

**The Accounting for Sustainability  
Group**

Accounting for sustainability  
PART II:  
Developments in the public and  
private sectors and  
environmental markets

**A report from the Accounting for Sustainability Group convened by HRH The Prince  
of Wales**

5 December 2006

This report contains 45 Pages

## **Contents**

<b>1</b>	<b>Sustainable development, public sector policy tools and the challenges of delivering the sustainable development strategy</b>	<b>1</b>
1.1	Introduction	1
1.2	The UK Government Strategy	1
1.3	The public sector sustainable development landscape	2
1.4	The policy tools used by Government	5
1.5	Service-level sustainability	5
1.6	Operational Sustainability	10
1.7	The challenges of joined-up Government and sustainability	12
1.8	Conclusions	14
<b>2</b>	<b>Developments in the private sector</b>	<b>16</b>
2.1	Introduction	16
2.2	Themes and Findings	16
2.3	Case Studies	19
<b>3</b>	<b>Environmental Markets</b>	<b>25</b>
3.1	Introduction	25
3.2	Origins	25
3.3	Today's Carbon Markets	29
3.4	Challenges for the Carbon Markets	31
3.5	Other Environmental Markets	34
3.6	How to Create Environmental Markets	37
3.7	Looking to the Future	41
3.8	About the Author	42

# 1 Sustainable development, public sector policy tools and the challenges of delivering the sustainable development strategy

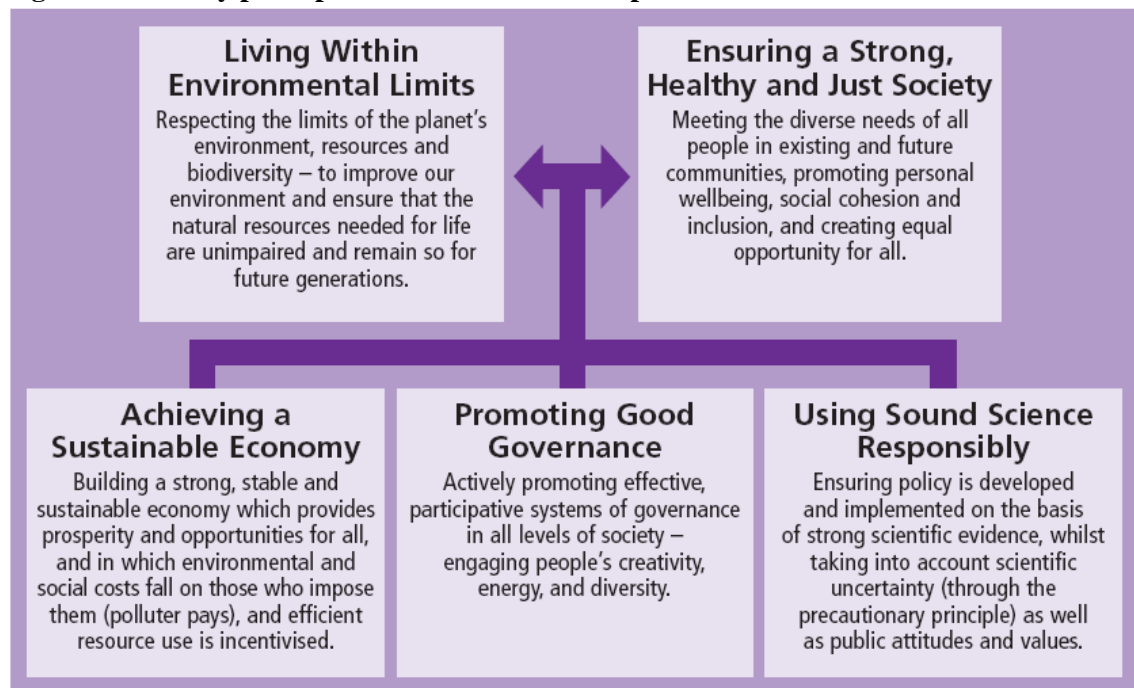
## 1.1 Introduction

This section considers the landscape and delivery of sustainable development in the public sector. It examines the UK Government’s sustainable development strategy, *Securing The Future*; the organisations tasked with delivering the strategy; the policies and programmes used to implement the strategy; the key challenge of encouraging organisations to work together to deliver the strategy; and concludes with a discussion of the most important steps that now need to be taken, including the necessity for practical tools to improve the prospects of delivery.

## 1.2 The UK Government Strategy

The sustainability agenda in the public sector is informed by and falls within the framework of the UK Government and Devolved Administrations’ Strategic Framework, *One Future – Different Paths*, and the UK Government’s own strategy, *Securing the Future*, which were launched in conjunction in March 2005. These documents are based on five key principles which form the basis for policy in the UK (Figure 1).

**Figure 1: Five key principles of sustainable development**

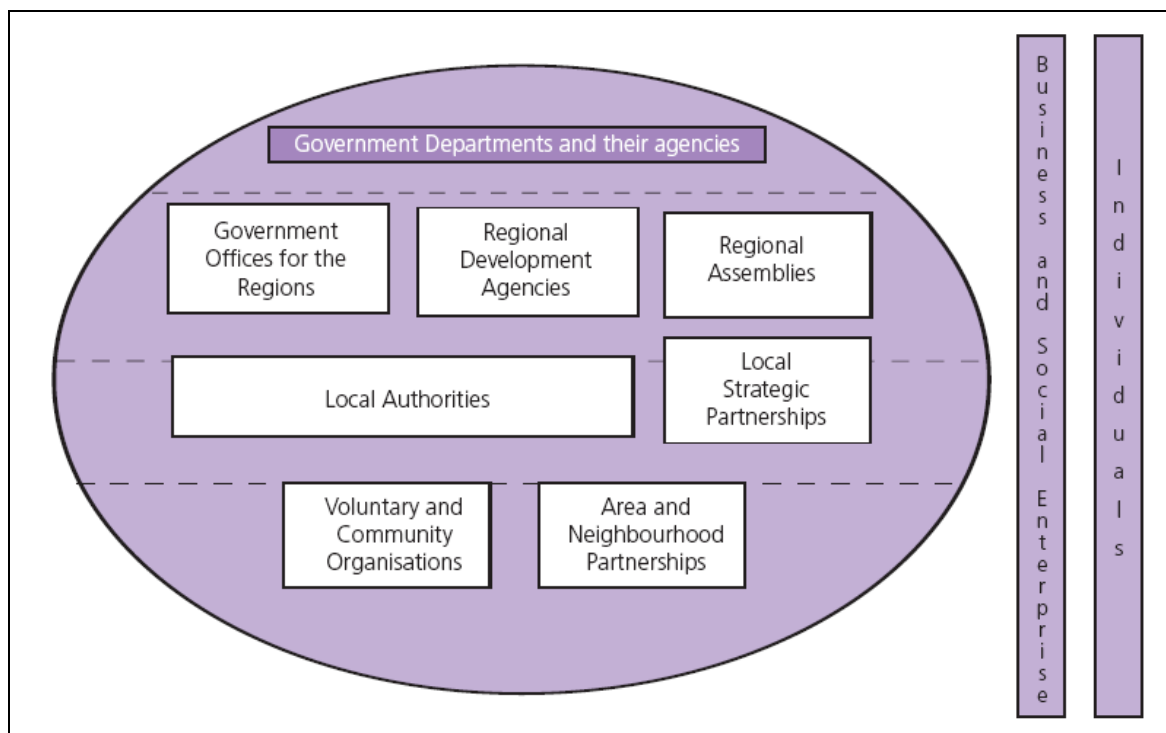


Source: Securing the future

### 1.3 The public sector sustainable development landscape

The public sector sustainable development landscape is complex, involving national, regional and local public sector organisations (Figure 2).

**Figure 2: The sustainable development landscape**



Source: Securing the future

#### 1.3.1 The National dimension

The Department for the Environment Food and Rural Affairs (DEFRA) holds the overarching Public Service Agreement (PSA) target for the delivery of the government's sustainable development strategy<sup>1</sup>. PSA targets covering specific sustainable development policy areas are held by individual departments or jointly by two or more departments. Sustainable development is promoted and coordinated through a number of Ministerial and official level groups working across government. There are two Ministerial Committees – the Cabinet Committee on Energy and the Environment and its sub-committee the Ministerial Sub-Committee on Sustainable Development in Government.

Whether or not a department holds a specific PSA target relating to sustainable development, all departments are involved in the delivery of the UK sustainable

<sup>1</sup> DEFRA PSA 1: To promote sustainable development across government and in the UK and internationally, as measured by: the achievement of positive trends in the Government's headline indicators of sustainable development; the UK's progress towards delivering the World Summit on Sustainable Development commitments, notably in the areas of sustainable consumption and production, chemicals, biodiversity, oceans, fisheries and agriculture; and progress towards internationally agreed commitments to tackle climate change.

development strategy through the requirement that they each complete sustainable development action plans<sup>2</sup>.

There are two key elements to these action plans. First, they raise the profile and importance of sustainable development within departments, particularly at senior level. Second, they set out sustainable development targets against which departments can be measured.

The action plans are overseen by the Sustainable Development Commission, established in 2000, which acts as the Government's independent advisor on sustainable development. It has recently been given the additional role of the sustainable development 'watchdog' reporting departmental progress on sustainability in the Government Estate<sup>3</sup> and more generally against the UK's sustainable development strategy.

---

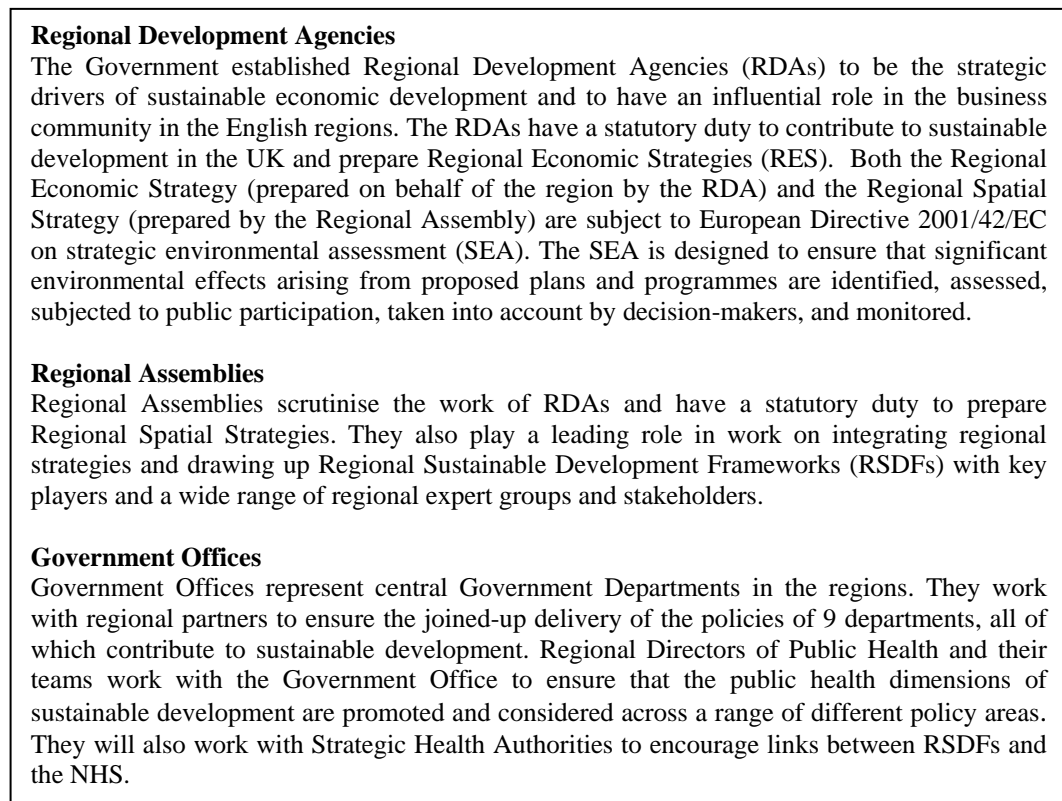
<sup>2</sup> All government departments and their executive agencies were required to produce a sustainable development action plan by December 2005 and to report on their actions by December 2006, for example, in their annual report and regularly thereafter.

<sup>3</sup> Central Government has been publicly reporting on its progress in reflecting sustainable development in the management of its own estate since 1999 and this has been developed into a systematic framework of monitoring.

### 1.3.2 The Regional dimension

At a regional level there are a number of organisations that have an important role to play in determining the arrangements needed to implement sustainable development strategy (Figure 3).

