

# Business strategies for climate change

*Huge value is at stake. The winners will be companies that reposition themselves to seize the opportunities of a low-carbon future.*

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and Jeremy M. Oppenheim**

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**Climate change is top of mind** for many executives. Media attention is high, political discussions are intense, valuations for clean-technology companies have increased considerably, and the corporate carbon footprint has become an important topic among senior managers. Apart from talk, what must companies do to address climate change, and how can they profit from what they do?

We believe that the shift to a low-carbon economy is already under way and that business must get ready for it, especially in energy, transport, and heavy industry—the heart of today’s carbon-intensive economy—and in many other industries as well. If current climate science holds true (and there is considerable uncertainty in the estimates) global greenhouse gas emissions should ideally decrease from today’s levels by 90 percent as of 2050 in order to contain global warming below two degrees centigrade.<sup>1</sup> To reach this ambitious goal, taking economic growth into account, the global economy’s carbon productivity<sup>2</sup> would have to increase by 5 to 7 percent a year, compared with a historic rate of just 1 percent, in the days when carbon emissions were not an issue. Economic growth must be fundamentally decoupled from emission growth (Exhibit 1).

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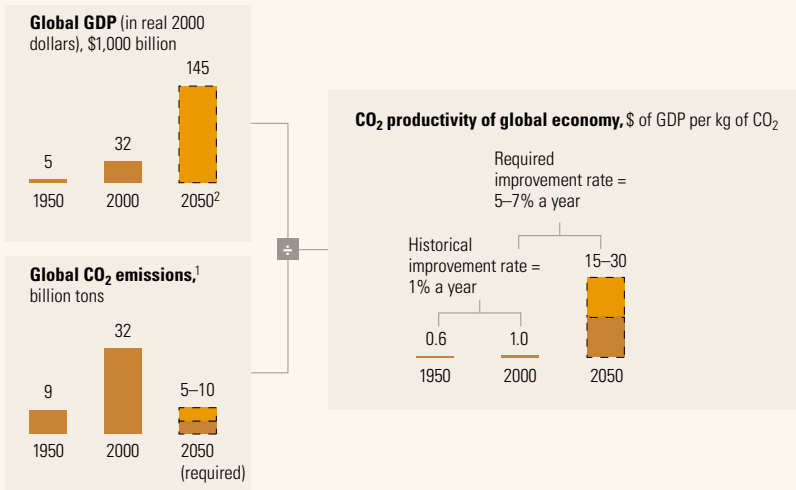
<sup>1</sup> According to the Fourth Assessment Report (issued in 2007) of the Intergovernmental Panel on Climate Change (IPCC).

<sup>2</sup> Carbon productivity, measured in GDP per unit of greenhouse gas emissions, shows how the emission performance of an economy develops over time.

## EXHIBIT I

**Improving carbon productivity**

Improvement in global carbon productivity required by 2050 to contain global warming below 2 degrees centigrade, according to the Intergovernmental Panel on Climate Change (IPCC).



<sup>1</sup>All CO<sub>2</sub> emissions including those from land-use change and forestry; excludes non-CO<sub>2</sub> greenhouse gases (~8 billion tons in 2000) because of lack of reliable historical and forecast data.

<sup>2</sup>Forecast.

Source: Global Insight; IPCC; World Resources Institute (WRI); McKinsey analysis

McKinsey's cost curve studies of potential ways to reduce carbon emissions<sup>3</sup> show that the incremental improvement of today's technology and energy consumption patterns can have a significant effect—but will not come close to realizing the necessary increase in carbon productivity. New low-carbon technologies that dramatically reduce energy consumption and direct greenhouse gas emissions will have to be developed and then implemented widely.

During the past five years, society at large has awakened to the climate issue. Climate change and the environment are higher on the minds of consumers around the world than any other sociopolitical question.<sup>4</sup> Executives across a broad range of sectors have started to recognize that this mind-set is a business reality—whether they believe in the science or not.<sup>5</sup>

Although there is great uncertainty about how the shift to a low-carbon economy will play out, the value at stake over the next two decades and

<sup>3</sup>See Anja Hartmann, Jens Riese, and Thomas Vahlenkamp, "Cutting carbon, not economic growth: Germany's path," *mckinseyquarterly.com*, April 2008. This article is accompanied by an interactive set of exhibits.

<sup>4</sup>See "Addressing consumer concerns about climate change," in this issue.

