

What Every Executive Needs to Know About Global Warming

by Kimberly O'Neill Packard and Forest Reinhardt



Harvard Business Review

Reprint R00409

Harvard Business Review

JULY – AUGUST 2000

Reprint Number

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ILLUSTRATION BY MARC MONGEAU

Extremism and emotion have dominated the debate about global climate change. It's time to cool off and take a level-headed business view of the risks and opportunities associated with the problem.

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and Forest Reinhardt

THE POSSIBILITY THAT THE EARTH'S SURFACE temperature is rising—permanently and significantly—caught the public's attention during the brutal summer of 1988. But it wasn't until December 1997 that global warming began to assume a prominent position on business executives' agendas. That's when representatives of 160 nations, convened by the United Nations in Kyoto, Japan, adopted a plan that would limit the amounts of carbon dioxide and other so-called greenhouse gases being released into the atmosphere. If ratified, the Kyoto Protocol would require industrial nations to dramatically reduce emissions of those gases by no later than 2012.

The protocol underscores the growing consensus among scientists that global climate change is a threat that must be taken seriously. While a few skeptics still question the evidence, most experts believe that human activity is contributing, at least in part, to an increase in the earth's average surface temperature. Scientists also agree that an increase of as little as two degrees Fahrenheit is likely to cause more severe storms, floods, and droughts and accelerate the spread of disease. Such catastrophes could devastate not only individuals and communities but also businesses and entire economies.

The Kyoto Protocol also sounded a second warning to business leaders, namely that new regulations designed to reduce the likelihood of climate change may themselves disrupt the flow of business. If large-scale reductions of emissions are mandated by law, many manufacturers will have to dramatically change the way they operate. They will also have to contend with shifts in demand, as energy-efficient products overtake those that have long been dominant. It's no wonder that business leaders at the most recent World Economic Forum in Davos, Switzerland, voted global climate change as the most pressing issue confronting the world's business community.

Faced with such a complex problem, however, many executives have wondered where to begin. They naturally feel defensive about possible new regulations and have difficulty reckoning the likely costs. And despite the body of scientific evidence that points to climate change, they find the actual details overwhelming. But it's not good business to hope the problem will go away.

A good place to start would be to look closely at the risks – and the opportunities – associated with shifts in the weather, potential regulatory changes, and the battle over public opinion. Some forward-looking companies in a range of industries, from energy to insurance to automobiles, 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 associ-

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ated with climate change. Companies that calculate the risks and opportunities effectively – as they would for any other part of the business – will be able to make wise investments that allow them to survive the coming storms.

Bad Weather Ahead

Although unusual weather conditions may strike the casual observer as common these days (perhaps accounting for the popularity of the Weather Channel), most of the extreme changes associated with climate change have yet to emerge. Nevertheless, companies whose assets are directly affected by the weather must plan now for the potentially widespread and negative consequences of climate change.

Insurance companies, for instance, should adapt their predictive models to ensure that their prices are accurate and to prevent large financial losses due to payouts after unexpectedly severe storms. To value waterfront properties correctly, real estate companies will have to keep up with the latest thinking on changes in flood patterns. Agriculture companies may eventually have to invest heavily in new areas where the climate has warmed enough to make farming viable; at the same time, they may have to abandon some investments, such as crop storage facilities, in regions that have become too warm. Businesses that cater to tourists face a variety of worrisome scenarios. More frequent storms may depress demand for vacations in some tropical areas, while warmer or drier mountain weather may prove disastrous to ski resorts.

Companies with climate-dependent assets must find ways to manage the risks associated with changes in the weather. For some, risk management should include investing in acquiring better information. For example, because many scientists believe that climate changes will lead to more severe hurricanes, a consortium of insurance companies has created the Risk Prediction Initiative to analyze developments in hurricane patterns.

Swiss Re, a leading reinsurer, has a group of in-house specialists who track the latest research in climate change and identify emerging risks and trends. The information is critical to Swiss Re's success, since its ability to turn a profit depends on its skills in assessing and pricing risk. The stakes are high. Thomas Streiff, head of Swiss Re's environmental management unit, points out that a single

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What a Difference a Degree Makes

What difference does a degree or two make? On a single spring day in Des Moines, Iowa, no one will notice much if the temperature goes from 68 degrees to 70 degrees. But when the average temperature across the planet rises – and stays at the higher level – the difference has enormous implications.

