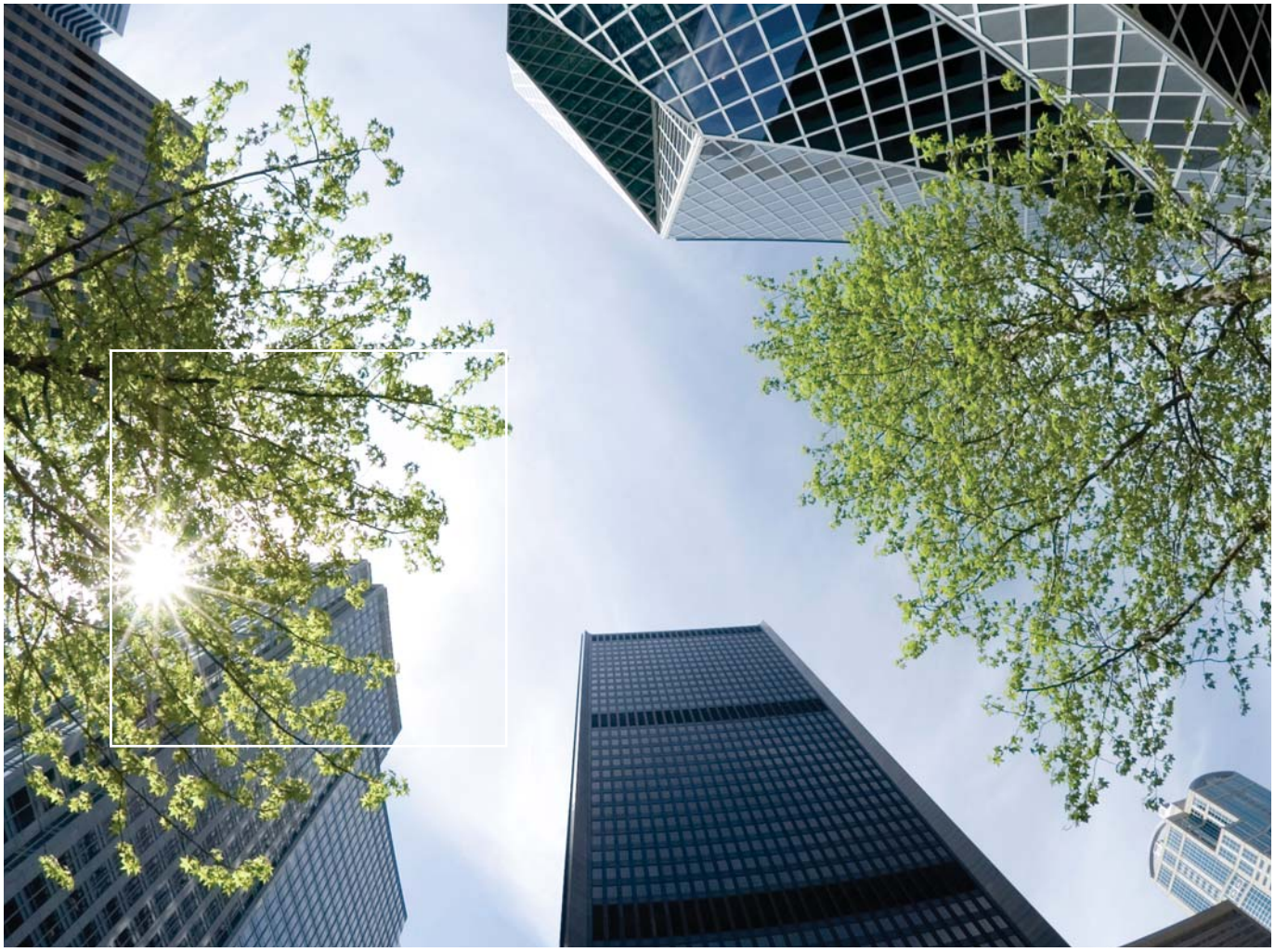
Arthur D Little

Sustainability & Risk

The Carbon Margin

Translating Carbon Exposure into Competitive Advantage



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Executive summary

The term "carbon margin" reflects the clear dual impact carbon emissions[1] have on today's business.

