to broaden your analysis and think strategically about how the six risks could hurt—or offer opportunities that better position—your business.

The forest products company Weyerhaeuser,

## Climate Change and Profitability

One way to look at how climate-related forces will affect your company is to consider their impact on both costs and revenue. A company’s ability to find opportunities in a carbon-constrained world will depend on its skill at hedging against physical climate risk, mitigating regulatory costs, avoiding expensive litigation and other threats to corporate reputation, managing climate risk in the supply chain, investing capital in low-carbon assets, and innovating around new technology and product opportunities.

Here are some prototype questions companies might ask themselves.

### Potential Revenue Drivers

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

### Potential Cost Drivers

- How will regulatory policy affect our costs? (Will we need to purchase emissions allowances?)
- Is there a chance that emissions will also, or alternatively, be taxed?
- What capital expenditures do we face as a result of emissions-reduction plans?
- How much will our raw materials costs escalate? How much will those of our suppliers escalate?
- How much will our energy costs rise?
- How will our risk profile affect our insurance premiums?



*Your company needs to beat competitors in two areas: reducing exposure to climate-related risks and finding business opportunities within those risks.*

whose mills create a significant carbon footprint, has committed to reducing operational emissions by 40% by 2020. But the company should also be considering climate-related issues beyond its emissions profile. Will the transportation costs to deliver its products rise significantly in a carbon-constrained economy? Are there potential physical effects of climate change on its main raw material, trees, such as greater damage by wood beetles because of milder winters?

Another way to assess the effect that climate-related forces will have on your company is to consider their direct and indirect financial impact. You can look at the “carbon intensity” of your profits—that is, what percentage is derived from products with high carbon dioxide emissions. Or you can look at ways in which climate change could affect your revenues and costs. On the cost side, climate change may drive increases in raw material costs, direct regulatory costs, capital expenditures (for example, new facilities with lower emissions levels), insurance premiums for assets located in at-risk areas (such as the Gulf Coast), and possibly even new tax liabilities. Revenues will be affected by your ability to pass these costs on to customers through new pricing structures while exploiting new market opportunities and maintaining market share. (See the exhibit “Climate Change and Profitability.”)

The interplay among the various elements of climate-related risk affects a firm’s cost of capital and ultimately its valuation. Investors will factor a company’s climate exposure into estimates of its future cash flow streams. The degree to which cash flow is sensitive to climate risk will also affect how much cash is available for interest expense and amortization of a company’s debt, ultimately affecting its ratings on bonds and bank debt. Calculating the impact of climate risk on cash flows and costs of capital is critical to understanding your company’s ability to compete in a carbon-constrained future.

**Step 3: Adapt your business in response to the risks and opportunities.** Having assessed the ways in which climate change could affect your company, you will be prepared to develop strategies and make moves based on that knowledge. Those moves range from the obvious reductions in energy consumption and carbon emissions to sometimes wholesale reinventions of parts of your business.

Caterpillar is investing in making its already relatively low-emission diesel engines more efficient. It also has found opportunity in the risk of greater regulation by building a new business that makes particulate filter systems to be retrofitted on its own and others’ engines. The company is studying turbines that run on alternative fuels, as well as combined heat and power generation turbines that recover waste heat. It is poised to commit significant R&D funds to these projects as soon as U.S. regulations put a cost on carbon emissions, thus making alternative fuels and technologies more attractive.

Creative moves aren’t restricted to heavy manufacturing and other industries traditionally unfriendly to the environment. Wal-Mart is in the middle of a three-year plan to reduce energy use at its stores by up to 30%. The initiative, part of a highly publicized plan to boost energy efficiency, cut down on waste, and reduce greenhouse gas emissions, was launched not only to meet current or anticipated regulations but to burnish the company’s reputation in an area where it had been attacked by critics.

In a lower-emissions sector, financial services, another industry in which reputation is important, Goldman Sachs has implemented a coordinated environmental-policy framework that, among other things, requires the measurement and reporting of greenhouse gas emissions attributable to its internal operations. The firm also is active in the burgeoning market for carbon allowances and has a team dedicated to doing research for clients on how environmental issues such as climate change can affect stock market valuations. The company’s stated aim for these programs: to boost earnings.