The Intergovernmental Panel on Climate Change, a scientific body convened by the UN, has developed models to predict changes to the global climate over the next 100 years. The IPCC projects an increase of two to six degrees Fahrenheit, which it says would likely have major effects on rainfall patterns and sea levels. Rainfall patterns would change because in a warmer climate both evaporation and precipitation, on average, would intensify. Climatologists also point out that the balance between winter and summer precipitation might shift, leading to increasingly frequent droughts in some areas. As a result, many more people will be at risk for flooding, and extended droughts could severely limit inland drinking water supplies. Sea levels would rise because ocean waters would expand as they became warmer.

Ecosystems would suffer if they couldn't change quickly enough to keep up with shifts in regional climates. The IPCC estimates that about one-third of the world's forests would undergo major changes in vegetation types. As forests changed, species that depended on them would become extinct.

Agriculture would face many changes. Some might be beneficial – for instance, the amount of arable land in the northern hemisphere could increase once potentially fertile areas in Canada and Siberia became warm enough for farming. On the other hand, higher temperatures can reduce yields of some crops, and agricultural pests now confined to warmer regions could invade temperate areas. Rising sea levels could significantly decrease the amount of low-lying land available for cultivation, especially in the developing world.

Some climate scientists assert that the overall effects of increased carbon dioxide levels would be beneficial; after all, plants use it to make the simple sugars on which the entire food



chain depends. The assertion sounds appealing at first. And who in Chicago, Toronto, or Zurich hasn't wished for a little global warming while commuting to work in a snowstorm?

Unfortunately, there are several flaws with that kind of thinking. First, global climate change is likely to increase snowfall in some regions, not decrease it. Second, the optimists are assuming that the temperature will rise once and then remain at its new level. But if climate change occurs, it will likely occur continuously and at an accelerating rate. Moreover, our infrastructure investments fit the current climate: we have railroad and irrigation infrastructures where it now makes sense to grow crops, buildings designed to withstand the worst storms that are common to an area, ski lifts where it snows. If the climate changes, current investments will lose their value, and the costs of reinvesting elsewhere will be heavy.

hurricane smashing into Miami could do property damage worth \$60 billion to \$80 billion, of which about 50% would be covered by insurance. Overall economic loss could exceed \$100 billion.

All companies that buy property insurance in areas where the weather has become more volatile will be affected by insurers' reassessments of risk. Streiff says customers don't necessarily have to worry that their coverage will be dropped, or even that premiums will skyrocket. Instead, he suggests, companies seeking insurance may be required to

invest more in risk reduction, such as by constructing sturdier buildings.

For companies that sell seeds, risk management could mean developing crops that can deliver higher yields in drier conditions. For timber operations, it could mean spending more on fire and pest management – drier conditions increase the risk of fire and make young trees weaker and more vulnerable to insect attack.

Some companies may choose to adjust their portfolios of climate-dependent assets. For example,

some property and casualty insurers are trying to reduce the amount of coverage they provide in disaster-prone coastal areas such as Florida. As some businesses abandon the playing field, however, others may replace them and charge the premium prices made possible by reduced supply.

Over the long term, companies in a variety of industries may see demand for their products shift as climate change affects more people. For example, if tropical diseases migrate into more industrialized nations – which is likely as temperatures become warmer at higher latitudes – pharmaceutical companies may see their markets expand. For example, the demand for products such as malaria medicines may shoot up in the industrialized world.

Anticipating Regulations

Although it may be decades before people in Munich or Minneapolis have to worry about tropical diseases, regulations designed to curb climate change are already being proposed. So in a business sense, at least, global warming is here, posing a threat to business as usual. For instance, it's likely that governments will impose additional taxes on fossil fuel consumption and require that cars and appliances use less energy.

Such regulatory programs will change asset values. As regulations push up energy prices, they'll reduce the value of some assets – fleets of trucks that get particularly low gas mileage, for example, and poorly insulated commercial buildings. They will also increase the value of goods and services as diverse as renewable-energy technology, process-control equipment, and telecommunications services – such as teleconferences – that substitute for transportation.

As government regulatory schemes start to take shape, companies should speak up. They should support programs that give them flexibility in deciding how to reduce emissions. A command-and-control approach – in which all sources would be required to make proportional reductions in carbon-dioxide emissions, regardless of the cost or difficulty – could cost six times as much as market-based solutions, according to the White House Council of Economic Advisers. Astonishingly, most businesses have not actively promoted market approaches as an alternative to command and control.