This impact embraces the difference carbon is making in terms of spawning regulation, influencing globalization and altering the rules of competition. It also includes the new profit margins to be made by companies that manage their and their customer's carbon exposure well.

Evidence of carbon's dual impact can be found in geographies from China to California, and in industries from chemicals to telecoms.

Each company will have its own approach to resolving the carbon challenge – dealing with the changes in regulation, globalization and competition, while grasping the opportunities for better business. However, Arthur D. Little's experience shows that the companies excelling in this quest share some common factors.

In this white paper, we explore the attitudes and actions that characterize today's leaders in managing carbon for business protection and business creation. We discuss key levers for achieving sustainable carbon margins. We introduce a method for helping you identify how proactive and technology focused your company should be in its approach to carbon.

[1] By carbon we refer to greenhouse gases that include carbon dioxide, methane, nitrous oxide and ozone


IBM

The carbon dilemma

Google "climate change" and you'll be offered nearly 100 million web pages to visit. Business, politics, academia and consumer society across the globe are increasingly concerned about the impact of greenhouse gas emissions, and carbon dioxide in particular, on the health, prosperity and prospects of humanity and the planet we inhabit.

At Arthur D. Little, we have identified a very clear dual impact of carbon on business, which is reflected in the term "carbon margin". On the one hand, this refers to the difference carbon is making to business: spawning new regulation; impacting the globalization of business; and affecting the way companies engage in competition with each other. On the other hand, the phrase "carbon margin" points to the new profit margins to be made by companies that manage their carbon exposure well: not just making savings through, for example, energy efficiencies and avoided environmental taxes, but creating new revenue streams and even new businesses related to carbon.

Evidence of the difference carbon is making in **regulation**, **globalization** and **competition** can be found in many regions and sources.

Regulation

In the US, California's lead in regulating to curb emissions and increase energy efficiency has inspired other State administrations to stronger action. It has also helped to shift the debate at US Federal government level. The US is now the only Annex I party to the UN Framework Convention on Climate Change that has yet to accept or approve, let alone ratify, the Kyoto protocol (Australia has now signed). However, President Bush, in his 2007 State of the Union address, urged Congress to approve a mandatory fuels standard to require 35 billion gallons of renewable and alternative fuels in 2017, as part of a plan to reduce gasoline usage in the United States by 20 percent over 10 years.

Another example is in the United Kingdom where the government published a draft Climate Change Bill requiring a reduction in current CO2 emissions by 60% by 2050, and setting a legally binding reduction target of 26% to 32% for 2020. Also in 2007, the European Union agreed to cut CO2 emissions by 20% by the year 2020.

Targets of this kind, like government targets for clean air, have significant and immediate implications for the way businesses plan and manage their facilities, vehicle fleets and distribution networks. Cleaning up carbon also spells opportunities. Clean coal technologies, for example, are receiving particular focus in Europe, the US and Australia.

Globalization

The urgent need for action to curb carbon is spelled out in the United National Global Environmental Outlook, published October 2007. The report highlights the extreme vulnerability of developing nations in particular to the impact of rising levels of greenhouse gas emissions. Here we can see the undercurrent of carbon's impact on globalization of business. These same developing nations – China and India most obviously, but also others – are prime opportunity spaces for companies seeking to expand through globalization of their products and services.

The recent meeting in Bali illustrates the drive for ongoing dialogue between governments. This has been strengthened by the call in advance of the Bali meeting from 150 leaders of major global companies for a mandatory agreement on emissions reductions to increase confidence in long-term low-carbon solution investments.

Energy Trading Floor

In January 2005 the European Union Greenhouse Gas Emission Trading Scheme (EU ETS) commenced operation as the largest multi-country, multi-sector Greenhouse Gas emission trading scheme world-wide.