“We’re committing people, capital, and ideas to find effective market-based solutions to some of the most critical challenges facing the planet,” Mark Tercek, the managing director of the Goldman Sachs Center for Environmental Markets, told us. “We see this as being entirely consistent with our central business objective of serving our clients and creating long-term value for our shareholders.”

**Step 4: Do it better than your competitors.** If Tercek is to be proved right, though, a “doing well by doing good” approach won’t be enough: You have to be better at it than your competitors. And that means beating them in

both areas: reducing exposure to climate-related risks and finding business opportunities within those risks.

Take the auto industry, which we have studied in detail. Consumer concerns about national energy security, climate change, local air pollution, and the cost of filling up at the pump are shaping the competitive dynamics within the industry. In mapping the climate competitiveness of the major automakers three years ago, we looked at two things: how well they were positioned vis-à-vis climate risk and how they were managing climate opportunities. The analysis found that Honda and Toyota were best positioned to sell cars in a

carbon-constrained economy, not only because their current fleets were more fuel efficient than most of their rivals' but also because they were leaders in the commercialization of hybrid vehicles. GM and Ford were burdened with above-average cost exposure because of the high proportion of fuel inefficient vehicles like SUVs and pickup trucks in their product lines. (Even among these gas-guzzlers, carbon emissions vary by as much as 40%, with the U.S. automakers' models being the least fuel efficient.) Detroit's failure to develop innovative low-carbon technologies may be the greatest obstacle to their recovery. (For a look at how other automakers per-

## Plotting Your Climate Competitiveness

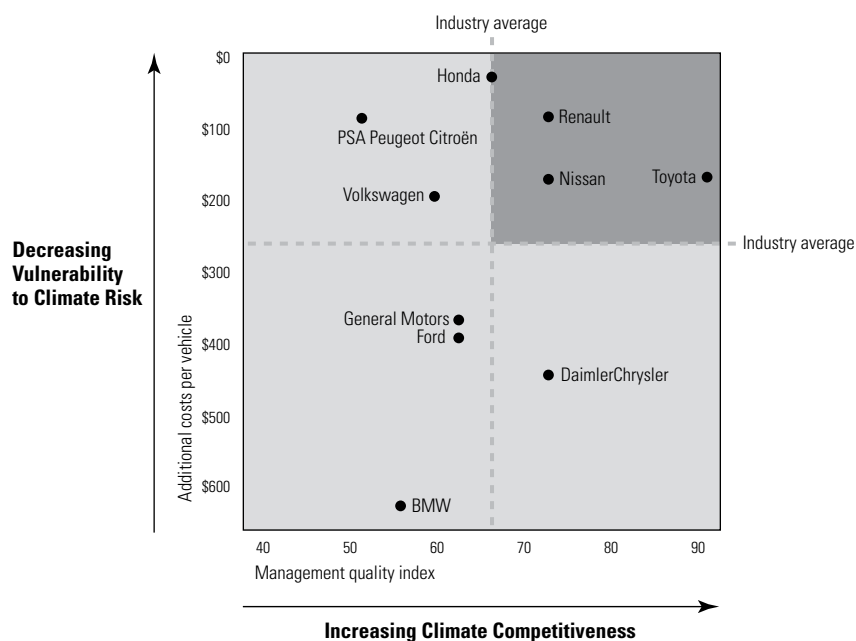
Reducing your exposure to climate risk and creating new opportunities for profit are both important steps in building your climate competitiveness. But if your competitors are doing these things better, your company is losing ground.

In 2003, we mapped the climate competitiveness of the ten largest global automakers, looking at their vulnerability to risks and their ability to seize opportunities. Our analysis was conducted with Sustainable Asset Management, an investment management firm. Specifically, we evaluated the vulnerability of each

automaker's current product line to further fuel-economy regulation by calculating the estimated cost per vehicle to meet new emissions standards during the following decade. We also analyzed how well the companies were managing climate opportunities. Using a zero-to-100 scale, we qualitatively assessed how advanced each automaker was in its ability to commercialize, market, and mass-produce vehicles using one or more low-carbon technologies—hybrid battery-and-gasoline, for example, or fuel-cell technology. Perhaps not surprisingly, we found that

Honda and Toyota were best positioned to sell cars in a carbon-constrained economy, both because their current fleets were relatively fuel efficient and because they were ahead of rivals in commercializing new technologies.