**Figure 3: Regional organisations involved in sustainable development**



### 1.3.3 The local dimension

At a local level, Local Authorities work to deliver sustainable development through Local Strategic Partnerships. The Central Local Partnership (comprising Local Authorities, the Local Government Association, the Improvement and Development Agency, the Audit Commission and other stakeholders) has developed an action plan to deliver sustainable development at a local level (see Figure 4 for examples of successful local initiatives).

**Figure 4: Local sustainable development initiatives**

<p><b>Essex schools – working together to pool expertise and reduce procurement costs</b> Essex County Council ceased to arrange catering provision for their schools in April 2004, delegating the responsibility for making these arrangements to the schools themselves.</p> <p>Four primary schools in Braintree (under the leadership of the chair of governors of one of the schools) started to work together to pool skills and knowledge of food safety, menu design and local sourcing. Recognising that meat purchases represented a significant proportion of the budget, they worked together with East Anglia Food Link (a not-for-profit co-operative which promotes a more sustainable and localised food system) to identify and benchmark local producers. As a result local producers were contracted to supply two products (pork sausages and beef burgers) to all four schools. The producers agreed to tailor their products for the school meals market; the sausages were made longer to fit the baguettes used by the schools and smaller burgers were produced which were more suited to children's appetites. The aggregation and standardisation of their requirements by the schools made the opportunity more viable for smaller producers. The schools have benefited from streamlined procurement processes and reduced unit costs when compared to what they would have achieved had they procured separately. They have also seen an improvement in nutritional quality (for example, the use of fresh sausages and burgers with 100 per cent beef content).</p> <p><b>Innovative Approach to Youth Services in Lincolnshire</b> The Council paired young people excluded from school with a local community managed woodland. The scheme has had a positive impact on the young people, the woodland, the wider community and has saved the council an average of £70,000 per young person per year. It has been calculated that every £100 entering the scheme generates an additional £131 for the surrounding area.</p>
--

## 1.4 The policy tools used by Government

The Government's sustainable development strategy covers two areas.

- *Service-level sustainability* considers the delivery of sustainable development policy throughout the UK (for example, by reducing greenhouse gas emissions).
- *Organisational sustainability* aims to ensure that Government's own operations (for example, procurement activities) are sustainable and that Government leads by example.

## 1.5 Service-level sustainability

### 1.5.1 PSA Targets

Sustainable development is incorporated into Government policy through a number of different mechanisms. The most important of these is the DEFRA PSA target which

underpins much of the UK sustainable development strategy. The Government has developed 68 indicators used to measure progress against the strategy, the majority of which are linked to a specific departmental PSA target. 19 of the indicators are linked to a joint PSA target involving two or more departments (see Figure 5 for examples of a single and joint PSA target. The NAO has examined the use of joint targets and has identified some of the key challenges of delivering policy using this mechanism<sup>4</sup>. These key challenges are outlined in Figure 8 below.

**Figure 5: Examples of PSA targets**

<p><b>Joint PSA target – Dept. for Environment, Food and Rural Affairs/Dept. of Trade and Industry/Dept. for Transport</b> To reduce greenhouse gas emissions to 12.5% below 1990 levels in line with our Kyoto commitment and move towards a 20% reduction in carbon dioxide emissions below 1990 levels by 2010, through measures including energy efficiency and renewables.</p> <p><b>Single PSA target - Dept. for Environment, Food and Rural Affairs</b> Enable at least 25% of household waste to be recycled or composted by 2005-06, with further improvements by 2008.</p>
---

### 1.5.2 Regulatory Impact Assessments

Regulatory Impact Assessments (RIAs) have also developed as a key tool in embedding sustainability into policy making. RIAs were introduced in 1997 as a tool for assessing the economic impacts of policies on business, but have developed to provide a framework for analysing the likely economic, environmental and social impacts of a policy change and the range of options for implementing it.

The central section of the RIA requires officials to identify and quantify the costs and benefits of all the policy options under consideration. The Cabinet Office has produced guidance for officials preparing an RIA, including a non-exhaustive checklist of impacts that should be considered. This is divided into three categories – 8 questions on economic impact, 15 questions on social impact and 8 questions on environmental impact.

The Cabinet Office guidance requires, wherever possible, the costs and benefits identified to be quantified to allow comparison of the options on a consistent basis. Monetary valuation is preferred but, where this is not possible, other forms of quantifications are acceptable.

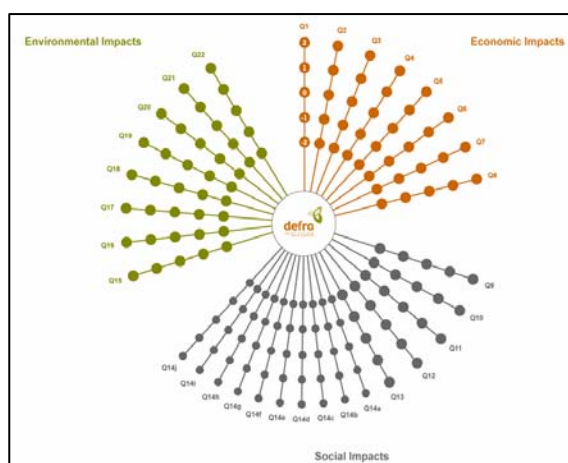
The Treasury Green Book provides guidance on the valuation of non-financial impacts, including environmental impacts. Some are relatively straightforward to assess, for example, greenhouse gas emissions should be expressed in terms of carbon savings, or in additional emissions measured in million tonnes of carbon-dioxide equivalent. The guidance recognises that other impacts such as the effect of a policy on biodiversity or vulnerability to climate change are much more difficult to value, but points policy makers in the direction of expert reference sources.

<sup>4</sup> National Audit Office (2005) *Joint Targets*, Report by the Comptroller and Auditor General, HC 453 Session 2005-06, 14 October 2005. London: The Stationary Office

Where costs and benefits occur over time, Cabinet Office guidance notes that estimates should be adjusted to reflect the fact that people prefer to receive benefit sooner rather than later, and prefer to put off paying for things as far into the future as they can – discounting for the time value of money. A 10 year discount period is typical.

**Figure 6: DEFRA’s ‘Stretching the Web’ tool**

The RIA framework and Cabinet Office guidelines apply to all Government departments. In addition, however, some departments have developed their own tools to supplement the RIA process. For example, DEFRA has produced a tool called “Stretching The Web” to help policy-makers integrate sustainable development considerations into policy making. The tool provides a visual representation of the RIA checklist. The answer to each question in the checklist is given a “score” between -2 (very negative impact) and +2 (very positive impact), and each answer then becomes a “spoke” of the web. Strands are then joined up to produce a spider’s web effect. The tool is intended to encourage policy makers to think of ways or mitigating negative impacts while maximising positive impacts rather than trading-off between different impacts.



In May 2006, the National Audit Office published its briefing for the Environmental Audit Committee *Regulatory Impact Assessments and Sustainable Development*. The briefing noted that RIAs have some potential strengths as a means to inform and facilitate the consideration of sustainable development concerns in new policy, such as the fact that the process is well established, and there is a high level of departmental compliance. However, it also notes that there are limitations, such as the fact that RIAs are sometimes used to justify decisions already made rather than to facilitate an objective appraisal of policy impacts, and that they are not always developed early enough in the policy making process to have a genuine influence on policy choices. In particular, the report found that most of the RIAs examined did not handle sustainable development concerns well, failing to identify all the social or environmental impacts that they might have been expected to cover, and not analysing those that were identified in sufficient depth.

### 1.5.3 Regulation

Regulation is an important tool used by the Government in delivering sustainable development policy, and there are a number of pieces of UK and European legislation either in place or planned. Some examples are examined below.

### 1.5.3.1 *Companies Act 2006*

The new Companies Act received Royal Assent on 8th November 2006, and will come into force in October 2008. The Act contains an important clause requiring all companies (except small business) to have regard to the impact of their operations on the community and the environment.

The requirement is more robust for quoted companies, which must produce a business review, containing information about environmental matters (including the impact of the company's business on the environment) and social and community issues.

### 1.5.3.2 *The Climate Change Bill*

The Queen's speech of 15th November 2006 announced the forthcoming introduction of a Climate Change Bill. This will give statutory force to the Government's target to reduce carbon emissions by 60% from 1990 levels by 2050. The Bill will also allow for the establishment of a carbon committee to work with the Government to oversee the emissions reduction and to set out improved monitoring and reporting arrangements.

### 1.5.3.3 *EU Legislation*

As already highlighted above, the EU Directive 2001/42/EC has been incorporated into UK law through the Strategic Environmental Assessment. Another example is the Waste Electrical and Electronic Equipment (WEEE) Directive which aims to reduce the overall volume of waste and promote the reuse, recycling and other forms of recovery, thereby reducing the quantity of waste generated<sup>5</sup>.

### 1.5.4 **Market Mechanisms**

The Government uses a number of market mechanisms in implementing sustainable development policy, including taxation, subsidies and trading schemes.

"Environmental taxation" can be defined as a tax system that provides incentives to reduce environmental damage and penalises individuals and organisations producing high levels of waste or pollution. A number of environmental taxes are already in existence – for example the landfill tax which taxes the disposal of waste, encouraging lower waste production, more recycling and greater use of environmentally friendly disposal.

The debate about extending the remit of environmental taxation has achieved particular prominence with the publication of the Stern Report on 30th October 2006. The report was commissioned by the Prime Minister and the Chancellor of the Exchequer to examine the economics of climate change and development.

The Stern Report concludes that, unless urgent action is taken, the costs and risks of climate change will be equivalent to between 5% and 20% of GDP per annum. One of

---

<sup>5</sup> The WEEE Regulations are expected to come into force on 1 January 2007 with the main requirements and obligations on producers and distributors of EEE coming into force from 1 April 2007. Full producer responsibility for the costs of treating household WEEE will start on 1 July 2007.

the key recommendations to tackle climate change made by the report is the establishment of a carbon price through tax, trading or regulation.

The rationale behind this suggestion is that those who produce greenhouse-gas emissions are bringing about climate change, and therefore imposing costs on the world and on future generations, but are not currently facing the full consequences of their actions themselves. Forcing people to pay for the carbon they produce will encourage people to move away from high-carbon goods and services towards low-carbon alternatives.

Although there are practical issues to overcome a price for carbon can be created through a system of taxation, trading or regulation, or a combination of all three. The Stern Report draws out the advantages of each system, and notes that the different systems, or combinations of them, may be more appropriate for different countries.

#### 1.5.5 **Incentivisation**

Incentive schemes have been used to increase the take up of environmental activities both by business and the public. For example, DEFRA introduced a scheme to increase household recycling, funded by a grant of £3.5 million. Over 50 pilots were run by local authorities across the country to test a variety of approaches to encourage their residents to reduce, re-use and recycle their waste. Individual prizes such as cash, cars and holidays were offered in some schemes, whilst in others, communities were rewarded with funding for local initiatives and improvements.

#### 1.5.6 **Voluntary Methods**

The Government have introduced a number of voluntary agreements and codes of practice to promote sustainable development in different industries. For example, in responding to recommendations made by the Sustainable Buildings Task Group, a Code for Sustainable Homes be developed. The code is a voluntary initiative, by Government and Industry, to actively promote the transformation of the building industry towards more sustainable practices by using: energy resources more efficiently; water resources more efficiently; material resources more efficiently; and practices and materials designed to safeguard occupants' health and well being.

There remain, however, a number of barriers to incorporating sustainable development considerations into policy including: knowledge and capacity across departments; lack of leadership; budgetary systems; accounting processes; capital rationing; the challenge of reconciling the drive to improve efficiency with sustainability objectives and limitations on appraisal mechanisms (for example, the valuation of environmental externalities). A previous report by the Accounting for the Future group provides a more detailed discussion of some of the key barriers<sup>6</sup>.

#### 1.5.7 **Measurement**

Government does not lay down mandatory frameworks for environmental reporting, but the Defra publication *Environmental Key Performance Indicators – Reporting Guidelines*

---

<sup>6</sup> Realising Aspirations: or, using value for money to make the public sector more sustainable, A report from the Accounting for Sustainability Group convened by HRH The Prince of Wales.

*for UK Business* notes that stakeholder interest in environmental performance is at an all-time high and that producing environmental reports can be beneficial for a company. It therefore sets out 22 Key Performance Indicators to enable businesses to measure, manage and communicate their environmental performance. Defra does not expect businesses using the framework to adopt all 22 KPIs – an analysis of business sectors has shown that 80% use 5 or fewer.