Competition

At the same time, carbon is helping to rewrite the rules of competition in business, whether on a local or global level, by creating new opportunities for competitive advantage for companies that are seen to respond better to their stakeholders needs. Those stakeholders can include consumers wanting 'greener' products, or investors looking for improved management of risk. The Carbon Disclosure Project, set up to facilitate dialogue between the business and investment communities on the impact of climate change on company value, points in its 2007 report on FT500 companies, to a "worldwide economic and industrial restructuring" driven by business and government responses.

The net impact is abundantly clear, for example, in the Carbon Winners Index developed by Arthur D. Little with independent financial firm ECPI. This index shows that companies with better current and future carbon management strategy outperform their peers by as much as 20%, as monitored by Bloomberg.

"What's needed is innovation based on understanding how markets will look in a low-carbon economy in 2020; understanding your core competencies, now and in the future, as part of an effective partnering strategy; and understanding new routes to market."

Innovation plays a key role in carbon management for business protection and business creation. However, senior executives need to recognize that their business will gain most benefit from innovation that goes beyond exploiting carbon markets and new technologies. What's needed is innovation based on understanding how markets will look in a low-carbon economy in 2020; understanding your core competencies, now and in the future, as part of an effective partnering strategy; and understanding new routes to market.

As more companies realize that carbon management will be an increasingly powerful source of competitive edge in the future, they are taking different routes to harness that source. For instance, our work with a chemicals major considered the different approaches used across the sector for carbon management. Our client emerged as one of the few companies to view carbon management as a business rather than a compliance or regulatory issue. The end result was the creation of a separate company with Profit and Loss responsibility, with a focus on carbon tracking and carbon trading.

While each company's approach to resolving the carbon challenge will be different, there is evidence that companies that excel share some common factors. Such companies demonstrate the kind of positioning, organization, processes and resources that allow them to manage their carbon exposure in line with the wider expectations of society, as well as the demands of investors, customers and business partners.

The ways these companies are designed and operated make them capable of living up to the positions they state and the promises they declare to all their stakeholders. At the same time, their strategies and capabilities allow them to exploit tomorrow's opportunities, through profitable innovation. As a result, they are achieving sustainable results.

In this paper, we examine what lies behind these common factors, integrating a hugely fragmented area to discern how individual companies are able to turn carbon exposure into competitive advantage.

Future-proofing your business

As with any other kind of business margin, the carbon margin can be summarily defined as the Top Line (opportunities, choices, revenues) minus the Bottom Line (costs).

In our experience, sustainable margins come from effective management of four key business levers: costs, options, risks and financing.