<sup>5</sup>See "How companies think about climate change," in this issue.

beyond is going to be enormous. Some companies will be clear winners, others clear losers—in fact, the outcome may be as unambiguous as it was when the industrial revolution shifted business from manual labor to energy-intensive factories. To help companies benefit from the coming transition, their managers should carefully begin to reposition them for a low-carbon landscape. Three related developments provide the starting point for this analysis and for any strategic response.

First, there will be efforts to optimize the carbon efficiency of existing assets and products: infrastructure (buildings, power stations, data centers, factories), supply chains, and finished goods (automobiles, flat-screen TVs, PCs). This optimization will involve measures to improve energy efficiency, as well as a shift to less carbon-intensive sources of power, such as nuclear, wind, solar, and geothermal.

Second, demand is growing for new low-carbon solutions that can meet the need for sustained, drastic emission reductions. Value chains that disrupt existing industries and create new ones will spring up—industries based, for instance, on the large-scale supply of biomass to power plants and on second-generation biofuels. New business models that reward suppliers and end users in the power and transport sectors for consuming less energy will be as important as new technologies.

Third, public policy and the widespread belief that higher energy prices are here to stay are driving both of these developments. The coming economy-wide discontinuity may be the first one driven largely by regulation.

### **Optimizing current assets and products**

During the next three to five years, most companies in energy, transportation, and other heavy industries will need to act on climate change in a major way. Sectors that have so far featured less prominently in the debate, such as consumer goods, high tech, and financial services, will have to get moving as well. Given a relatively slow turnover in the capital stock of heavy industries, a significant part of their response will be to optimize the carbon performance of existing assets.

This development will have big implications for energy providers as demand gradually shifts from high- to low-carbon energy, for equipment suppliers as carbon-efficient technologies (such as car engines modified for biofuels) become increasingly competitive, and for property owners as high-carbon real estate gets taxed more heavily. Most companies, in their role as energy users, will have to follow stricter technical rules and standards, as well as have access to energy-saving technologies. Corporate leaders should consider several ways to benefit from the shift.

### Reduce costs through carbon-efficient operations

Many companies in most sectors have profitable opportunities to save money by cutting energy consumption and greenhouse gas emissions. Our studies indicate that a lot of companies can reduce them by 20 to 50 percent, and in some cases even more, while becoming more cost competitive to boot. Reducing emissions will be particularly profitable when companies can receive carbon credits, which can be sold in the EU's Emission Trading Scheme (ETS), for the reductions. Yet only 24 percent of executives around the world—and about 50 percent in the energy and basic-materials sectors—say that their companies have set emission targets for operations.<sup>6</sup>

Executives should design carbon programs with ambitious targets based on an understanding of the importance and savings (or costs) of all possible measures. These measures and targets will naturally be very different for, say, a steel company, with its energy-intensive production processes, and a financial institution, with a carbon footprint created largely by buildings, data centers, and travel, as well as an exposure, through its portfolio, to energy-intensive, high-carbon assets.

A simple starting point for any company is to improve its internal energy efficiency and, if appropriate, to use less carbon-intensive fuels. Better insulation and energy-efficient lighting systems are often quick wins. Reconfiguring production can be an effective lever in heavy industry. One example is to reuse heat from manufacturing processes to generate electricity or to heat later stages of production. Another is to reduce the often excessive capacity of equipment like machines and pumps to bring it in line with actual production needs. Similarly, financial companies can save energy and cut costs by reconfiguring data centers—removing redundant applications, installing new servers, and optimizing layouts to improve heating efficiency. Most companies can also shift their norms and behavior by reducing air travel and switching off machines and lights when not in use. Peer pressure and internal incentives can promote some of these changes in behavior. Relatively low-cost technologies, such as motion sensors, can also make a real difference.

Companies should then extend their efforts to cut costs and reduce carbon emissions throughout their supply chains—particularly the extensive ones of companies such as retailers, automakers, and consumer goods businesses. To reduce such emissions significantly, companies ought to develop mandates and key performance indicators when they select and negotiate with suppliers, much as they now set standards for cost and quality. It may be

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<sup>6</sup>See “How companies think about climate change,” in this issue.

necessary to help suppliers reduce their emissions, since many subcontractors have little knowledge in this area.

The third way a company can reduce its carbon footprint, and the most effective one in many industries, is to design products—say, computers or cars—that are made from more carbon-efficient raw materials and consume less energy and emit lower levels of greenhouse gases in operation. One global manufacturer analyzes its total carbon footprint as follows: its own emissions and electricity consumption, 10 percent; its suppliers' direct emissions and electricity use, 15 percent; and the carbon content of the raw materials used in its products, 75 percent.