The framework is not intended to be as sophisticated as some of the reporting systems that individual companies who are leaders in this field have developed, but it enables many more companies to reach a level where they understand their environmental performance and can improve it.

## 1.6 **Operational Sustainability**

In *Securing the Future*, the Government makes it clear that it intends to lead by example in considering sustainable development issues across all of its own activities.

### 1.6.1 **Sustainable operations on the Government estate**

In June 2006, the Prime Minister launched new targets for sustainable operations on the Government estate, replacing those in the Framework for Sustainable Development on the Government Estate (originally published between 2002 and 2004). In May 2005 the Sustainable Development Commission became responsible for monitoring and reporting progress against the framework of targets. In its first report, it reported a mixed performance overall. No targets were consistently ignored, but neither were many met consistently by all Departments.

### 1.6.2 **Sustainable procurement**

In *Security the Future*, the UK government stated its aim to be amongst the EU sustainable procurement leaders by 2009. In pursuance of this, a Sustainable Procurement Task Force was set up under the direction of Sir Neville Simms, and a National Action Plan, *Procuring the Future* was published in June this year. This drew heavily on the work undertaken by the NAO and the EAC<sup>7</sup>. The Task Force made six recommendations for improving the sustainability of public sector procurement:

- lead by example, with clear commitment to the Action Plan from senior officials;
- set clear priorities;
- raise the bar, ensuring that mandatory minimum standards are properly enforced;
- build capacity through information and training;
- remove barriers, such as the focus on lower up-front costs; and
- capture opportunities through greater engagement with suppliers.

---

<sup>7</sup> National Audit Office (2005) *Sustainable procurement in central government, September 2005, Sustainable Procurement – The Way Forward*, Environmental Audit Committee, Third Report of Session 2005-06

The report suggests that delivery of the recommendations should be underpinned by three building blocks:

- A Flexible Framework to guide actions
- A means of prioritising policy objectives so that expenditure is targeted on key areas
- The development of specialist toolkits to provide advice and support for public sector procurers

The Flexible Framework is the foundation of the Sustainable Procurement Action Plan. It identifies the five key behavioural and operational change programmes that need to be delivered to ensure sustainable procurement: People; Policy, Strategy and Communications; Procurement Process; Engaging Suppliers; and Measurement and Results. Within the Framework are five “Steps of Progression” through which organisations can work in following the Action Plan: Foundation; Embed; Practice; Enhance; and Lead. These steps enable any organisation to use the Action Plan, whether they have a long history of sustainable procurement or are just beginning to consider it.

The Government are due to respond to the Sustainable Procurement Task Force’s report by the end of 2006.

### 1.6.3 **Measurement and reporting**

*Securing the Future* outlined a new set of 68 national sustainable development indicators on which data was published in June 2005 and updated in July 2006. These indicators include measures of everyday concern such as health, housing, jobs, crime, education and the environment. These are supplemented by regional and local indicators. As outlined above, the Sustainable Development Commission has recently been given the role of monitoring and report progress against the Strategy indicators.

However, there remains a wide variation in sustainability reporting across the public sector. A NAO review of sustainability reporting by central government departments<sup>8</sup> found that methods and standards of reporting in 2004 were highly variable across government, that there was no mandatory reporting standard and that few reports made any reference to *Securing the Future*. The NAO’s review informed a subsequent inquiry and report by the Environmental Audit Committee, which recommended improvements. In response, in October 2006 government noted that some improvements were already evident and others were planned, especially to link sustainability planning and reporting more directly to the annual cycle of department’s financial plans and reports.

CIPFA (the Chartered Institute of Public Finance and Accountancy) has developed a model of sustainability reporting that can be applied by any public sector organisation when considering and reporting on organisational and service-level sustainability. It provides a loose framework that can be used to prompt sustainability analysis and to structure a sustainability report.

---

<sup>8</sup> National Audit Office (2005) *Sustainable development reporting by government departments*, July 2005.

## 1.7 **The challenges of joined-up Government and sustainability**

The importance of working together to deliver the UK's sustainable development strategy is a theme running throughout the Strategy:

*“Responsibility rests with everyone. The success of this strategy depends on the commitment and capacity of all government departments, their agencies and other public bodies, including local authorities and those providing public services at regional and local level, communities, businesses and individuals.”* (Ch 7, Securing the future)

There are many notable examples of how the public sector is rising to the challenge of being more sustainable, changing its own behaviour and encouraging others to reflect wider and longer term issues in key decision making processes. However, often such good practice is sporadic – local initiatives championed by individuals or organisations determined to make a difference. Perhaps the biggest single challenge confronting the public sector is how to get those many good practice examples to be the norm.

Encouraging organisations to work together effectively to address issues that may be nebulous, where the problem may be difficult to define and the solution even more so, and when more immediate priorities may rule the day is not easy. Recent work by the National Audit Office, The Audit Commission and the Healthcare Commission on child obesity illustrates the point<sup>9</sup>. Like sustainability, few would dispute that our children are getting fatter and unhealthier. Yet despite the existence of a joint PSA target, shared between three major Government Departments, the complex nature of child obesity – like sustainability – means there are significant challenges to address, including which of the many possible programmes works best, and how to get the range of organisations to work together at a national, regional and local level – including the private and voluntary sectors.

More directly on sustainability, related work by the NAO and Audit Commission examining bus services<sup>10</sup> shows how important it is that public sector organisations, whether Government Departments or local authorities, identify where existing arrangements are unlikely to cause a change in behaviour, in this case to encourage greater use of public transport in preference to the private car (Figure 7).

### **Figure 7: Case example – Increasing the use of bus services**

---

<sup>9</sup> Audit Commission, Healthcare Commission and National Audit Office (2006) *Tackling Child Obesity – First Steps*, Report by the Comptroller and Auditor General, HC 801 Session 2005-06, 28 February 2006. London: The Stationary Office.

<sup>10</sup> National Audit Office and Audit Commission (2005) *Delivery Chain Analysis for Bus Services in England*, Report by the Comptroller and Auditor General, HC 677 Session 2005-06, 9 December 2005. London: The Stationary Office.

In 2000, the Government set a PSA target to increase bus and light rail usage by 12 percent by 2010, and achieve growth in every region. In setting this target, the Government aimed to tackle three associated sustainable development concerns: social exclusion, road traffic congestion, and climate change. The joint National Audit Office/Audit Commission study revealed a disparity between London and the rest of the country in progress towards this target: although bus usage increased by 32 percent in London between 2000-01 and 2004-05, over the same period it fell in every region outside the capital. While recognising the range of diverse factors behind this differing performance, the study made a number of observations regarding the different delivery chains used in London and the regions and highlighted characteristics that encouraged bus use in the capital and discouraged it in other parts of the country.

For example, London's relatively simple delivery chain is a major factor behind the capital's progress in boosting bus use. The Mayor of London has personal responsibility for setting the transport strategy for London in consultation with the Greater London Assembly, and in July 2001 the Mayor set his transport strategy by combining targets for increasing bus use with car restraint measures. Outside London, many bus service delivery chains leave local authorities with few direct levers with which to manage the bus network, making it difficult to increase bus use. Although local authorities are accountable for delivering improvements in local transport through the Local Transport Plan system, they have few powers over commercial bus operators, which in 2003-04 comprised almost 80 percent of bus services outside London.

The NAO has examined the issue of government working together to deliver policy objectives in a number of reports<sup>11</sup>. Delivery invariably requires a number of organisations working together in a complex delivery chain<sup>12</sup>. Success relies on every organisation in the delivery chain pulling in the same direction. Figure 8 provides an overview of some of the key challenges of working together to deliver policy objectives.

**Figure 8: Key challenges of working together<sup>13</sup>**

Issue	Challenges
Agreeing objectives and priorities	Partners may have different views about the objectives to be achieved through working together to meet a joint target. The priority with which they view achievement of the target, compared with their other targets, may also differ. Within individual Departments, staff working to achieve a joint target may also see it as less or more important than other work they have to deliver. Conflicting expectations may lead some partners to pursue joint working mainly to achieve their own ends.

<sup>11</sup> National Audit Office and Audit Commission (2006) *Delivering Efficiency: Strengthening the links in public service delivery chains*, Report by the Comptroller and Auditor General, HC 940 Session 2005-06, 10 March 2006. London: The Stationary Office. National Audit Office (2005) *Joint Targets*, Report by the Comptroller and Auditor General, HC 453 Session 2005-06, 14 October 2005. London: The Stationary Office. National Audit Office (2001) *Joining Up to Improve Public Services*, Report by the Comptroller and Auditor General, HC 383 Session 2001-02, 7 December 2001. London: The Stationary Office

<sup>12</sup> A 'delivery chain' refers to the complex networks of organisations, including central and local government, agencies, and bodies from the private and third sectors that need to work together to achieve or deliver an improved public sector outcome.

<sup>13</sup> National Audit Office (2005) *Joint Targets*, Report by the Comptroller and Auditor General, HC 453 Session 2005-06, 14 October 2005. London: The Stationary Office.

Understanding the problem	Joint targets often relate to addressing complex problems, where the means to deliver what is required and who should take action are not always clear. Lack of clarity amongst partners about which are the right levers to pull, when and by who can lead to ineffective attempts to work towards delivering the target.
Identifying partners and establishing accountability	Identifying the right partners may not always be obvious, particularly if the actions necessary to achieve the target are not clarified fully at the outset. And formal accountability for delivery of the target may not include all those who have a role to play.
Funding	Like most targets, achieving success depends on committing appropriate resources to support implementation. And joint working, itself, can incur costs which may not be recognised or measured.
Handling risk	The complexities of joint working can increase the attendant risks of failure because identifying key risks can become harder as the factors which contribute to success multiply and the number of stakeholders increase.
Dispute resolution	Partners may not always agree on the most appropriate course of action to achieve a joint target. Lack of an agreed mechanism for resolving disputes, which may involve an independent third party to act as 'honest broker', could see time and resources being wasted on attempting to find a solution or see the partners taking increasingly divergent and possibly conflicting routes to target achievement.
Performance monitoring and reporting	Departments have indicated that establishing suitable measures for outcomes and targets shared with other Departments is a key concern. Partners need to agree on which aspects of performance to monitor and report on and so strike the right balance between meeting the needs of each partner whilst providing adequate information on progress towards achieving the target as a whole. They also need to ensure that they report performance in a consistent manner, thus avoiding mixed messages being sent about progress as a result of different partners taking a different view on the degree of progress achieved.

## 1.8 Conclusions

One of the key challenges for delivering sustainability across the public sector is encouraging the wide range of organisations with an interest and role to play to work together.

At central, regional and local government level a series of strategies and initiatives have been developed that place sustainability should be at the heart of much of the public sector's activity. However, more connections need to be made between key central

government initiatives and localised examples of good practice, so that decisions are routinely made beyond the confines of immediate organisations, localities or issues.

Achieving this requires the development of a new set of decision making tools. While there is already considerable guidance, more is needed to equip individual decision makers – whether Whitehall civil servants, members of regional or local government or individuals on the ground delivering services – to be confident about making decisions (often involving personal accountability) about spending potentially more money today for the wider benefit of society and the longer term care of the environment.

## 2 **Developments in the private sector**

### 2.1 **Introduction**

This section of the report considers the private sector and how it is approaching the issue of sustainability and decision making. The industries that have been reviewed include:

- Energy & utilities
- Mining and extraction
- Construction
- Food & Retail
- Banking and finance

The analysis that follows is based on a review of publicly available information and interviews with a small sample of companies<sup>14</sup>. While this cannot be considered representative of industry as a whole, it does provide some insights into developments in the private sector, the externalities that affect it and how these are measured.

A summary of the principal themes and findings is set out in paragraph 2.2. A number of case studies which illustrate these are contained in paragraph 2.3.

### 2.2 **Themes and Findings**

It is apparent that there is an increasing awareness in the private sector of the need to consider the impact of business' activities on the wider environment. The motives for doing so are mixed but would appear to be based on a desire to demonstrate compliance with legal requirements (carbon emissions, for example), to illustrate what internal objectives have been set and how these are being met, to improve external communications and to share best practice.

The benefits will be different for each type of organisation, but typically fall into the following categories:

- Licence to operate: better branding
- Ability to manage social risk with associated savings
- Lowering operating costs
- Improving retention and recruitment of talented people
- Company differentiation

Many organisations that now produce corporate sustainability reports and publish them often include information on policy commitments, work done in communities and codes of conduct to which different stakeholders are expected to adhere.