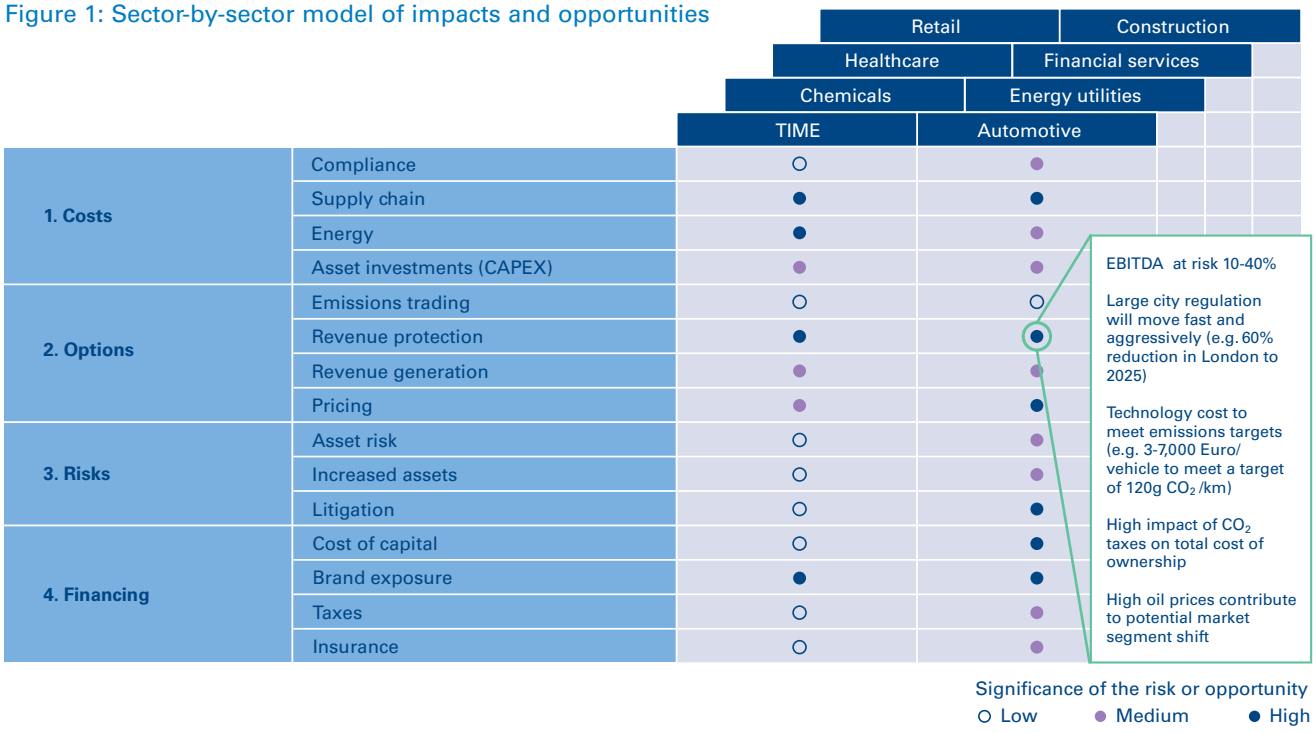
At the very least, a sound proactive strategy for carbon management will deliver reduced compliance costs, reduced materials costs and waste, and also reduced energy costs. But this is just the beginning.

By recognizing and addressing the needs of the wider spectrum of stakeholders, a company can avert risks to its reputation, protect its brand, and – through better stakeholder relations – reduce disruptions to the business.

Broadening the strategic parameter sets to include carbon also creates more options for the business. New product ideas can emerge; new markets can become viable. With a broader perspective on what the business is trying to achieve, people find new ways of working, and forge innovative partnerships.

Our experience (e.g. as indicated in **Integrity + Innovation = Sustainable Performance 2007**[1]) across industry sectors and geographic boundaries shows that innovation that reinforces and enhances the integrity of the business – both in terms of its ability to operate as a cohesive organism, and its ability to deliver on the promises it makes to stakeholders – clearly raises standards of performance.

Figure 1: Sector-by-sector model of impacts and opportunities



Source: Arthur D. Little

[1] Arthur D. Little white paper: The sustainability value formula www.adl/iplusi

There is no "one size fits all" solution to creating a carbon-integrated business, or to managing your carbon exposure. Each company needs to identify the strategic options open to its business, and prioritize those options on the basis of a number of attractiveness variables. Judgements need to be made about the balance of uncertainty and impact that is optimal for the business, in the near term and longer term.

The final piece of the puzzle is getting the necessary financing in place to pursue the carbon margin through the most promising options, the most appropriate cost base and an optimized risk profile. Relationship building with key stakeholders is the key here: with suppliers and customers, with employees and investors, enhancing the reputation of your business and reinforcing a carbon-integrated brand for your company, in an atmosphere of mutual understanding and shared benefit.

Constructing scenarios can be helpful in the process of assessing possible future performance levels and evaluating potential solutions.

Case study

A key challenge for companies is managing uncertainty surrounding the government responses to climate change. Companies need to know the long term mechanisms that will be employed including taxation, carbon pricing, incentives among others before the make the necessary investments.