#### Reposition the portfolio

Companies in energy and heavy industry can also reap strategic advantages by repositioning their asset portfolios. They could sell plants likely to be less competitive if carbon regulation is introduced or reinforced. They could buy assets that will benefit from public-policy actions. And they could shift the mix of their investments toward less carbon-intensive plants and technologies. To profit from such a portfolio restructuring, companies must not only have a better understanding of how climate regulation will affect their industries but also act faster than their competitors do. To this end, leading companies are developing scenario-based models that build on analyses of many facts and assumptions about supply, demand, and regulation in order to help executives make informed decisions on optimizing asset portfolios.

Many companies in energy-intensive industries will face the complex issue of when and how they should make the transition to a low-carbon economy. On the one hand, incumbents must improve the short-term carbon efficiency of their existing high-carbon assets and protect the value of those assets. On the other, they must seize current low-carbon business opportunities and seed options for future growth. To go for growth, executives must understand how carbon issues will affect their existing and potential customer segments—a point that isn't intuitive in many industries. One useful starting point for this kind of analysis is the assumption that all activities reducing emissions at little or no cost or receiving public subsidies could well represent growth markets. In chemicals, for example, two interesting opportunities are improved insulation materials and enzymes used in sugarcane fuels (Exhibit 2).

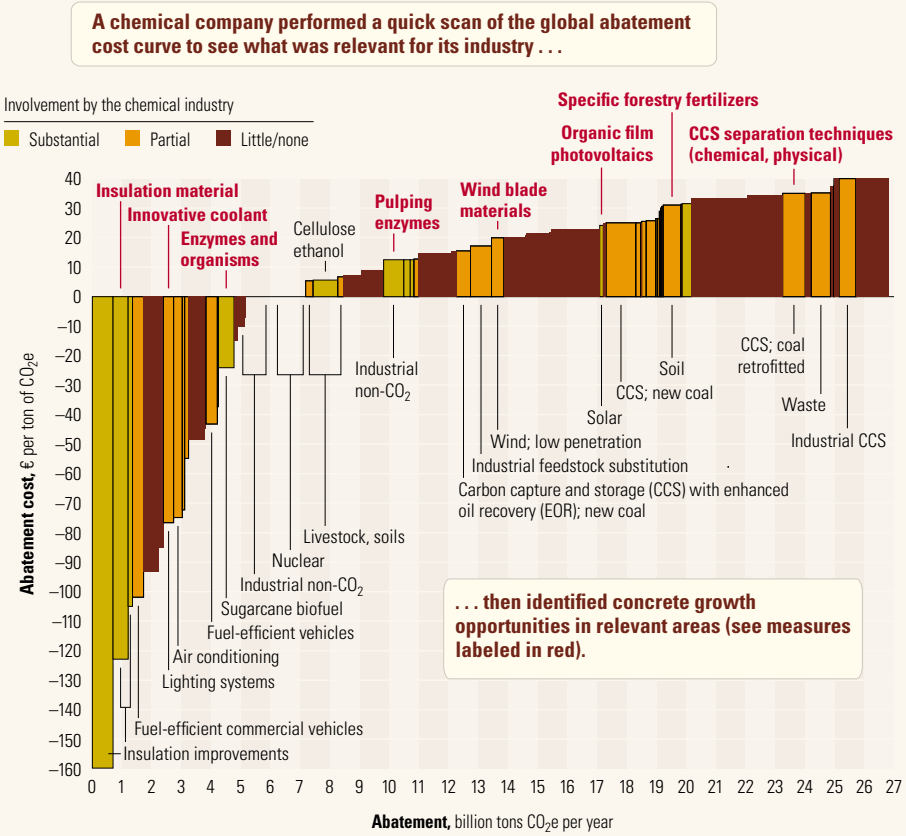
#### Capture profit in carbon-trading markets

The EU Emission Trading Scheme and similar regulatory mechanisms that could be established elsewhere are ideal for banks and other capable traders that understand what drives carbon prices and how these markets could

EXHIBIT 2

**Finding the opportunities**

Global abatement cost curve, 2030, measured in tons of carbon dioxide and equivalent greenhouse gases (CO<sub>2</sub>e)



develop. The total value of the emission rights in the EU scheme is about €40 billion a year. Only a fraction of that value is traded now, but it is a growing fraction. Many roles are attractive—buying or selling for speculative purposes, for example, or creating clean-development-mechanism projects that would help companies outside the system reduce emissions at low cost and then profitably selling the emission rights in the market.