One market approach is to tax emissions of greenhouse gases. Companies could then decide if it's more efficient to pay the tax or invest in reducing emissions. But given the aversion to tax increases in the United States, this approach is probably not politically feasible. A more viable solution would be to set up a system of tradable permits, as the U.S. Congress did for sulfur dioxide in the 1990 amendments to the Clean Air Act. Under such a system, the government allocates emissions permits that companies can then buy and sell. Businesses that would have to pay huge sums to reduce their emissions of greenhouse gases could instead buy permits from companies that are able to make the required operating changes more cheaply. A tradable-permits system could reduce overall costs while giving businesses a continuing incentive to cut emissions.

Whatever regulatory systems emerge, some companies stand to make money from the changes. Makers of industrial process controls, like Honeywell and ABB, may be some of the big winners. They are already investing in sophisticated thermostats, equipment that generates electricity more efficiently, and other products and services whose value will increase in a world of higher-cost energy.

Agriculture and forest-products companies may also find new opportunities, especially if they can persuade governments to subsidize or otherwise encourage a variety of activities that remove carbon dioxide from the air. Planting trees may in some cases turn out to be a cheaper way to limit atmospheric carbon dioxide than reducing emissions, so companies that plant forests should lobby for regulations that recognize their efforts. Cultiva-

A system of tradable permits could reduce overall costs while giving businesses a continuing incentive to cut emissions.

tion practices such as no-till agriculture can prevent the release of carbon dioxide into the atmosphere by reducing disturbance of the soil – and makers of

herbicides that facilitate no-till agriculture will want to communicate that fact to policy makers.

It's easy to understand why companies that grow trees or make energy-efficient products might support new regulations. It's less clear, at first blush, why General Motors has advocated government policies that may make driving more expensive, such as reduced subsidies for fossil-fuel production. But the truth is, GM and other large automakers such as Ford see climate change as an opportunity to gain advantages over their less technologically sophisticated rivals. That's why they are investing

in cars that run on a combination of gasoline and battery power and in fuel cells that combine hydrogen with oxygen to provide electricity without producing carbon dioxide. As the cost of driving conventional automobiles rises, Ford and GM may be able to dominate a new market and freeze out smaller competitors for whom the required investments would be too great.

Like automakers, energy companies stand to be hit hard by any new policies that arise from the anticipation of global climate change. The energy industry provides an illuminating contrast between a company that has adopted a forward-looking strategy and another that supports the status quo.

BP Amoco has been a leader in supporting international efforts to slow climate change. It has even announced voluntary cutbacks of its own carbon dioxide output, promising that its emissions of greenhouse gases in 2010 will be 10% below 1990 levels – even though the company expects its output and sales to be roughly 50% greater in 2010 than they were in 1990. BP Amoco's voluntary cutbacks are similar to those that would be required under the Kyoto Protocol. To help reach the announced goals, it has established an in-house carbon dioxide trading program that requires business units to buy and sell allowable emissions levels.

CEO John Browne and other BP Amoco executives do not expect retail customers to switch their business from other oil companies (at least in the short term), and they admit that they do not know exactly what the carbon-dioxide reductions will cost the company. But they are confident that their commitment is sensible. For one thing, they believe that taking a leadership position on climate change gives the company a distinctive identity in the eyes of government officials, scientists, and environmental groups. Such leadership may give BP Amoco better access to government-controlled oil deposits and more operating flexibility. Furthermore, the company's experiments with emissions trading are likely to give it clout at the negotiating

The Greenhouse Effect

Greenhouse gases have a bad reputation these days, but they've been warming the earth's climate for hundreds of millions of years.

Without them, the earth's surface would be too cold to support life as we know it. The problem is that atmospheric concentrations of certain greenhouse gases have increased significantly over the past century. Here's how the process works.

The earth receives a tremendous amount of energy from the sun – a few days' worth of sunshine is equal to the amount of energy stored in all of the planet's fossil fuels. About 30% of solar radiation is reflected back into space; the rest is absorbed by oceans, land surfaces, clouds, and atmospheric gases, which then emit that energy in the form of thermal radiation. Naturally occurring greenhouse gases, especially water vapor and carbon dioxide, trap some of the thermal radiation and redirect it toward the earth's surface, insulating the earth like a blanket.