We recently supported a European government ministry to develop a process to reduce this uncertainty and initiate a dialogue with industry on likely carbon reduction scenarios, potential solutions and costs. The ministry recognized that a way forward in which government and industry worked side by side was more likely to produce the desired results.

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Instead of looking at the current situation and projections of what it might lead to, and inviting different industry sectors to lobby on behalf of their respective solutions (e.g. nuclear energy, biofuels, etc.), we developed low-carbon scenarios which government, industry and experts considered feasible and necessary to meet national climate change requirements.

We then backcasted each image to identify different technology solutions to close the gaps between business as usual and a future low-carbon economy. This included an assessment of the total emissions saving potential, cost efficiency and key barriers which need to be addressed. The exercise resulted in identification of key measures which need to be considered by government and industry to meet wider climate change ambitions.

Carbon as a source of opportunities

Grasping the opportunities offered by carbon requires two kinds of thought process: around what your business should be doing immediately, and what it should be shaping itself to do in the future.

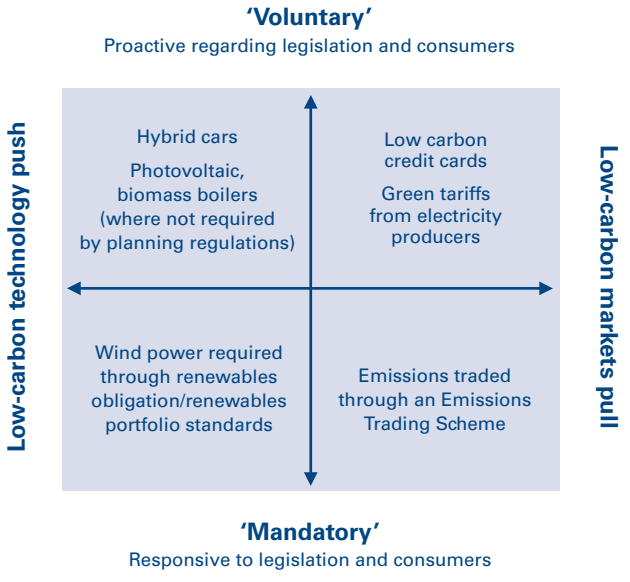
When developing strategies, companies often rely on a review of past trends. However, we believe the speed at which consumer, customer and regulatory forces are currently changing makes the value of this approach questionable today.

With a view to achieving practical outcomes, businesses can choose from a spectrum of approaches between two extremes:

- **'Mandatory'** – responding to regulation as it emerges
- **'Voluntary'** – proactively seeking ways to change the rules of competition by being ahead of the game in responding to climate change

The key issue here is the degree of technology intensiveness of the business's current and future strategies.

Figure 2 Illustrative: Range of strategies developed by companies to respond to climate change



The 'mandatory' approach is usually adopted by companies employing well-established technologies. The 'voluntary' approach is more characteristic of companies pursuing emerging technologies, or companies using carbon as a means of differentiation. However, in terms of how technology-focused a company should be to harness current or emerging carbon opportunities, there is (as for reactive vs. proactive positioning) a spectrum of possibilities.

"A company that constantly restricts its strategy to responding only when regulation demands can lose out on competitive opportunities that more carbon-aware and integrated peers tune in to and exploit."

The important thing is for each business to find its own optimum position on the grid. Too much technology focus, without enough attention to what's happening in regulation and among consumers or customers, will almost certainly lead to loss of margins. Signs of this kind of risk can be seen, for example, in surveys of how ready consumers are to actually pay higher prices for greener products.

On the other hand, a company that constantly restricts its strategy to responding only when regulation demands can lose out on competitive opportunities that more carbon-aware and integrated peers tune in to and exploit.

New **strategies**, **technologies** and **ways of working** will be needed to grasp the opportunities that lie ahead but are not yet formed. Arthur D. Little's 100 years' experience in innovation, and our expertise in disruptive technologies, provide useful insights into these "must haves".