Several early movers have already earned substantial returns. The French chemical company Rhodia, for example, significantly increased its earnings as a result of clean-development-mechanism projects in South Korea and Brazil. These projects reduced emissions by 11 million to 13 million tons of greenhouse gases a year, with a significant annual value. We believe that carbon markets will grow in number and turnover and that they will be attractive in coming years.

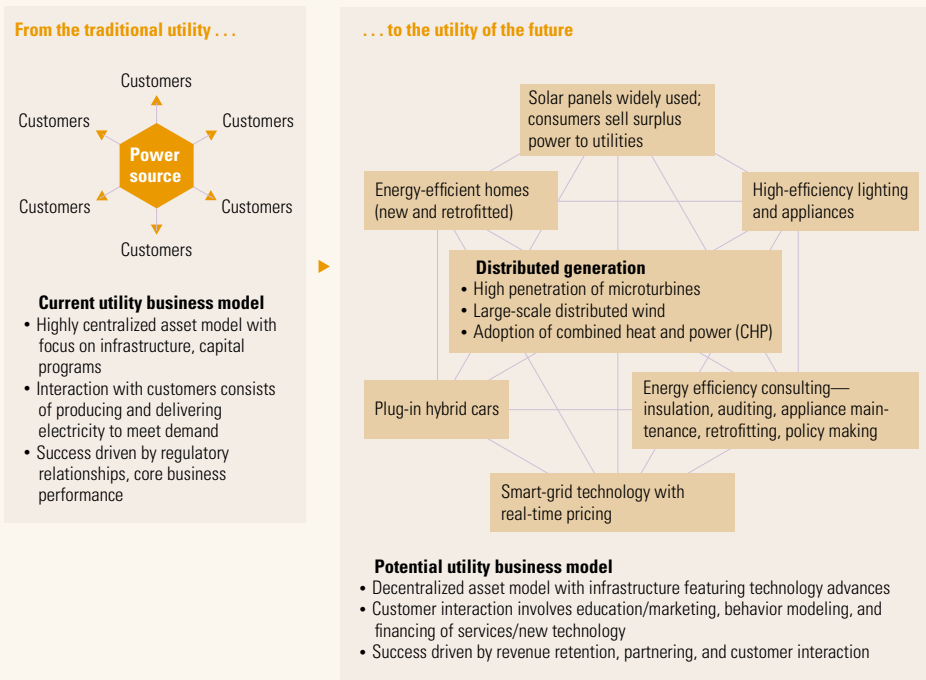
### Building new low-carbon businesses

In parallel with efforts to optimize the existing infrastructure’s carbon performance, there will be major moves to develop radically more effective low-carbon solutions for new infrastructure. Emissions can usually be reduced at lower cost by building new houses, factories, or cars than by retrofitting existing assets. Indeed, regulation will have to encourage these new low-carbon solutions, for they could only match a predicted doubling of global GDP by 2030 with a significant and simultaneous decrease in greenhouse gas emissions.

The need to decouple emissions from economic growth will reinvent industries. In forestry and bioenergy, for example, a major new value chain seems likely to appear around the large-scale supply of biomass to power plants. Another value chain may build on cellulosic ethanol, which could significantly change the supply patterns of transportation fuels if its cost comes down as quickly as many predict. Power companies and property owners could form new alliances to generate distributed power (provided, for instance, by rooftop solar panels) if regulatory conditions were right (Exhibit 3).

EXHIBIT 3

#### Changes



New technology-driven businesses will appear as well. If carbon capture and storage (CCS)<sup>7</sup> proves to be technically and commercially viable, it could create an industry with an annual turnover in the €40 billion to €90 billion range by 2030.<sup>8</sup> We also believe that integrated low-carbon ideas are about to migrate from think tanks to streets and factories. Masdar City, for example, now under construction in Abu Dhabi, will be an ultralow-carbon, car-free urban area served by magnetic trains, supplied by zero-carbon electricity exclusively, and meeting strict norms for water usage and waste disposal. The next 30 to 40 years will probably offer opportunities to apply such ideas on a large scale in Asia and the Middle East, where a further 300 million to 500 million people could migrate from rural to urban areas.

What will it take to win? Making new low-carbon business models and value chains happen is fundamentally about orchestration. The solar-power value chain, for instance, includes competitors from the semiconductor industry, oil and gas, consumer electronics, and utilities, as well as pure plays. The big winners will have not only distinctive insights and proprietary technologies or capabilities but also the ability to integrate them with skills from a variety of industries to create entire value chains of new low-carbon businesses. What's more, these winners will bring together public and private stakeholders and shape the regulatory environment so that socially efficient solutions are economically attractive as well. New companies in the electric car segment, for instance, are looking to build consortia that include power companies, high-tech suppliers of car batteries, municipalities, and consumers.