Human activity has increased the concentration of greenhouse gases in the atmosphere. At the same time, temperatures have increased. The warmer atmosphere is able to hold more water vapor, further enhancing the natural greenhouse effect.

Although carbon dioxide and other greenhouse gases, such as methane, are natural phenomena, human activity contributes significantly to the release of those gases into the atmosphere. Most man-made carbon dioxide comes from activities that involve the burning of fossil fuels, such as factory operations and driving. Deforestation also contributes to the greenhouse effect. Trees act as "sinks" for carbon dioxide – they absorb it from the atmosphere through photosynthesis. Burning this vegetation throws carbon dioxide into the air and reduces the quantity of sinks available.

Some greenhouse gases, including chlorofluorocarbons, are entirely artificial.

Chlorofluorocarbons have also been implicated in the partial destruction of the stratospheric ozone layer, but ozone depletion and climate change are separate phenomena.

There is little doubt among scientists that the planet's climate will change if atmospheric concentrations of greenhouse gases continue to increase. The problem is pressing and real, and human activity is responsible for much of it.

table when international regulatory frameworks are being devised, company executives will be able to present hard data on how their system works.

BP Amoco's leaders also believe that by announcing the 10% cutback they'll release the creativity of employees and increase their commitment to the company. "Do not underestimate the power of preemptive, aspirational target setting," says Chris Gibson-Smith, BP Amoco's executive director for policy and technology. "The role of leadership is to invent actions that naturally have the consequence of transforming people's thinking." In other words, confronting the climate challenge will stimulate the company's employees – line workers and managers alike – to think more imaginatively. And to the extent that the employees see their values reflected in BP Amoco's goals, they may become more committed to their jobs and to the company.

It's clear that this managerial approach has very little to do with conventional, engineering-driven ideas about pollution control.

On the other side of the divide is ExxonMobil. The company maintains that the evidence for global climate change is inconclusive and that no international accord is necessary. Unlike BP Amoco, ExxonMobil was until recently a member of the Global Climate Coalition, a consortium of trade groups in the energy business and other industries that oppose regulatory controls (the coalition no longer has individual companies as members). The coalition and its supporters appear to be betting against the weight of scientific opinion, but their approach to the problem may be subtler than it appears. If they can stall regulation of carbon-dioxide emissions, they might be able to protect the short-term values of their assets. They may hope they'll be able to convince the public that government regulation is a greater evil than climate change. In doing so, they run the risk of missing out on the opportunity to help tip the balance toward more sensible forms of intervention.

The Climate of Public Opinion

Probably the only thing more unpredictable than the weather is public opinion. But good publicity can pay big dividends: as the intensity and level of public interest increase, companies known to have made early efforts to tackle climate change will have seats at the negotiating table when regulations are being debated.

Although some companies are making investments to increase energy efficiency and to study and accommodate changes in weather patterns, most of those efforts have not reached the public's attention. Surprisingly few companies make public statements—or even have pages on their Web sites—about how they are dealing with climate change.

By contrast, Swiss Re has been vocal about its investments in knowledge on climate change, and the company has broadcast its concerns at industry conferences, on the Web, and in discussions with the insurers that are its customers. BP Amoco has also made public announcements about its com-

mitment to reducing carbon-dioxide emissions, including a high-octane address by John Browne at Stanford in 1997 and other speeches. Further information can be found on company Web pages.

The Kyoto Controversy

At the 1992 summit on the environment in Rio de Janeiro, diplomats pledged their nations to a voluntary program of reducing greenhouse gas emissions. A series of follow-up meetings culminated five years later in the Kyoto Protocol, a first attempt to put some teeth in the international regulatory framework. The protocol calls on industrial nations—to it exempts developing countries—to reduce their emissions of greenhouse gases by specified percentages (using emissions levels in 1990 as a baseline) before deadlines ranging from 2008 to 2012.

The United States would have to reduce its emissions by 7%, the European Union by 8%, and Japan by 6%. Since the industrial world's economies are expected to grow over the next decade, the actual cutbacks required to meet the target are much greater—on the order of 35% to 50%.

The Kyoto Protocol has been attacked from all sides. Environmentalists see its demands as inadequate. Businesspeople and politicians decry the high costs it would impose and its short-term focus. Critics in the developed world denounce its exemption of nonindustrialized countries, pointing out that emissions from developing nations will soon surpass those from the industrial world. Leaders of developing countries counter that the rich countries got rich while greatly increasing their own emissions; why should developing countries be denied that option?