---

<sup>14</sup> Wessex Water, Anglo American Plc, Rio Tinto Plc, Carillon Plc, Kingfisher Plc, Tesco Plc, Boots Plc, Goldman Sachs, HSBC and BT Plc.

The manner in which sustainability is measured and reported on varies considerably and very few organisations have attempted to place a value on many of the issues that sustainability raises. Rather, the measures used tend to reflect the specifics of the activity being monitored, such as water usage and carbon emissions.

Practices differ between sectors. The commentary that follows seeks to draw out the trends in a sample of industries: energy, utilities, mining and extraction; construction; food and retail; banking and finance; and telecommunications.

## 2.2.1 **Extractive Industries: Energy and Mining**

The extractive industries are amongst the most developed in terms of their approach to Accounting for Sustainability, reflecting the significance of the impact of their activities on the environment and the fact that the environmental consequences of their activities are more regulated than some other sectors.

### 2.2.1.1 ***Energy and Utilities***

Within the oil and gas sector, the impacts of some externalities are already measured and included in the financial statements. For example, accounting standards require decommissioning costs to be provided for in some circumstances.

Sustainability is also taken into account in investment decisions. Alongside traditional methods such as Net Present Value analysis, environmental considerations such as the impact on local ecosystems are taken into account in the context of the business' environmental strategy.

The sector is also quite advanced in terms of its Corporate Social Reporting. BP, for example, has been reporting "in accordance with" the Global Reporting Initiative Guidelines for many years, as have Shell. BP also adhere to the IPIECA/API Oil and Gas Industry guidance on Voluntary Sustainability Reporting.

The use of shadow accounts (incorporating monetised sustainability actions) is starting to emerge alongside the traditional financial statements, as can be seen in the Wessex Water Case Study.

### 2.2.1.2 ***Mining and Extraction***

This industry has developed its own framework around the sustainability agenda, including the International Council on Mining and Metals (ICMM) Sustainable Development Framework, approved in May 2003.

Members of the ICMM are committed to measuring their performance against the ICMM principles within the framework. This covers ethical business practices, continued improvement in health and safety performance, conservation of biodiversity and integrated approaches to land use. Through this process the issues in social and environmental impacts are considered. (see the Anglo American Case Study).

The integration of the sustainability agenda and the corporate agenda appears to be widespread within the industry. This has led to the development of sustainable development decision-making criteria for many companies. Which consider the implications of the activities that affect people or the environment. This is measured and monitored using the Balanced Scorecard approach, as illustrated in the Rio Tinto Case Study.

### 2.2.2 **Construction**

The construction sector is concerned with how it designs and constructs buildings and other infrastructure projects. The issue of sustainability, and how this sector is and has responded to it, sees issues like low-carbon structures, energy and water consumption, construction materials used and waste now being tackled. Construction companies now place greater consideration of them in building design. New legislation is also driving changes in this industry.

During 2006 Carillon realigned its sustainable strategy programme. This was done to help the organisation understand how the delivery of the business objectives is supported by improving the effects they have on the environment and the communities in which they operate. Through this they have developed a “Sun Diagram” which encapsulates these elements. New methods of measuring the benefits of becoming a more sustainable company have now been introduced. (see the Case Study below).

### 2.2.3 **Food and Retail**

The most common approach used in this sector is a variation on the balanced scorecard (Tesco and Boots), although other tools are being developed to form the basis of a sustainability accounting system (Kingfisher).

The particular issue in this sector relates to the manufacture and transportation of goods and waste and packaging issues. Most large retailers are actively seeking ways to ensure they minimise the sustainability impacts in all these areas. Initiatives include; supply chain verification procedures to ensure suppliers are meeting their own high standards; changes to transportation policies to cut carbon emissions; and product design and development aimed at reducing waste.

### 2.2.4 **Banking and Finance**

The Banking and Finance Sector has an important role to play in driving the issue of sustainability through responsible investment.

The finance sector has long been called upon to assess the investment potential of business. The widespread availability of corporate social responsibility data enables investment analysts to factor these into their investment recommendations (Goldman Sachs).

The Equator Principles, a financial industry benchmark for determining, assessing and managing social and environmental risk in project finance attempts to avoid negative

impacts on project affected eco-systems and communities and, where unavoidable, attempts to reduce or mitigate these risks (HSBC).

Banks and finance houses are also involved in socially responsible investment funds (SRI). All the major UK High Street banks are members of the UK Social Investment Forum (UKSIF), an organisation that believes that “all material social, environmental and ethical factors should be an integral part of standard investment practice.” (UKSIF Review of Activities 2005). As a result of this they all offer SRI funds to their customers. Membership of UKSIF extends to many of the major investment management institutions in the UK as well.

## **2.3 Case Studies**

### **2.3.1 Wessex Water case study**

Wessex Water is an example of a company attempting to incorporate accounting for sustainability into its mainstream financial reporting. Alongside their profit and loss and balance sheet reports they publish a set of Environmental Accounts to meet the stated aim that “our accounts should help us to understand the financial costs of our main environmental impacts and our spending towards sustainability.” (Wessex Water: 2006 Annual Report and Accounts).

The company worked with Forum for the Future on a four step approach to achieve this:

- The most significant external environmental impacts not already covered in the financial reports are identified.
- A sustainable level or target is identified for these impacts.
- The current level of impact is calculated.
- Finally, the financial cost of tackling these impacts is calculated using market values for offsetting pollutants, or by estimating restoration or abatement costs.

Wessex Water also monitors the social and economic aspects of sustainability alongside their environmental accounts, but at present do not put a financial value on these metrics. This is consistent with most companies in the UK, and is perhaps due in part to the lack of market mechanisms to price such externalities.

### **2.3.2 Anglo American Plc case study**

Anglo American uses its Socio-Economic Assessment Toolbox (SEAT) to manage its social and economic impacts. This has stakeholder engagement as a vital part of the SEAT process. Here “a robust assessment process involves developing a profile of an operation and of its neighbouring communities. This includes identifying stakeholders and their key concerns.”

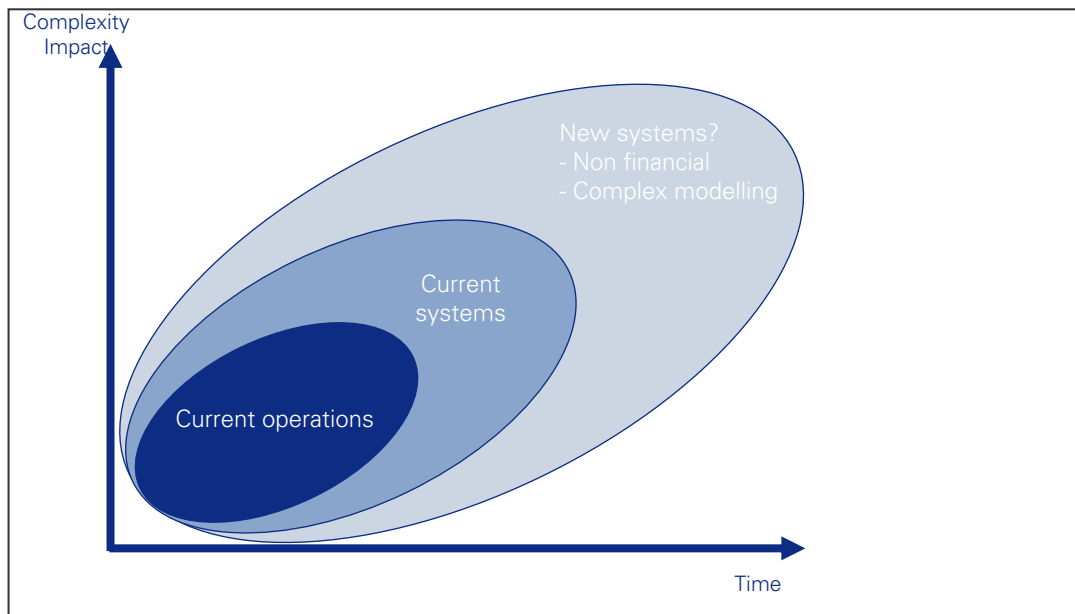
This process is assisted and supported by tools that are used to:

- Identify stakeholders and generate stakeholder maps
- Give an overview of potential issues and possible causes
- Give guidance and approach to consultation
- Summarise issues raised by stakeholders and needs identified

Identification of issues through stakeholder engagement allows externalities to be identified and managed. The management of these issues should see overall risk reduced and minimised. It should also facilitate change in the organisation, so that innovation and efficiency become business as usual, and socially responsible investment is attracted.

### 2.3.3 Case study Rio Tinto Plc

Rio Tinto Plc has established a Sustainable Development Leadership Panel that has developed a set of decision making criteria to help Rio Tinto business and departments incorporate sustainable development in all its business-related initiatives. These are applied to all investment decision making by the company, so that sustainability is integrated into its operations.



A set of questions is used to frame the consideration of the investment, focused around:

- *Social*: enhancing human potential and well being
- *Environment*: maximising resource efficiency and minimising environmental damage
- *Economy*: optimising economic contribution

This is used throughout the group as its everyday decision making model. It has been developed to help demonstrate the value of non-financial performance. This process

seeks to show how relationships with non-financial outcomes are linked to profits and value to the group.

This information is monitored through the use of a balanced score card. This links the strategy of the group to the results of projects. It is the achievement of all these objectives on which management is then judged within the group. This ensures that the non economic factors are considered and acted upon as well.

### 2.3.4 Carillon Plc case study

Sustainability accounting by Carillon attempts to value the actions taken which impact upon the environmental and social aspects of a project. This is achieved through the Sun diagram.

These actions are split between direct and indirect benefits and costs arising from the project, as a result of initiatives taken to improve the sustainability performance in the design, construction and operation of the building. Where possible, Carillon seeks to convert these into financial benefits and costs, which are then integrated into the traditional financial accounting systems.



This information is captured in a Sustainability Action Plan. A detailed example of how this has worked in operation, and the outcomes is shown in the issue of floor coverings for the Great Western Hospital project in Swindon. It questioned the sustainability implications of different flooring materials to be used. The evaluation showed that lino should be used, being made of natural products, having a longer life than other flooring materials, being biodegradable and requiring low maintenance. The process used identified an

environmentally friendly product, less frequent replacement, and low maintenance (which meant lower costs and less waste). Less waste meant less to landfill, and less transportation and associated costs as well.

There were no additional costs associated with this outcome as against a non-sustainable option, but considerable benefits in both environmental and economic terms arose.

### 2.3.5 Kingfisher case study

Kingfisher uses the balanced scorecard to great effect. Their “steps to responsible growth” tool monitors 12 areas that go towards achieving their stated strategy, to “ensure that the long term development of our business is sustainable and reflects the values and expectations of our communities” (Gerry Murphy, Chief Executive).

The tool is categorised into 4 stages; in progress, minimum action, policy target and leadership position.. All businesses in the Kingfisher group are required to achieve minimum action on all 12 issues by the end of 2007 and policy target by the end of 2010. This ensures that all Kingfisher operating companies (with their different cultures and stages of development) work towards consistent standards over time. The system was designed internally, in consultation with both internal and external stakeholders and is independently verified to ensure that it is accurate. Although this is not accounting for sustainability in its fullest sense, the Kingfisher system is providing meaningful, relevant, comparable and independently verified data to both internal and external parties.

### 2.3.6 Tesco case study

During 2006, Tesco added to its Business Plan a Community section. This has been incorporated into their balanced score card, the “Steering Wheel”, which is used to align the strategy of the company and balance its objectives.



This is reviewed annually to ensure that the set of key performance indicators used is the most appropriate and robust set of measures of Tesco’s impact.

In the area of the environment Tesco is seeking to:

- Reduce energy consumption and greenhouse gas emissions
- Reducing, reusing and recycling waste
- Making our products more sustainable

This is being used to drive accounting for sustainability into the company, by dealing with issues like:

- Developing energy efficient stores. Energy consumption is to be reduced by 50% for running stores between 2000 and 2010.
- To increase the level of goods delivered per litre of fuel by 2.5%.
- Waste – reducing packaging used in operations and the amount of packaging taken home by customers. The target is 80% of Tesco waste to be recycled.

Measurement of these targets and monitoring them over a longer term is intended to drive real change in the organisation, and help to take it to the heart of the organisation. These

quantifiable performance improvements are showing how behaving in a more sustainable way, across a range of issues in the business can deliver real change and benefits.