Creating a **carbon-integrated strategy** relates to how the company is organized; we find in practice that carbon management is usually handled through environment, health and safety groups, not at board level. Attitudes and cultures in the company to climate change and carbon emissions need to be recognized and taken into account. Clarity is needed around the reasons for attempting to reduce emissions; again, in practice, cost cutting usually takes precedence over emissions reduction per se. Strategy setting also needs transparency around how the company measures its performance; we find the most common ground is around energy efficiency, although this often only benefits emissions reduction when energy prices are high.

External issues also feed into carbon-integrated strategy development: e.g. lack of clarity about emerging standards and regulation; inequalities in the value chain regarding the costs of CO2 mitigation, and how they can be passed on to other players; and uncertainty around which technologies to aid carbon management will be not only available, but commercially viable, at defined points in the future.

"Clarity is needed around the reasons for attempting to reduce emissions; again, in practice, cost cutting usually takes precedence over emissions reduction per se."

To deal with such complexity, companies need strategies that can respond to a range of probable scenarios, rather than a single set of predictions or forecasts. For example, Arthur D. Little developed a suite of scenarios for the automotive industry in which the key drivers were oil price, regulation and consumer behavior. These scenarios indicate the different opportunities for car makers to expand the global market for existing classes of cars, and also possible evolutions of the total new car market over the coming years.

In the strategy selection process, it is also vital for companies to recognize that going into the future focused solely on the costs of carbon abatement will limit them. Understanding the likely changes in supply and demand for carbon abatement will be equally important.

"Good decision making will require an informed and balanced view of all sides of current debates – e.g. around nuclear energy, around IT platforms, or around different raw material resources and industry feedstocks."

For companies implementing carbon-integrated strategies, **low-carbon technologies** offer major opportunities for the users and developers of such technologies. Here again the range of options and influences is complex. Good decision making will require an informed and balanced view of all sides of current debates – e.g. around nuclear energy, around IT platforms, or around different raw material resources and industry feedstocks. Bringing together many insights from different industries, and understanding their interrelationships and interdependencies, will support robust technology choices.

Arthur D. Little has used this multidimensional approach, for example, to support a major European oil company looking to identify areas at which the company could successfully integrate carbon capture and storage (CCS) into its value chain. For an international utility we helped with the development of a strategy for micro combined heat and power (CHP), evaluating technology options for fit with the company's overall strategy to provide valued-added fuel cell solutions.

In the uncertainty around carbon and climate change, one of the most powerful **ways of working** to identify opportunities is soft systems thinking. This helps companies go beyond measurements of performance to understand the underlying dynamics causing it. With this understanding, executives and managers gain the ability to influence performance in an uncertain world more profoundly and sustainably.

"Our results enabled the investment company to assess a potential investee's patent position within the wider patent landscape and make judgments on the importance of obstacles to, and opportunities for, the proposed technology."

For example, an investment company was looking to invest money in low-carbon technology development. We analyzed the patent landscape in relation to ten emerging technologies, using information on patent applications, inventors, citations and claims. Our results enabled the investment company to assess a potential investee's patent position within the wider patent landscape and make judgments on the importance of obstacles to, and opportunities for, the proposed technology.

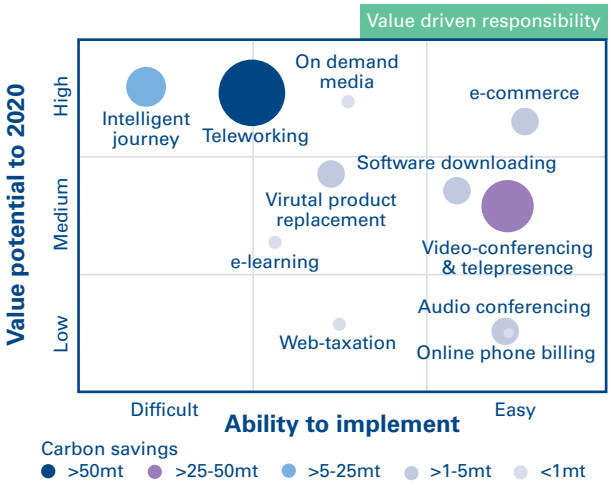
In any implementation of strategic options, there is no "silver bullet". An effective response to carbon will incorporate a portfolio of measures. Individual measures will be chosen on the basis of criteria such as value potential and implementability.