### Shaping the regulatory landscape

For many industries, huge value is at stake in the regulatory arena. The precise design of emission-trading schemes can have a great bearing on profits, depending on the extent of the free emission permits, the allocation of permits to new production, and the ability to pass on price increases to end users. Within the next 12 to 24 months, for example, the European Parliament will make decisions on the future distribution of permits in the EU scheme that could be worth up to €3 billion for the airlines—an amount greater than the entire 2006 profits of the global commercial-aviation industry.<sup>9</sup> Likewise, mandates and subsidies will be decisive for the commercial viability of solar power and many other emerging green technologies.

<sup>7</sup>Carbon capture and storage (CCS) is a technology to separate carbon dioxide from the combustion gases in power plants and other large emission sources and to store it underground instead of releasing it into the atmosphere.

<sup>8</sup>This estimate assumes that two billion to three billion tons of carbon dioxide are stored annually by 2030, at a cost of €20 to €30 a ton.

<sup>9</sup>Tim Gibbs and Simon Retallack, *Trading Up: Reforming the European Union's Emissions Trading Scheme*, Institute for Public Policy Research, 2006.



Regulatory uncertainty will be high for the next few years. The European Commission is negotiating with member states about the design of the EU's Emission Trading Scheme after 2012. In the United States, it is unclear what (if any) system the federal government will implement. At any rate, in December 2007 the Bali meeting of the United Nations Framework Convention on Climate Change approved a global negotiation process that will lead, in 2009, to a meeting in Copenhagen. Many observers believe that the overall principles of a future global system will be forged there.

The all-important role of regulation as an enabler of low-carbon business strategies means that many companies will find it essential to influence its design, at the level of both fundamental policy principles and tactical

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regulatory instruments. Companies need to work closely with regulators to ensure, for instance, that the rules don't unintentionally shift production away from relatively carbon-efficient plants in regions

with high carbon costs to higher-emitting plants in geographies with lighter regulation. Policy makers are open to fact-based arguments presented in the right way. The European permit experience has shown them that they must learn and adapt rapidly and that if they don't listen to industry, their policies won't be effective. However, there are several ways companies can influence the regulatory environment.

[Assess the value at stake and develop a stance to regulation](#)

The regulatory interests of companies within an industry vary considerably, depending on issues such as the carbon intensity of their assets and products, their technological capabilities, their market shares in different segments, and the geographies where they operate. Figuring out what position to take in each area of regulation—and integrating these different stances into a coherent and credible argument—are prerequisites for successful regulatory management.

Companies should base their positions not only on near-term value but also on what might be sustainable in the eyes of regulators and other stakeholders. Voluntary targets, for example, may give businesses an opportunity to reduce emissions on their own terms. To gain traction, however, these targets must be credible. EU motor manufacturers didn't heed that reality when they embraced voluntary reductions later deemed insufficient by regulators, who imposed far more demanding ones.

### Leverage the advantages of incumbent or attacker positions

Incumbents have an opportunity to build strong positions by amassing emission permits as carbon markets develop. Attackers, by contrast, typically have the benefit of a newer, lower-carbon asset base. Thus in the airline industry, easyJet takes a vocal stance on climate change, arguing that the 700 most carbon-intensive aircraft in Europe should be banned and comparing the emission intensity of its own planes, whose average age is less than three years, with that of the Toyota Prius.

### Engage regulators at many levels

Regulatory negotiations and decision making will be unusually complex for the next few years as global, regional, national, and state-level processes play out. Businesses have a lot to gain from participating in a sophisticated process of engagement, using partnerships and alliances to support their arguments, and influencing policy makers both through direct dialogue and through efforts to shape public opinion. Many companies are ill prepared for such moves. In a survey of executives around the world, just a quarter of the respondents said that their companies often take climate change into consideration when developing regulatory strategies, and three out of four reported that levels of management below the corporate executive suite are responsible for climate issues. To succeed, most companies will need to strengthen the regulatory organization and raise the discussion to the level of senior management.

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Climate change represents a discontinuity for much of global business. Incumbents should consider a three-part strategy. First, they must raise the carbon productivity of their current assets while at the same time moving as attackers to pursue new business growth and sow the seeds of future expansion. Winning strategies will manage this tricky balancing act and underpin it with a third dimension: a regulatory strategy that helps to shape public policies that benefit the environment and business alike. As the transition to a low-carbon economy moves apace, incumbents capable of adapting to it will face a wave of low-carbon attackers, unencumbered by legacy assets, that will help write the new rules of the game. **Q**

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