### 2.3.7 **Boots case study**

Another organisation successfully using a type of Balanced Scorecard approach is Boots. They have also consulted their internal and external stakeholders, as well as benchmarking themselves against their peers, to come up with a series of KPI's to meet their Sustainability Targets. This "Wheel of Fortune" identifies 21 measures within the 4 key areas of Marketplace, Community, Environment and Workplace. An action plan is developed for each of the segments, along with annual targets. Progress against these targets is published on Boots' CSR website.

A particular feature of Boots' business is that a large proportion of their supply chain sits within the company, giving them the ability to control the sustainability criteria of their products. They have developed a tool called "The Product Journey" to embed sustainability criteria at all stages of product development. This is an example of a system that results in the impacts of sustainability decisions being reported in traditional financial reports.

### 2.3.8 **Goldman Sachs case study**

Goldman Sachs is one of the forerunners of sustainable investment appraisal. In February 2004, they launched their Energy Environment and Social Index which rated the companies in the global energy sector against 30 environmental and social criteria. This was then expanded to include corporate governance measures, bringing the total criteria under review up to 42. In 2006, Goldman Sachs expanded this work to other industries such as media and telecoms, using some of the original criteria as a key base and adding other industry specific criteria as necessary.

As a result of their innovative work in this area, Goldman Sachs have also been asked to work with the Chartered Financial Analysts (CFA) institute to develop a section of their professional examination syllabus covering environmental and social analysis. This is a sign that such analysis will become increasingly important in the future and that its use will be standardised and regulated.

### 2.3.9 HSBC case study

HSBC operate a model to help reduce risk to both their clients and themselves. When assessing business deals a process whereby the transactional and project related risks are contemplated is carried out in conjunction with considering the issue of sustainability. These risks together with an assessment of the track record that a company has, allows the investment decision-making process to reflect other non-financial information.

	High PROJECT RISK	Medium PROJECT RISK	Low PROJECT RISK
Low CLIENT CAPACITY	X	X	?
Medium CLIENT CAPACITY	X	?	✓
High CLIENT CAPACITY	?	✓	✓

### 2.3.10 BT case study

BT is very focused on reporting “the things that really matter”. They have a very detailed process which allows them to focus on the how they determine whether an issue is really important to the business.

This process focuses on the following issues:

- External issues – this looks at the societal issues around the topic itself, its relative importance, alignment to company operations and which markets it affects.
- Internal issues – this looks at the financial impact of the issue identified, both in terms of known costs and liabilities, but also an indication as to the impact on the branding of the organisation. Company policies then look at how these issues are dealt with including the social and environmental impacts.

This process allows issues to be distilled down into those that require actions because of their importance to the on going business, and those that may affect more local operations. This prioritisation within BT allows management at different levels to deal with the issues that affect them and then monitor and review progress on the achievement of the targets then set. Other issues will still be included in the actions plans but the prominence of them can be factored, and then aligned with the organisation’s strategy.

## 3 Environmental Markets

### 3.1 Introduction

Environmental markets have developed in a number of different areas. The commentary and analysis that follows has been provided by Robert Rabinowitz, PhD<sup>15</sup>, Director, Climate Exchange (Europe) Ltd.

### 3.2 Origins

Environmental markets were born in the United States, although they owe their theoretical origins to a British economist, Nobel Laureate Ronald Coase. Coase argued that environmental problems such as excessive pollution and resource depletion were caused by market failure.<sup>16</sup> Such harmful phenomena occurred because they were not priced and hence were not factored in to market decisions. Coase noted that the costs of such “externalities,” (i.e. phenomena external to the market’s pricing mechanism) were most often paid by persons who did not benefit from their production. Hence people with respiratory ailments and cancers suffered for industrial production which made profits for others. His response was straightforward in essence; to create property rights related to these harmful effects that internalise these costs so that they became commodities that were capable of being bought and sold, to the mutual benefit of the trading counter-parties.

In 1982, Coase’s ideas on the creation of property rights related to pollution were tested by US Environmental Protection Agency (US EPA) in a national programme to reduce the lead content in gasoline. Tradeable permits to add lead to gasoline were allocated to refineries in accordance with an annual cap that declined over time, thus reducing the total amount of lead that could be added to the gasoline supply. The theory was simple. Refineries that found it more cost-effective to phase out lead at a slower speed than demanded by the regulations could buy excess permits from those refineries that found it cost-effective to exceed the speed by which the cap declined. This would benefit both counter-parties, saving the slower refineries money and earning additional revenue for the faster refineries, while still meeting the overall target set by US EPA. High levels of trading were reported. In the second quarter of 1987, the amount of permits traded reached around 60% of those eventually used for compliance. The programme was a striking success. By the time the programme ended, all refiners had complied with the required standard and not a single refiner requested additional time to meet it. Early achievement of the target generated around 10 billion allowances which were banked to offset costs later in the programme. This saved an estimated \$250 million, or around 2.5 cents per gram, compared to the standard “command-and-control” regulatory approach

---

<sup>15</sup> Many of the ideas and most of the analytical framework for this paper are owed to Richard L. Sandor. Thanks to Amanda Rooney for research and editorial assistance.

<sup>16</sup> “The Problem of Social Cost,” R Coase, *Journal of Law and Economics*, 1960.

which would have set targets for individual refineries but not allowed trading among them.<sup>17</sup>

The success of the lead Phasedown Programme reinforced other lessons learned in the first two decades of environmental regulation following the creation of US EPA. Achieving emission reduction targets through command-and-control regulations which attempted to specify exactly how reductions should be achieved was difficult. Regulated industries tended to delay compliance as long as possible, and to “work to the rule,” limiting their compliance to exactly what the regulations specified, and no more. If the regulations were not precise enough to achieve the targets, they were not met. Moreover, the constant addition of new sources and types of pollution and new technologies to abate it forced regulators to aim at a moving target.

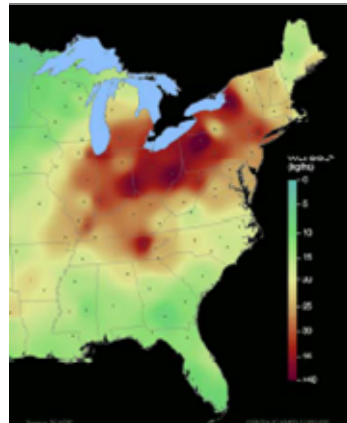
The Lead Phasedown Programme was followed by the development of the emissions market that would become the forerunner to today’s carbon markets, the Acid Rain programme.<sup>18</sup> The Clean Air Act Amendments of 1990 required electric utilities to reduce their sulphur dioxide emissions by about 50% from 1980 levels, from 18 million tons to around 9 million tons per year. The Act provided for a market-based approach under which each plant subject to the programme would be assigned a specified number of sulphur dioxide “allowances”, each granting the right to emit one ton of sulphur dioxide during a year. The total number of allowances would decline over time in accordance with the targets set in the Act, representing a nationwide “cap” on emissions. If a plant decided it was economic to reduce emissions below the level of allowances issued, it would have excess allowances to sell. If it was uneconomic for a plant to reduce to that level, the plant would look for allowances to buy, hence the term “cap-and-trade” to describe such markets. Crucial to the system is the fact that the price of the allowances traded is determined solely by the interaction of buyer and seller, in accord with Coase’s ideas.

The Acid Rain programme has been a signal success. Compliance levels have been extraordinarily high. In 2004, only 4 units out of nearly 3,400 covered by the programme were not in compliance. The cost of allowances for the first ten years of the programme was around a third of the lowest prediction prior to its implementation and around a tenth of the price estimated by the coal industry. According to the US Office of Management and Budget, the programme accounted for the largest quantified human health benefits of any recent government programme. The annual health benefits (excluding environmental benefits such as reduced acidity of lakes) of over \$70 billion exceed the costs by more than 40:1. The combined benefits of the programme have been calculated to have saved over 22,000 premature deaths and two million days off work.

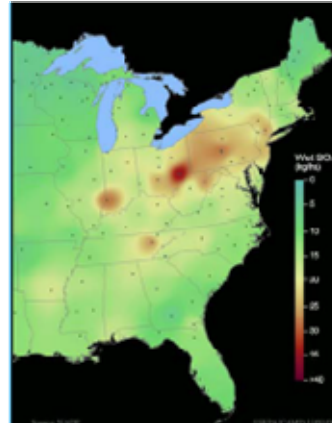
---

<sup>17</sup> “Directory of Air Quality Economic Incentive Programs,” *United States Environmental Protection Agency*.

<sup>18</sup> Information on the Acid Rain programme comes from “Acid Rain Program 2004 Progress Report,” *United States Environmental Protection Agency* and “The Sulfur Dioxide Emission Allowance Trading Program: Market Architecture, Market Dynamics and Pricing,” *Chicago Climate Futures Exchange*, 2004.



*Annual Mean Ambient Sulphur Dioxide Concentration, 1989-1991*



*Annual Mean Ambient Sulphur Dioxide Concentration, 2002-2004*

*Source: US EPA*

The programme has created a vital and liquid market for allowances. Early trades required considerable legal advice and cost as much as \$5 per ton in brokerage fees, and took months to complete. With standardized trading contracts fees have dropped to \$0.50 per ton. In 2004, around 7.5 million allowances were transferred between economically unrelated parties, close to 80% of the allowances allocated for that year. Specialised emissions brokerages have emerged, along with exchanges that allow trading of sulphur futures such as Chicago Climate Futures Exchange.

Two significant features of both the Lead Phasedown Programme and the Acid Rain Programme should be noted. First, the levels of compliance for both have been almost 100%. This is because of their tight regulatory focus. US EPA did not get bogged down in prescribing how targets should be met. That is left to the ingenuity of participants. Rather, the programmes established clear and direct methodologies for establishing whether targets have been met such as continuous emission monitors attached to power station stacks. This provides certainty about environmental impact. Focusing on the level of emissions rather than on how reductions are achieved gives regulators clarity about their role; to ensure emission are reduced, not to second guess the private sector on the best way to obtain the reductions. Second, in both programmes the cost of compliance was low because participants discovered solutions not anticipated by the regulators. In the case of the Acid Rain programme, for example, there has been a major increase in use of low-sulphur Powder River Basin coal, bringing down emissions without the need to build as many expensive scrubbers to remove sulphur from stack emissions.

Other advantages of emissions trading include the provision of incentives to go beyond compliance. By creating a price for each additional unit of pollution, trading creates incentives for polluters to reduce emissions as much as possible. By putting a financial value on pollution, emissions trading also creates incentives to develop new emissions mitigation technologies. New assets and revenue streams can be used to secure financing to reduce emissions. This is particularly important in combating climate change because there are so many different technologies and methods needed to combat climate change,

including energy efficiency, reversing deforestation, carbon capture and storage underground and different types of renewable energy, and so many of the technologies are relatively untested. A centrally planned, command-and-control regulatory environment simply cannot match a market mechanism for devising the most economically efficient way to allocate capital amongst all these potential options.

Emissions trading is central to the Kyoto Protocol, signed in 1997 and finally coming into legal effect in February 2005. It has three so-called “flexibility mechanisms.” The first, international emissions trading, is the closest analogue to the Acid Rain programme. The signatories to the Kyoto Protocol agreed to reduce their collective emissions by 5.2% from a 1990 baseline by 2008-2012. Within this overall cap, each country has its own target, ranging from -8% for the EU to +10% for Iceland. During 2008-2012, each country will be issued with Assigned Amount Units (AAUs) in an amount equivalent to its target, just as power generators covered by the Acid Rain programme are issued with allowances. The emissions trading component of Kyoto allows countries that will exceed their targets to sell AAUs to countries that would otherwise fail to comply.

The second flexibility mechanism, the Clean Development Mechanism (CDM), arose from the “Kyoto Surprise,” a remarkable compromise between developing countries seeking payments from developed countries that failed to meet their Kyoto targets and developed countries, primarily the Americans, who were seeking more flexibility on options for meeting those targets. The CDM allows developed countries to gain credit towards Kyoto compliance for investments, such as wind farms or methane collection and combustion systems, that help to reduce emissions in developing countries below the level at which they would otherwise have been without the investment. As will be discussed later, the CDM has the potential to become one of the most significant legacies of the Kyoto Protocol process because it binds both developed and developing countries into a single, unified framework for emissions trading and because of the scale of capital flows it could potentially liberate for investment in developing countries.

The third flexibility mechanism, Joint Implementation (JI), actually predates the Kyoto Protocol. Formally it allows countries with Kyoto emissions targets to gain credit for investments made in other countries with such targets. In practice, it has become a sort of CDM for wealthy countries to invest in the former Communist countries.