"In any implementation of strategic options, there is no "silver bullet". An effective response to carbon will incorporate a portfolio of measures."

These, in turn, incorporate factors such as the readiness of the fit with current company capabilities, the readiness of the market for the proposed actions, the availability of the necessary technologies, the scale and timing of investment, and more.

Figure 3: Carbon management – A business opportunity

Certain sectors, such as Telecoms, see new revenue opportunities as a result of emerging pressures for sustainability



Source: Arthur D. Little & WWF

Best practice in managing carbon exposure today

Each industry sector, and each region, has its leaders and laggards on the path to integrating carbon into their strategy and operations for effective business protection and material business creation.

Benchmarking exercises carried out by Arthur D. Little in all major sectors show that leaders share common ground across industries. They exhibit best practice in implementing their carbon strategies through defining a positioning/strategy that satisfies their stakeholders, developing the necessary processes, and aligning their organization and resources appropriately.

In today's top quartile companies, carbon **strategy** is shaped by both internal and external expertise, with scheduled reviews built in to the implementation design. The strategy is led by senior management and set by a diverse team including leadership from board level and all levels of management and employees involved. Once set, the strategy is clearly expressed, ideally by the CEO. In setting the strategy the company includes a baseline assessment to accommodate major changes.

"The strategy is led by senior management and set by a diverse team including leadership from board level and all levels of management and employees involved."

As indicated above, these steps can lead to a range of positions on the matrix in Figure 2. Some companies are pursuing highly active carbon management, through low carbon technologies, energy demand management, energy sourcing solutions, supply chain management opportunities, and partnering strategies. Others focus more on managing carbon risks, especially through carbon market and offset opportunities.

The reasons for choosing a specific position can be complex, and so assessing the success of that position needs to be done carefully. For example, oil and gas companies investing in renewable energy technologies such as photovoltaic cells, or utilities investing in fuel cells, can reasonably argue the reputational benefits of such investment, and the business value they bring.

One criterion for benchmarking a company's proficiency at managing carbon effectively is the way carbon management fits within the overall **organization** of the business. In many companies, carbon management has been allocated to the new technology division, often reporting to External Affairs or the Environment, Health and Safety department. Better organized companies may still have division of labor – a Corporate Sustainability group making sure the company's emissions efforts are progressing, and a technology group providing the means to maintain the effort – but the whole is under the careful supervision of the company leadership team, because carbon management is seen (rightly) as a whole-business issue.

Finding your company's positioning on the matrix in Figure 2 can assist greatly in identifying which **processes** you should focus on to make the chosen carbon strategy work best for your business. For example, a technology-intensive company is likely to focus on honing its R&D processes, whereas a company at the other end of the technology focus scale may concentrate more on its marketing or distribution processes. For one pan-European company, we have set up processes that enable the organization to trade carbon credits within and between operations, across borders.

"For one pan-European company, we have set up processes that enable the organization to trade carbon credits within and between operations, across borders."

Monitoring and measuring of new or improved processes are vital processes in themselves. That's why, in a project-evaluation study we undertook for a Portuguese carbon fund within the UNFCCC (United Nations Framework Convention on Climate Change) framework, our assessment of emissions reduction projects included assurance studies of the technology reliability and measurement systems precision; and why evaluation of each project included scrutiny of the efficiency and compliance of the monitoring processes and the emissions reduction estimates.