To determine where your company stands with respect to your competitors, you can map your own industry using these two variables—positioning against risks and preparedness to seize opportunities. In doing so, you are likely to uncover ideas on how to move to a position of competitive advantage.



formed, using a matrix that could be applied to any industry, see the exhibit “Plotting Your Climate Competitiveness.”)

General Electric has actively pursued competitive advantage through its climate policies. In 2003, it began using the Greenhouse Gas Protocol to construct an emissions inventory, allowing it to quantify its regulatory risk. It also joined a group of companies from different economic sectors—including Bristol-Myers Squibb, Citigroup, Con Edison, Johnson & Johnson, and Staples—to discuss climate strategies and learn from peers.

GE then began to think more strategically about how climate change could affect its business and that of its customers. In 2005, the company launched what it called Ecomagination, a coordinated product offering that features clean technologies that serve the transportation, energy, water, and consumer product sectors. GE’s goals for the program were to double its annual investment in clean technologies to \$1.5 billion by 2010 and to increase to at least \$20 billion the revenue generated from products and services that offer customers measurable environmental performance advantages.

GE is already well on its way to reaching per-

haps the most critical element of this strategy: increasing profits. Revenues from Ecomagination products reached \$10.1 billion in 2005, with orders and commitments nearing \$17 billion. And the R&D program is already paying off, with a 75% increase in certified Ecomagination products brought to market.

The aggressive moves by GE and other forward-looking companies show that climate change isn’t a topic to repeatedly table until next year’s meeting. It is already influencing the competitive dynamics in markets all over the world. As GE chairman and CEO Jeffrey Immelt recently commented, “Our customers have made it clear that providing solutions to environmental challenges like climate change is essential to society’s well-being, and a clear growth opportunity for GE. Companies with the technology and vision to provide products and services that address climate and other pressing issues will enjoy a competitive advantage.” Or, to put it differently, they will do not just well but *better* by doing good.

---

Reprint [R0703F](#)

To order, see the next page

or call 800-988-0886 or 617-783-7500

or go to [www.hbrreprints.org](http://www.hbrreprints.org)

---

---

# Competitive Advantage on a Warming Planet

## Further Reading

### ARTICLES

#### [Building the Green Way](#)

by Charles Lockwood

*Harvard Business Review*

June 2006

Product no. R0606J

Lockwood describes another strategy for reducing your carbon footprint: constructing corporate offices and facilities in an environmentally responsible way. This “green building” isn’t just the right thing to do—it’s now proving to be economically smart as well. By taking actions such as minimizing on-site grading and construction waste as well as using alternative materials and mechanical systems that improve indoor environmental quality, you reduce costs and enhance employee productivity. Green materials, mechanical systems, and furnishings have become widely available and are considerably less expensive than they used to be—often cheaper than less environmentally responsible counterparts. So building green doesn’t have to be a pricey experiment.

#### [What Every Executive Needs to Know About Global Warming](#)

by Kimberly O’Neill Packard and

Forest Reinhardt

*Harvard Business Review*

July 2000

Product no. R00409

The authors provide a wealth of examples showing how companies in a wide variety of industries can anticipate and mitigate risks as well as identify opportunities associated with global warming. As Packard and Reinhardt point out, thanks to the Kyoto Protocol, global warming is assuming a prominent position on business executives’ agendas. New regulations designed to curb climate change may themselves disrupt the flow of business. How to face this complex problem? Start by closely examining the risks—and inevitable opportunities—associated with climate shifts, potential regulatory changes, and the battle over public opinion. Forward-looking companies in a range of industries—energy, insurance, automotive—are already seeking ways to mitigate the effects of the weather on their operations, shape any regulatory regime that governments may devise, and inform the public about their efforts to reduce the problems associated with climate change. Calculate the risks and opportunities effectively, and you’ll make wise investments that enable you to survive the coming storms.

Harvard Business Review 

---

### To Order

For *Harvard Business Review* reprints and subscriptions, call 800-988-0886 or 617-783-7500. Go to [www.hbrreprints.org](http://www.hbrreprints.org)

For customized and quantity orders of *Harvard Business Review* article reprints, call 617-783-7626, or e-mail [customizations@hbsp.harvard.edu](mailto:customizations@hbsp.harvard.edu)