The irony of the whole story, of course, is that it is the Americans who pioneered the concept and practice of emissions trading. Indeed, the very idea would not have been included in the Kyoto Protocol but for the insistence of the American delegation. And yet today, as will be discussed later, it is America’s failure to participate in the global carbon markets that is the key barrier to the markets’ ability to assist the world in the transition to a world in which greenhouse gas emissions are brought under control.

### 3.3 Today's Carbon Markets<sup>19</sup>

There are four active carbon markets in the world today. The largest market by far is the European Union's Emissions Trading System (EU ETS). The EU ETS runs in two phases; 2005-2007 and 2008-2012. The first phase is a learning phase designed to prepare emitters for the second phase which coincides with the first, and so far only, commitment period of the Kyoto Protocol. As in the US Acid Rain programme, participant companies are allocated allowances annually corresponding to their emissions target for that year. Allocations are determined by national governments through their National Allocation Plans (NAPs). Phase 1 of the EU ETS covers around 2.2 billion tonnes of CO<sub>2</sub> emissions (around 8% of global emissions) from around 11,500 installations in the following sectors: power and heat generation, oil refineries, ferrous metal production, cement, glass and bricks, and pulp and paper.

Currently, companies subject to the EU ETS only know their emission targets until the end of 2007 and, for the next few years at least, will only know their targets until the end of 2012. Under the Acid Rain programme, emitters have a pretty sound idea of their targets over a period of decades. Also, EU allowances (EUAs) are issued annually. Companies thus have allowances in their accounts for the following 12 months of emissions at most. Sulphur allowances, by contrast, are issued thirty years in advance which means that participants can trade 2035 allowances today. In addition to using EUAs for compliance, emitters can also use carbon credits from CDM and JI. This gives more flexibility than the Acid Rain programme which has no "offset" component whereby participants can earn credit for reductions achieved by sources outside the programme.

Launched on January 1<sup>st</sup> 2005, the EU ETS has so far seen traded volumes of over 1 billion tonnes of CO<sub>2</sub>, with a total notional value exceeding €25 billion. The market is also increasing in size and liquidity. In 2005, the volume of EUAs traded was 324 million tonnes of CO<sub>2</sub>, rising to over 750 million tonnes in the first nine months of 2006. Perhaps more important than the volume of trade has been the development of an emissions trading infrastructure including electronic registries for storing and transferring EUAs, verification entities licensed to provide third-party assurance of emissions levels, legal contracts for the trading of EUAs, and specialist brokerages and exchanges for the trade of EUAs.

Prices in the EU ETS have been volatile, starting around €7 per tonne in January 2005 and reaching close to €30 in April 2006 before crashing to below €10 per tonne. The crash coincided with the release of data showing that the market as a whole was significantly "long" for 2005, i.e. that member states had issued far more EUAs than were required for compliance purposes. Although some companies will still need to buy significant amounts of EUAs to meet their targets, the lack of overall scarcity has continued to depress prices. Although prices rallied following the crash, they have continued to drift downwards and by the end of October 2006 have fallen back to below the €10 level. It is significant to note, however, that prices for EUAs in 2008 which will

---

<sup>19</sup> Many of the figures cited in this section come from *State and Trends of the Carbon Market 2006 Update: (January 1 – September 30, 2006)* published by the World Bank and the International Emissions Trading Association.

be part of the second phase of the EU ETS have fallen by far less than the benchmark price for phase 1 allowances, suggesting some confidence by the market that there will be a greater scarcity of EUAs in the second phase of the EU ETS.

The CDM has also witnessed massive growth in the past two years.<sup>20</sup> In 2005, transactions with a total notional value of \$2.65 billion were completed, while in the first 9 months of 2006 \$2.26 billion of deals were done. According to the UN, the 1,200 projects currently going through the approval pipeline could generate up to 1.4 billion tonnes worth of credits by 2012, although it is important to note that only around 400 projects have been registered and to date only 18 million tonnes of credits have actually been issued.<sup>21</sup> Over forty different methodologies for quantifying emission reductions have been approved for projects including wind farms, landfill methane collection and combustion systems, reforestation schemes, destruction of industrial waste gases and schemes to improve public transport. CDM projects have been registered in around 40 countries. Major destinations for CDM investments include leading developing world economies such as India, China, South Africa and Brazil but CDM projects can also be found in countries such as Papua New Guinea, Mongolia, Bhutan, Tunisia and Nicaragua. Prices in the CDM are not as transparent as in the EU ETS because most transactions are over-the-counter forward purchases of Certified Emission Reductions (CERs) to be delivered in the future. In 2006, however, the weighted average price of CERs rose by almost 50% to around \$10-11 per tonne.

While the US has not signed up to Kyoto, the Chicago Climate Exchange (CCX) has been trading since December 2003. It is a voluntary, legally-binding programme for reducing and trading greenhouse gas emissions. Its members include leading global corporations such as Ford, IBM, DuPont, International Paper, Rolls Royce, American Electric Power and Bayer, state and local governments such as the States of New Mexico and Illinois and the Cities of Chicago and Oakland and environmental pioneers such as the World Resources Institute and the American Council on Renewable Energy. Members sign a legally binding agreement to cap their emissions and to buy credits if they fail to meet their targets. The price of carbon credits on CCX has risen from 80 cents per tonne to over \$4 per tonne since the launch and the value of trades executed on the exchange in the first nine months of 2006 is ten times the total value for 2005.

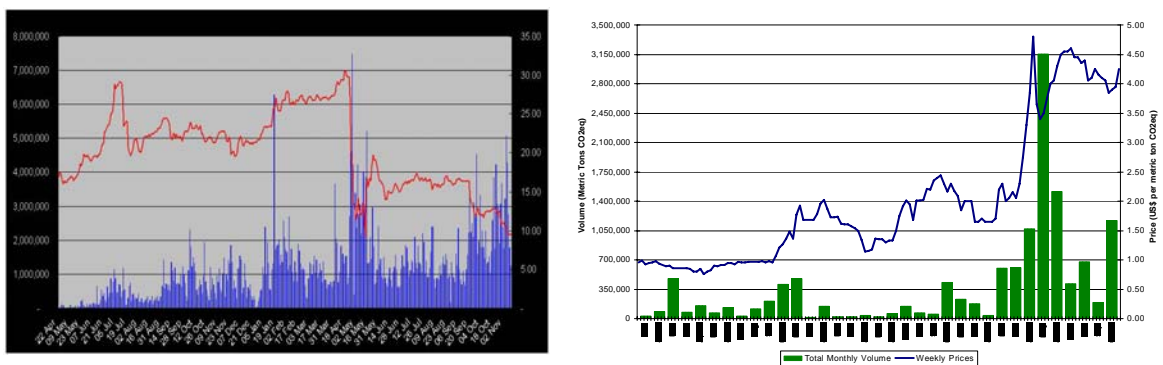
CCX combines “cap-and-trade” along the lines of the Acid Rain programme with an “offset” project-based component along the lines of the CDM. Eligible project categories include renewable energy, forest carbon sequestration, soil carbon sequestration and the capture and destruction of landfill and agricultural methane. Although several states in the United States have announced plans for regional trading systems, CCX is likely to be the only formal marketplace for emissions trading in the United States until at least 2009.

---

<sup>20</sup> JI, by contrast, is still only an emerging market. Volumes are small and relatively stagnant in comparison to the CDM.

<sup>21</sup> Data on the CDM can be found at <http://cdm.unfccc.int/>.

The fourth active carbon market is the New South Wales Greenhouse Gas Abatement Scheme which is structured somewhat differently from the other markets. Rather than placing a cap on emissions at the polluter level, the scheme places the burden on electricity retailers and certain other parties who buy or sell electricity with a cap based on per capita emissions of electricity consumers in the state. The initial level was set at 8.65 tonnes and drops to 7.27 tonnes in 2007. This cap remains in place to 2012. Entities subject to the cap can reduce the average emissions intensity of the electricity they supply or offset some of the emissions by purchasing abatement certificates. Market volumes have tripled in the first nine months of 2006 relative to the whole of 2005 and the value of certificates traded exceeds \$180 million.



Price and Volume for ECX and CCX since launch

The key achievements of the global carbon markets to date are two-fold. The first is simply to put a price on greenhouse gas emissions, thus beginning the process imagined by Coase of internalizing the externality and establishing a price for the use of the atmosphere to dump carbon dioxide pollution. Perhaps the major barrier to internalizing externalities is that of imagination, of turning an inspired idea into something that looks, feels and smells like a regular financial market. Once relatively robust and liquid markets have been established, the externality begins to fade away as people begin to understand that carbon emissions have a price.

The second major achievement is building the infrastructure for a carbon market; the standards and procedures for counting and verifying emissions and reductions, the rules and precedents governing allocation methods, the software for authenticating, storing and transferring carbon credits, the legal contracts governing trades, the banks, brokerages and exchanges to facilitate transactions and perhaps most importantly, the people who understand what it takes to make a market work, whether they be government officials, lawyers, traders, regulators or financiers. The development of this infrastructure represents a considerable financial and intellectual investment that is a *sine qua non* for an efficient environmental market.

### 3.4 Challenges for the Carbon Markets

Despite these achievements, the carbon markets face a number of significant challenges before they can be said to have truly matured. Crucially, the markets are still perceived to be highly vulnerable to political whim. The crash in EU ETS prices exemplifies this. It was caused by a systematic over-allocation of emission allowances to industry across

many countries in Europe, probably in response to business and government concerns about protecting the competitiveness of domestic industries. This deprived the market of the scarcity in allowances that it needs to function effectively and sent the message to potential investors that they could not be sure that governments were truly committed to taking some of the difficult decisions needed to create a robust market that could attract serious volumes of capital. The volatility was amplified by a structural idiosyncrasy of the EU ETS which does not allow excess emissions allowances to be banked beyond 2007, thus depriving them of any potential future value once the first phase of the EU ETS expires.

Similar uncertainties surround the future of all the carbon markets. Kyoto, the EU ETS and the CDM expire in 2012, while CCX currently runs to 2010. While climate negotiators and political leaders, especially from the EU, make statements about Kyoto's goals being extended past 2012, there is no formal, legally binding commitment. The short-term nature of the goals currently set does not match the time horizon for the massive capital investment required to reduce emissions by the order that scientists tell us is required. By contrast, as mentioned above, allowances in the Acid Rain programme are issued 30 years in advance, enabling trades to be executed for "streams" of emissions allowances that extend to the 2030's. This allows the market to play a part in financing emission reduction investments that take decades to pay for themselves.

The CDM process is also highly politicised on issues about which project categories should be eligible for receiving carbon credits. Forestry has been subject to endless debate and huge uncertainty. To date, there is only one registered forestry project in the CDM. Nor will the EU allow CERs generated by such projects to be used for compliance in the EU ETS. More contentious still is the topic of avoided deforestation, paying countries to prevent the destruction of their forests although it continues apace and no policy-makers deny the connection between deforestation and climate change.

At the root of the political uncertainties surrounding the carbon market is one and only one problem, the participation of the USA. Its failure to mandate emission reduction targets at the Federal level is the major reason for the inadequacy of current global efforts to reduce emissions. In its absence, the world's carbon policies resemble a giant version of the economists' favourite game, "prisoner's dilemma," in which participants ponder the pay-off of cooperation with others, knowing that while cooperation serves the collective interest, it could grievously harm their own self-interest if others fail to reciprocate. From the European perspective, despite a desire to set long-term emission reduction goals, the political will is currently lacking to make unilateral commitments that are perceived to be harmful to European competitiveness vis-à-vis the United States which would gain "free-rider" benefits from European reductions.

While Japan remains formally committed to Kyoto, it is on course to miss its target by a significant margin and is yet to pass formal regulations capping emissions. Canada has taken little or no meaningful action to reduce its emissions and cannot conceivably meet its target short of massive economic collapse. The two emerging titans of the economic and emissions realms, India and China, will certainly not commit to any form of legally-binding target, even if it allows them significant room to grow their economies, before the United States makes such a commitment. Simply getting on with strengthening and

extending the Kyoto Protocol is no answer because it is reasonably clear that the United States will never sign up to it in its current form.

Another major challenge is extending the reach of emissions trading systems. For example, only around 35% of UK greenhouse gas emissions are covered by the EU ETS, mostly from power stations and other big energy users whose emissions are growing incrementally. Emissions from road transport, which is not included in the EU ETS, have risen by around 15% since 1990 and now constitute 18 per cent of all UK greenhouse gas emissions. While still small in absolute terms, emissions from aviation are also growing fast. Homes also contribute close to 30% of the UK's emissions and the country's housing stock continues to expand. New technology, combined with better building methods and simple energy efficiency techniques, can greatly reduce emissions from British homes. As energy prices rise, more of these measures come closer to being cost-effective. The additional financial incentives provided by an emissions trading system could be the tipping point that ensures these improvements are widely adopted.