Overall, best practice today includes clear monitoring and reporting that allows for comparison across years and sections of the company. Measurement covers all key emissions, with a comprehensive and robust set of indicators linked to the strategy and action plan. Monitoring and reporting include a robust external "reasonable assurance" and verification, exceeding compliance to approved international standards. Full public disclosure is made through the Global Reporting Initiative (GRI) and other media. The effectiveness of mitigation measures – energy efficiency, material/energy sourcing and also offsetting – is explicitly monitored; if voluntary standards are used they must follow best practice.

Among the **resources** evident in best-practice companies is a well honed skill set with the capability to know when to trust an opportunity, e.g. for carbon funds, carbon emissions offsetting or low-carbon technology investment. Where this capability is properly integrated with the unique combination of other competences in the organization, the impact on current operations and opportunities to create a platform for sustainable innovation and business creation in the future are unparalleled.

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A regional development agency was seeking to provide the foundations for a low-carbon economy. We assisted in substantial progress by encouraging the agency to focus on its work force, partnering with business support services and training providers to develop the leadership and management skills necessary for innovation, enterprise and growth in such an economy, and acting to attract and retain those skills.

Where to from here?

The urgent need for action on carbon – by business as well as policy makers and consumers – is clear.

At the very least, companies need to respond to the impact carbon is already having in terms of regulation, globalization and competition. And they need to take a long-term perspective: carbon is not going to go away, so knee-jerk reactions that are not strategically compatible and operationally integrated with the enterprise are more likely to damage business than protect it, more likely to destroy value than create it.

"At the very least, companies need to respond to the impact carbon is already having in terms of regulation, globalization and competition."

We find that the two faces of the carbon margin – carbon's impact and the opportunities it offers – can be more successfully addressed by companies that establish a clear sense of where their business is (or should be) located on the matrix in Figure 2.

Optimal positioning on this grid depends on a range of factors, and may need to take into account a number of possible scenarios. Planning and implementing your positioning will require deep understanding of competitive and regulatory information and trends, strong innovation capabilities, and the ability to assure integrity – coherence with the enterprise as a whole, and satisfactory delivery of promises made to stakeholders.

If you would like to explore your company's positioning, or courses of action that will enable your business to handle the carbon margin more effectively, why not contact your local Arthur D. Little office.

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Translating Carbon Exposure into Competitive Advantage

More businesses are realising that carbon management will be an increasingly powerful source of competitive edge and are taking different routes to harness that source.

Arthur D. Little

Arthur D. Little, founded in 1886, is a global leader in management consultancy; linking strategy, innovation and technology with deep industry knowledge. We offer our clients sustainable solutions to their most complex business problems. Arthur D. Little has a collaborative client engagement style, exceptional people and a firm-wide commitment to quality and integrity. The firm has over 30 offices worldwide. With its partners Altran Technologies and Cambridge Consultants Ltd, Arthur D. Little has access to a network of over 16,000 professionals. Arthur D. Little is proud to serve many of the Fortune 100 companies globally, in addition to many other leading firms and public sector organizations. For further information please visit **www.adl.com**

Our Sustainability and Risk practice supports companies across the world to find performance through integrity and innovation. Our work is rooted in the origins of the firm. Since the days when Arthur D. Little himself advised clients on finding commercial uses for their process waste, we have combined our in-depth sector knowledge and expert advice in business strategy and performance, technology and innovation with a strong track record in advising companies on environmental and social responsibility.

The recent launch of our **Global Carbon Advisory Service (GCAS)**, within our Sustainability and Risk Practice, consolidates 40 years of advising clients on opportunities and risks in sustainability and in climate change. **The GCAS team** help manage the complexity and confusion surrounding carbon management debates driven by policy, consumers, supply chain etc for both companies and investors by providing solutions that embrace the complexity and unlock value. We pull together environmental, economic, policy drivers for carbon into something that makes corporate strategy development manageable.

We understand the role of emerging and potential technologies and mechanisms in addressing climate change and we have the breadth that is necessary, in terms of timing, from short to long term, geographically with teams across Europe, USA, SE Asia, and measures that include energy supply, energy demand, efficiency and behaviour.

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