The protocol also looks very different to groups on opposite sides of the Atlantic. Ratification by the U.S. Senate appears unlikely, but European governments are going ahead as though the treaty had already been agreed upon; they will insist on credit for their early actions in negotiations over a final accord. Further, European governments tend to favor restricting nations from trading emissions reductions internationally; Americans generally oppose such restrictions.

For strategic reasons, some companies have chosen to be quiet about their efforts. Makers of process controls like Honeywell and ABB would gain advantages from more stringent emissions regu-

Executives should encourage a regulatory climate that will be stable and predictable—and therefore friendly to investment—over the long term.

lations, but they've had to be cautious in their public statements on global warming. Some of their biggest customers are fossil fuel and electricity companies, and antagonizing those customers by

In our view, the protocol deserves much of the criticism it has received. An improved framework could deliver more benefits to the environment at a lower cost. Flexibility, for example, needs to be built into any regulatory regime. While the protocol raised the possibility that countries could trade emissions allowances, it left the all-important details to be worked out later. It's critical that such trading be allowed. Why? Because countries that have lower energy efficiency will be able to reduce their emissions more cheaply – and therefore will have something to sell to more efficient countries, where reductions are harder to come by. Although the idea of “trading the right to pollute” sounds immoral to some, it encourages all participants to find the most efficient ways to reduce emissions. A global trading system for carbon dioxide would have the same wealth-increasing effects as global trading systems for other goods. It would enable the global community to reduce emissions where it can do so most cheaply – just as free markets concentrate production of wheat, oil, semi-conductors, and software in places where those goods can be made at the lowest cost.

Countries also need flexible deadlines. Climate change is a long-term problem, and it would be better to get three tons of emissions reductions in 2020 than only one ton in 2010. Stretching out Kyoto's compliance schedules would also reduce the premature retirement of existing capital assets and thus drastically lower compliance costs.

Differences in perspective among the negotiating partners make agreements on climate change difficult. Whatever the fate of the Kyoto Protocol, the hard work of designing international regulations and institutions to address the climate change problem is just beginning. Companies should not stand by silently during this critical time.

taking a tough stance on regulations would be counterproductive.

While good PR buzz on preventing or preparing for climate change has its appeal, smart companies realize they have to earn the public's trust. They know it's simply bad business practice to make investments, relocate resources, or change strategies solely for the sake of appearance. They also realize that overstating their commitment to reducing global warming won't wash in the long run. The public will eventually see through pledges that are skin-deep. And losing the credibility needed to participate in future debates is a significant price to


pay for a short-term public relations gain. That's why David Allen, who oversees BP Amoco's solar energy investments, is careful to emphasize that the company's foray into solar “is not just a public-relations sop. We would not do that. If you just paint something, then people will in due course see it as paint.”

As they think through the PR challenges, executives should bear in mind the trade-offs between the pursuit of regulations with short-term advantages and the encouragement of a regulatory climate that will be stable and predictable – and therefore friendly to investment – over the long term. They should recall that, following World War II, the United States began pushing its partners down a long, uneasy path toward free trade. Fifty years later, the system is still imperfect, but trade is much freer and incomes are much higher than they would be if government leaders had not been patient and far-sighted back in 1949. Building a workable international system to manage climate change is not a one-shot, one-year project. Business leaders would do best to sell their elected representatives on a long-term approach to managing the effects of climate change.

No Excuses for Inaction

Global warming is a problem characterized by uncertainties. And in a world where even TV weather forecasters can't accurately predict rain or sun, business leaders might be forgiven for tending to more immediate problems and leaving climate-change efforts to the next generation.

But as with any other risk, the uncertainty is no excuse for inaction. The vast majority of scientists agree that we will face serious consequences if we fail to address the problem. Given the long time it takes for climate changes to occur, drastic short-term actions don't seem necessary. But dealing with climate change will be expensive. It may cost us as much as we have spent on cleaning up air and water pollution over the past three decades. Clearly, business leaders need to inform themselves about climate change and think systematically about its effects on their companies' strategies, asset values, and investments.

The ability to think steadily and consistently about a topic as complicated as climate change is a tough test of management acumen. Some executives are meeting it head-on. Those who are not should wonder why they aren't – and so should their shareholders. 

Reprint R00409

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