The EU is expanding the EU ETS to new sectors and is making attempts to bring aviation into the ETS, although how and when this will happen is uncertain. There has, however, been little progress in including emissions from other greenhouse gases such as methane and nitrous oxide. The broader the emissions trading system, the more efficient it becomes. Including a wider variety of emissions and emission sources ensures that all emissions are covered by a legally binding cap rather than escaping regulation as is the situation today. It also provides the widest opportunity for the market to identify the most cost-effective methods for reducing emissions across the entire economy.

Although the CDM has been a catalyst for significant volumes of investment in a wide variety of emission reduction projects, it has also been the subject of much criticism.<sup>22</sup> In its first years of operation the CDM was hampered by a severe lack of resources and while budgetary stability is closer and more staff are being hired, even today the CDM is overwhelmed by the sheer volume of work it faces in analysing and approving methodologies, registering projects and reviewing verification reports before it can issue CERs.

It can be argued that the CDM is actually a victim of the non-standardised approach it has taken to evaluating what counts as an eligible emission reduction. Out of a legitimate concern to ensure the "additionally" of emission reductions it approves, the CDM has created a very complex and often quite subjective approach to determining whether projects actually achieve emission reductions that would not otherwise have happened without the finance provided by the carbon market. This has led to some decisions that limit the amount of credits to be issued that have little basis in sound science or policy. The consequences are that the methodologies the CDM approves for emission reductions are generally quite limited in application and the outcome of often lengthy review procedures, lasting up to two years, are highly uncertain. Viewing the CDM primarily as a mechanism for the transfer of investment capital from developed to developing countries, a more effective approach would have been to establish more standardised

---

<sup>22</sup> A detailed analysis of the CDM can be found in "2006 State of the CDM," *International Emissions Trading Association*.

procedures for earning CERs that would have been easier to monitor and verify. This, of course, creates the risk that certain projects will earn credits for activities that would have happened without the carbon markets. Rather than allow this to happen, the CDM has chosen to reduce the potential investment capital available to fund emission reductions by creating an often opaque and uncertain process.

Although Africa is set to be the continent that will perhaps be hardest hit by climate change, its participation in the global carbon markets is currently minimal, especially for sub-Saharan Africa excluding South Africa. A major challenge for the global carbon markets is to assist Africa to develop as a source of clean development capital.

### **3.5 Other Environmental Markets**

In addition to markets in greenhouse gases, sulphur dioxide and other atmospheric emissions, there are a number of other emerging environmental markets.

#### **3.5.1 Renewable Energy and Energy Efficiency**

Various US states and European countries operate markets for renewable energy credits. A target is set for the proportion of the energy supply that must come from renewable sources. Each energy supplier must meet that target from their own generation sources or buy excess renewable energy certificates from other suppliers or generators. Italy operates a “white certificate” market in which targets are set for energy savings and those that exceed their targets can sell certificates to those that fail to meet theirs. These markets, of course, are closely allied to carbon trading markets.

#### **3.5.2 Water Quantity**

The Roman Polanski film *Chinatown* dramatises the life-or-death value of water in a parched region. The film is loosely based on William Mulholland, the water engineer from Los Angeles, who orchestrated the draining of Owens Lake in the High Sierras and the piping of its water down into Los Angeles through the San Fernando Valley.

The Western United States faces growing shortages of water with a rapidly expanding population and the threat of reduced precipitation due to climate change. And yet, massive market failures continue so that across the West, farmers receive very cheap water to irrigate subsidised crops in what is effectively a desert, while burgeoning urban areas that are willing to pay much higher prices for water are facing shortages.

Water trading has been suggested as a solution to this problem<sup>23</sup>. In California, where 80% of the water is used by agriculture, an electronic trading platform called WaterLink has been set up. Buyers and sellers can post bids and offers. In response to these initiatives and other enabling legislation introduced by the government, brokers and other market participants are entering this nascent market. New Mexico is another state that has experimented with informal water markets. A system based on private or municipal ownership of irrigation ditches called *acequias* was brought to the region by Spanish settlers in the 1500s. Users of water from another person’s *acequia* had to compensate the

---

<sup>23</sup> See “Water rights and wrongs,” Richard Sandor (*Environmental Finance*, July–August 2003).

owner. This remains the model for water allocation in the state. The major problem facing water trading in the West in the dense thicket of overlapping federal, state and local jurisdictions and the many unresolved legal disputes over rights to water that prevent the emergence of a market that can easily trade clearly assigned legal rights to extract water.

A more ambitious programme has been set up in the Murray-Darling Basin, Australia's biggest watershed, which faces severe water shortages threatening livelihoods and severe environmental damage<sup>24</sup>. This year, the Murray River has received only 10 per cent of its normal flows. Water trading within states has been possible since the late 1980s and the possibility of interstate trade has been expanded in recent years.

The market in seasonal allocations (temporary rights to water) represents about 10-20% per cent of entitlements over recent years. Volumes of trade in entitlements (permanent rights to water) are much lower, averaging about 1-2 per cent of entitlements annually. Trades in allocations in particular areas have reached 30% in a dry year. Prices vary between regions of the watershed reflecting segregation of markets. Annual average prices for allocations have ranged from AUS\$15 to AUS\$228 per ML (million litres) while the long-term average price for a permanent water entitlement is AUS\$750 -1,050 per ML.

### 3.5.3 Water Quality

In the Gulf of Mexico south of the mouth of the Mississippi lies a massive "Dead Zone," an area of water stretching up to 7,000 square miles so depleted of oxygen that most marine life, including all commercial fish, crab and shrimp species, cannot survive in it. The Dead Zone is caused by excess nitrogen and phosphorus run-off from farms all the way up the Mississippi-Missouri watershed that is washed into the Gulf from the Mississippi River. The nutrients spur huge "blooms" of algae that drop to the ocean floor and decompose, using up the oxygen in the water.

Water quality trading works by setting a cap on the overall levels of such nutrients that can be emitted into a watershed, often called the Total Maximum Daily Load (TMDL). Several watersheds across the United States have experimented with water quality trading. The World Resources Institute has set up a web-based trading system called NutrientNet<sup>25</sup>, which is operational for phosphorous in the Kalamazoo Watershed in Michigan and for nitrogen trading in the Potomac Watershed of the Chesapeake Bay, which also has its own dead zones. While some trading has taken place, market volumes have been very limited. A major constraint on volume includes restrictions on trading across larger watersheds. This reduces the potential liquidity of the market, and hence offers insufficient incentives to attract providers of capital and professional traders to the market. Another problem includes nervousness of the agricultural sector about entering the market as a voluntary provider of offsets and acknowledging its role as a major polluter.

---

<sup>24</sup> Information on water trading in Australia can be found from the Murray-Darling Basin Commission (<http://www.mdbc.gov.au/>).

<sup>25</sup> [www.nutrientnet.org](http://www.nutrientnet.org). See also "Water – new horizons for markets," Richard Sandor (*Environmental Finance*, November 2003).

### 3.5.4 Fisheries

The collapse of the Canadian Atlantic cod fisheries is a dramatic example of what Garrett Hardin called the Tragedy of the Commons. They had yielded around 250,000 tons of cod per year for over a century until decades of over-fishing caused them to be virtually wiped out in the early 1990's with a loss of around 40,000 jobs. Scientists now warn that the same fate awaits North Sea cod stocks. In a study published in *Science* in November 2006, there was a warning that 29 percent of global fish and seafood species have collapsed, i.e. their catch had declined by 90 percent. Further, on current trends all fish and seafood species are projected to collapse by 2048.<sup>26</sup>

Tradable fishery permits have had some success in addressing this issue. The basic principles are just the same as for greenhouse gases. The overall cap on harvests is the total allowable catch (TAC), determined annually by fishery managers. The equivalent of an emission allowance is the individual fishery quota (IFQ). An IFQ grants the holder – usually the owner of a fishing vessel – the right to harvest a fixed share of a fishery's TAC. By contrast, many current fishing permits grant the owner access to the fishery but do not guarantee a share of the harvest. The second key feature of an IFQ is that, like an emission allowance and unlike most fishing permits, it is tradable.

By guaranteeing fixed shares of a TAC over many years, IFQs are designed to align their owners' interests with the long-term sustainability of the fishery. The tradability of IFQs should also promote rationalisation in fisheries that are frequently over-capitalised. Fishermen finding it uneconomic to operate with small quantities of quotas may opt to sell their IFQs and receive some financial return for their previous investment in the fishery.

New Zealand has used IFQs to regulate almost all of its commercial fisheries since 1986 and a similar system has been in place for Alaskan halibut since 1995. The New Zealand programme has experienced more than 140,000 annual leases and 23,000 sales of quotas as of 2000—an annual average of about 9,300 leases and 1,500 sales. In the typical quota market, the percentage of the total allowable catch that is leased in any given year has risen considerably, from 9% in 1987 to 44% in 2000. According to researchers at UC Davis<sup>27</sup>, 80 percent of 492 fish stocks (92 species) in the country have been rebuilt to sustainable levels. One of the consequences of the trading system, however, has been the consolidation of IFQ ownership under the control of large seafood processors, with the five biggest companies now owning about 85 percent. In some ports, small fishing operations have virtually disappeared. It should be noted, however, that in the Alaskan halibut fishery there are limits on the amount of quota that an individual, company or group may own which has prevented over-concentration of IFQ ownership.

---

1.1 <sup>26</sup> "The Tragedy of the Commons," Garrett Hardin, *Science*, 162(1968):1243-1248. "Would Isaiah Approve of Emissions Trading?" Robert Rabinowitz, *eCLAL Magazine*, 21 June, 2002. "Fishery finance," Richard Sandor (*Environmental Finance*, December 2003-January 2004).

<sup>27</sup> *UC Davis Magazine Online*. Volume 24, Number 1. Fall 2006.

### 3.5.5 Wetland and Stream Mitigation Banks

The U.S. Clean Water Act requires developers who build on or near a wetland to offset any unavoidable damage to the wetland by restoring an equivalent ecosystem somewhere else. The Endangered Species Act makes a similar requirement of developers when they damage endangered species habitat. As a result of these legislative requirements, the last several decades have witnessed a growing demand for habitat restoration in the U.S. A mitigation bank is a wetland or stream restoration project that restores habitat and gets credit from the government for doing so. The bank can then sell that credit on to developers who need it to meet permitting requirements.

As of September 2005, there were 405 mitigation banks in the US, of which 330 are active and 75 are sold-out. This is a 780% increase in the number of banks in fourteen years. The majority sell only wetland credits, some sell stream credits and a very small number of banks are working to get approval to sell habitat conservation credits. There is no single, transparent price for mitigation because different banks relate to different ecosystems which may have very different restoration costs. Prices range from \$3-4,000 per acre, plus the costs of land acquisition, to as much as \$350,000 per acre.<sup>28</sup>

Whilst mitigation banks in theory could help to halt the increasing rate of wetlands loss in the US, a recent report on 12 of Ohio's oldest wetland-mitigation banks found that practice departs radically from theory.<sup>29</sup> Only three banks scored in the successful category, five passed in some areas and failed in others and four failed nearly every assessment. Perhaps the most troubling finding was that the government agencies supposed to be regulating the failing banks had not conducted sufficient checks of the data the banks submitted.

## 3.6 How to Create Environmental Markets

Although environmental markets are only just beginning to show their potential for enhancing the sustainability of our civilization, we now have enough experience to outline some basic lessons learned that can guide future policy in creating more efficient carbon markets and, indeed, markets in other environmental commodities. Following Richard Sandor's analysis of the evolution of environmental and other capital markets, we can trace a four stage process common to all environmental markets.<sup>30</sup>

### 3.6.1 Stage 1: A new demand for capital

The first stage is the emergence of a major structural change that creates a demand for capital. In terms of global environmental problems such as climate change, loss of biodiversity, depletion of natural resources such as fisheries and water shortages, the

---

<sup>28</sup> "2005 Status Report on Compensatory Mitigation in the United States," Jessica Wilkinson and Jared Thompson, *Environmental Law Institute* (April, 2006).

2 <sup>29</sup> "Ohio Study Shows Mitigation Banks Not Living Up to Potential," Alice Kenny, *Ecosystem Marketplace* (August 24, 2006).

<sup>30</sup> The four stage process described below is actually a condensed version of Richard Sandor's two-fold description of the seven stages through which all capital markets pass in their development to maturity and the twelve theoretical stages that guided the development of the Chicago Climate Exchange.

structural change is that humanity's "ecological footprint" has grown to unsustainable levels. This creates a demand for capital to finance the measures necessary to curtail that impact.

In the case of climate change, for example, huge financial resources will have to be spent on new technologies and capital investments to increase energy efficiency, to sequester carbon and to generate renewable energy. The emissions trading market does not itself reduce emissions, it acts to direct capital to the investments that most cost-effectively reduce those emissions.

The practical value of emissions markets was exemplified quite dramatically by the success of the Acid Rain programme in the United States. It allowed power generators to develop sophisticated, relatively low-cost compliance strategies that were not predicted in advance and hence could not have been incorporated into command and control mechanisms.

The huge size of the emission reductions required to prevent dangerous climate change (60-80% reduction by 2050 for the UK) and the multiplicity of possible solutions and technologies, many of them relatively undeveloped or untested, mean that it is impossible in advance to "pick winners." It is therefore particularly important to create a market-based mechanism that allows society to explore and evaluate all of the options by driving capital to as many as possible, enabling the discovery of cost-effective emission reductions as yet unanticipated.

### 3.6.2 **Stage 2: Creation of uniform standards for a commodity**

It is not enough to know that capital needs to be spent to combat a particular environmental problem. The problem must be "commoditised," turned into standard units in which the problem can be stated. This in turn enables verifiable measurement of performance in abating the problem.

With respect to carbon, the first component of the process is scientific and involves the creation of a single commodity "CO<sub>2</sub>e," carbon dioxide equivalents, a numeraire against which the relative global warming impact of an emission of each greenhouse gas is measured. So, for example, one tonne of methane equals 21 tonnes CO<sub>2</sub>e while one tonne of sulphur hexafluoride equals 23,900 tonnes of CO<sub>2</sub>e. This new commodity is the connection between the science of climate change and the trading markets. It allows the emission reduction targets set by the scientists, in terms of overall atmospheric concentrations of greenhouse gases, to be translated into reduction targets for individual emission sources and organizations.

The second component of commodification is translating the general scientific picture into a practical measurement of particular emissions and reductions. While it may be relatively simple to meter the carbon dioxide emissions coming out of a power station stack, it is not so simple to quantify carbon dioxide emissions from highly complex industrial processes such as iron and steel-making because it is simply not possible to have meters at all points in the process in which there are emissions. More complex still are PFC emissions from aluminium smelting. Even more complex are the research and

calculations necessary to create a standard tradable commodity to take account of the carbon dioxide removed from the atmosphere by reforestation or restoration of wetlands and prairies. Probably the leading initiative to address this issue is the GHG Protocol project<sup>31</sup> of the World Resources Institute and the World Business Council for Sustainable Development which consists of calculations and accounting rules for developing greenhouse gas emission inventories and quantifying the emission reductions achieved by particular projects. These tools unify almost all principal activities that produce or sequester greenhouse gas emissions into one common framework for measurement.

Once commodification has been achieved, the market can now get to work comparing the returns from investing capital in various possible activities, all of which can be compared against their effectiveness in achieving reductions of CO<sub>2</sub>e levels in the atmosphere.

### 3.6.3 **Stage 3: Development of a legal instrument that provides evidence of ownership**

In order for trading to take place, it must be possible for one party (with a high cost of internal abatement) to pay money to another party (with a lower internal cost of abatement) in return for the investor being able to claim the reductions that ensue as its own. This requires the development of contracts specifying that the investor gains legal title to the reductions which can then be used to fulfil legal or voluntary obligations to reduce emissions. This turns out to be a very challenging process. In the carbon markets, the first trades were executed well in advance of any regulatory framework being in place and the counter-parties had to create their own standards by which to determine that the seller had met its contractual commitments, i.e. that the reductions had been measured and verified, as well as devising methods for providing evidence for legal transfer of the rights to the emission reductions. Over time, as more regulatory clarity has been achieved, it has been possible to develop master-contracts for over-the-counter markets, such as the IETA, EFET and ISDA contracts for the EU ETS. These standard contracts deal with all related aspects of a trade including *force majeure* and taxation. Trading is at its most efficient, however, with the introduction of exchange-based contracts, such as those used by the European and Chicago Climate Exchanges, which are standard contracts to which all counter-parties agree as part of their exchange membership, allowing trading to move directly from agreement on price to delivery and payment without any further legal negotiations.

### 3.6.4 **Stage 4: Development of market-based emission reduction programmes**

With all the scientific and theoretical groundwork laid, it is now possible to undertake the creation of a market-based programme for reducing environmental externalities. Typically, these will involve the establishment of a central authority which governs the system, the definition of baselines against which reductions in externalities can be measured, setting of reduction targets, the allocation of legal responsibility and tradable permits to market participants and the creation of a “true-up” procedure to determine whether market participants are in compliance with the programme’s rules.

---

<sup>31</sup> [www.ghgprotocol.org](http://www.ghgprotocol.org).

### 3.6.5 The Need for Liquidity

Perhaps the single most crucial criterion that will determine the success or otherwise of a market-based programme is the “liquidity” of the markets it brings into being. The liquidity of a market is measured by the ease with which a participant can find a counterparty willing to trade sufficient volumes at a price close to the market price. In a relatively liquid and effective emissions market such as the carbon market or the US sulphur market, there will be a clear and transparent price which participants can use to calibrate their investment and trading strategies in the knowledge that they can go into the market at any time to take advantage of differences between the market price and their own internal cost of abatement. This is at the heart of the old traders’ adage that “liquidity begets liquidity.” In a liquid market, participants will not only buy or sell once a year for compliance. They buy and sell often as part of their risk management programmes and employ derivatives such as futures and options to take or hedge risk, thus making the market more liquid and hence more effective at creating and transmitting a price that truly reflects the abatement cost of the economy as a whole.

Potential barriers to liquidity are numerous and include:

- high transaction costs which mean that the financial benefits of trading are overshadowed by the costs of the trade (e.g. small-scale emission reduction projects under Kyoto’s Clean Development Mechanism);
- regulations that create different classes of commodity that are not equivalent and hence are not tradable (e.g. the rules separating forest carbon sequestration credits from other carbon credits under Kyoto);
- insufficient numbers of participants (e.g. the Averaging, Banking and Trading Programmes for US engine manufacturers which has seen very few trades due to sensitivity about releasing proprietary information to competitors);
- restriction of a market to participants that have similar abatement costs, reducing the inherent rationale for trading in the first place (e.g. the inclusion only of CO<sub>2</sub> from only the power sector, and not other greenhouse gases and sectors, in the proposed Regional Greenhouse Gas Initiative in the North-Eastern United States);
- regulatory uncertainty that leads participants to believe that they may be penalised in the future for trades executed in good faith today (e.g. Germany’s proposal to change EU ETS allocations retrospectively for companies that prove to have excess spare allowances); and,
- creation of a market that is simply too small for liquidity providers such as financial intermediaries and speculators to devote adequate resources to the market (e.g. proposed water-quality trading programmes limited to relatively small water-sheds).

The Chicago Climate Exchange was designed to avoid these barriers to liquidity by including multiple economic sectors, all six greenhouse gases and methods for allocating and issuing credits, and employing a low-cost, anonymous, trading platform with guaranteed payment and delivery of carbon credits.

### 3.6.6 **Price Comes Last**

One final thing must be borne in mind by policy-makers creating market-based environmental regulations; price actually comes at the end of the process. Many economists have laboured hard to derive a value for ecological services by certain environmental assets. While such studies are useful in illustrating the dependence of human well-being on natural resources that have no price in our current economic system, no actual reliance should be placed on the prices they generate.

The temptation for policy-makers is to build such prices into proposed market-based regulations in the form of price-caps or similar methods that purport to reduce or limit the cost of regulation. In fact, as can be seen with programmes that involve a price cap, such as the New South Wales Greenhouse Gas Abatement Scheme, the price that emerges tends to be just below the government price cap, making credits a marginally more attractive compliance option than failing to meet the scheme's targets. This does not allow the market to discover the economy's real abatement price, hiding the true volume of abatement that would be present at lower prices and preventing the economy from paying the true price of its abatement if that turns out to be above the price cap.

Price in an environmental market is a function of many things: the sources covered, the severity of the targets, rules on banking, availability of technology and, not least, human ingenuity. The failure of economists to predict correctly the price of sulphur under the US Acid Rain programme, covering emissions for which there are only a handful of well-understood abatement possibilities, is testimony to the impossibility of being able to second-guess the market with accuracy. Setting the price in advance effectively neuters the market from achieving its goal of "costing the earth" and internalising environmental externalities.

## 3.7 **Looking to the Future**

The future of the carbon market is uncertain but the prospects are sound. In less than two years since the Kyoto Protocol came into force, and despite significant political uncertainties, over \$30 billion of transactions have been confirmed. Several billions more of investment commitments have been announced. To be fully effective, however, several other things must happen. First, the United States has to be engaged in the international process of building the carbon market. On this front, there are encouraging signs. A group of States in the North-Eastern United States plan to begin emissions trading in 2009 and the State of California has announced its intention to create a carbon market. The outcome of the recent mid-term elections also suggests that there will be stronger moves towards federal regulation of greenhouse gas emissions. The participation of the United States is likely to bring with it fuller commitment from developed countries such as Canada, Australia and Japan. It is also a pre-condition of obtaining binding reduction commitments from developing countries. Second, the carbon markets have to increase their scope and depth. Longer-term and deeper targets are required and broader sectors of the economy must be included. If all these events come to pass, the global carbon market could emerge as one of the world's largest and most significant commodity markets.

The Clean Development Mechanism deserves special focus in a consideration of the future of the carbon market. It serves as a vital bridge between the developed world, which has reduction targets under Kyoto, and the developing world, which is not only eager to reach Western levels of material consumption but also largely views itself as an economically disadvantaged victim of the wealthy world's pollution. From an environmental perspective, it is imperative to combat the rapidly growing carbon emissions from developing countries. The CDM has already demonstrated the potential to funnel large amounts of Western capital into investment in the infrastructure that will enable developing countries to avoid the carbon intensive economic path that the developed world has taken. More ambitious, longer-term international emission reduction targets, combined with more stream-lined processes to enable the CDM to handle the required scale of investment capital flows, could transform the development trajectory of China, India, Brazil, South Africa and other burgeoning economies and, ultimately, help reduce damage to the world's climate.

Taking a broader perspective, it is hard to remain sanguine. There are currently six billion people on the planet. According to the World Bank, that is projected to increase to nine billion within fifty years while global GDP quadruples.<sup>32</sup> Looking at the scale of environmental damage humanity has already caused with far fewer and less wealthy people, including deforestation, climate change, destruction of the ozone layer, prevalence of persistent organic pollutants in the polar regions, depletion of fisheries and extinction rates running thousands of times higher than natural levels, it is hard not to wonder how the global environment will possibly be able to handle future environmental impacts of human life. What is clear is that drastic reform of the global economic machine, to include the cost of environmental externalities, is urgently required. Perhaps it would be fair to say that one of the key indicators of whether our future will be environmentally sustainable will be the health of the world's emerging environmental markets.

### 3.8 **About the Author**

Robert Rabinowitz is a Director of Climate Exchange (Europe), a member of the Climate Exchange group of companies which design, build and operate the world's leading marketplaces for reducing and trading emissions. Climate Exchange (Europe) provides administrative and fund-raising services to PURE the Clean Planet Trust, a newly-created charity that offsets greenhouse gas emissions by retiring high quality regulated carbon credits, putting them beyond use. This finances projects around the world that reduce emissions and limits the amount of greenhouse gases that polluting companies are allowed to release into the atmosphere. Robert was part of the team that launched the Chicago Climate Exchange. His responsibilities included the development of protocols for quantifying emissions and reductions from various sectors and project types. Robert oversaw annual verification of annual carbon emissions equivalent to around 8% of total UK emissions and assisted leading global corporations in the development of trading strategies. Robert has a BA from Oxford University with a special focus on environmental politics and economics and a Ph.D. in philosophy from the University of London. Robert's previous career was in the field of religious education, most recently as

---

<sup>32</sup> *The Road to 2050: Sustainable Development for the 21<sup>st</sup> Century*, The World Bank, 2006.

Director of the Centre for Multi-Faith Education at Auburn Theological Seminary in New York City.