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Research Report

Emissions trading and the management accountant

Malcolm Hill

Laurie McAulay

Loughborough University Business School

Adrian Wilkinson

Griffith University

Malcolm Hill
Professor of Russian and East European Industrial Studies

Laurie McAulay
Lecturer in Management Accounting

Loughborough University Business School,
Loughborough,
Leicestershire,
LE11 3TU,
United Kingdom

and
Adrian Wilkinson
Visiting Professor, Loughborough University,
and Professor in the Department of Industrial Relations,
Griffith Business School, Griffith University, Nathan 4111,
QLD, Australia

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Emissions trading and the management accountant

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Links to web pages in this report were correct at the time of the production, but emissions trading is a fast moving area where web pages are constantly changing. We therefore apologise for any links which are no longer current. Links will be checked on a regular basis, but we regret that we cannot guarantee that all links will be operable.

Contents

1. Introduction

World-wide initiatives in emissions trading are numerous and complex, involving governmental policy, regulatory and other developments. Amongst these initiatives, the European Union Emissions Trading Scheme (EUETS) and the Kyoto Protocol are likely to demand new organisational competences to which management accountants will need to respond, whilst management accounting systems are already central to many environmental concerns. Systems of capital investment appraisal, performance measurement and transfer pricing are implicated in environmental management at the corporate level, whilst there is a growing need to account for emissions trading for financial reporting purposes. Management accountants will need to learn a new language associated with these initiatives if they are to be able to work alongside technical experts and to contribute to debates which are already affecting corporate agendas.

This report is based on research into the UK Emissions Trading Scheme (UKETS) which commenced in 2002, and the EUETS which commenced in 2005, and incorporates comments from experts directly involved in both systems. The purpose of the report is to introduce members to the broader context of emissions trading, so that they can engage in debates and contribute to the development of appropriate strategies, policies and reporting systems. The report is presented in five sections:

1. Why management accountants need to take an interest in emissions trading.
2. The basics of worldwide initiatives.
3. The basics of the EUETS.
4. Financial reporting.
5. Management accounting and emissions trading.

Each section provides an overview together with links to websites that provide more comprehensive details.

2. Why management accountants need to take an interest in emissions trading

There are three reasons why management accountants need to take an interest in emissions trading: regulatory; strategic and commercial; and social justice.

2.1 Regulatory

The first argument is the most straightforward. Due to worldwide initiatives to mitigate global warming, trading in emissions allowances for carbon dioxide (CO_2) and other greenhouse gases (see Appendix A) has already begun, and accountants are faced with the question of how to process such transactions for purposes of profit and loss account and balance sheet reporting. Greater numbers of accountants will be confronted with this issue in the years ahead, as more companies are drawn into the need to buy, sell and account for emissions allowances.

2.2 Strategic and commercial

2.2.1 Introduction

Trading in emissions allowances (or emissions trading) poses both threats and opportunities. These centre on organisational profitability and reputation.

2.2.2 Profitability

Emissions trading offers two kinds of opportunities relating to profitability. The first centres on two kinds of revenue generation. The first of these is the potential revenue stream which arises from an emerging value chain based upon product and process development initiatives to reduce emissions, and the marketing of related expertise. The second centres on a direct revenue stream which can arise from a firm's ability to sell surplus emissions allowances at the going market price. It is too early to assess the market price of emissions allowances with any assurance but prices for the European Union's Emissions Trading Scheme were originally expected to be some 10 to 15 euros per tonne of CO_2 within a possible price range of 3 to 50 euros per tonne. Prices in early 2006 exceeded €20 per tonne of CO_2. By May 2006, however, prices had fallen to a low of €8.6 a tonne following news that Germany and six other European nations had met their EUETS targets for 2005 (www.euractiv.com/en/sustainability/climate-change-eu-emissions-trading-scheme-eu-ets/article-133629). These price levels indicate that companies have had to react not only to the consequences of relatively high prices, but also to price volatility.

The second area of business opportunity is cost reduction. Costs associated with the environment in general include those arising from insurance, energy, transport and the cost implications of emissions trading schemes. Costs associated with the environment in general are felt to be substantial and rising. A report produced by the New Economics Foundation, for instance, suggests that, 'the costs of 'natural' disasters mostly linked to global warming hit $60 billion in 2003, of which $15 billion were insured'. In relation to insurance, Lloyds issued a report in early June 2006 which begins to address the changes needed in the insurance industry, and business more generally, to balance the need for more affordable premiums and profitable insurance (www.lloyds.com/News_Centre/360_risk_project.htm).

Views on the commercial implications remain mixed. A BBC report issued on 6 June 2006 suggests that British industry is divided over the question as to whether the costs associated with government action over the environment will damage competitiveness or, on the other hand, whether government target setting will leave companies more energy efficient and thus more profitable (http://news.bbc.co.uk/1/hi/uk/5050774.stm). Energy itself may appear to be a small percentage of sales on average for many firms, but it is very important for energy-intensive companies, and can become highly significant for firms with small profit margins. Furthermore, energy prices have increased in recent months as a consequence either of political volatility in some oil producing regions or of increased demands for fossil fuels compared with available supplies, and prices may increase even further if this demand/supply relationship continues to strengthen. Additionally, significant savings in energy can sometimes be made for very little investment, and such cost savings can be reinforced by consequent income opportunities from the sale of allowances from the associated reductions in carbon emissions.

2.2.3 Reputation

Reputation amongst institutional investors marks an area in which the control of emissions is already making an impact. Institutional investors are able to secure information about emissions through the London-based Carbon Disclosure Project, which was launched on 4 December 2000 at No. 10 Downing Street. The project involves writing to the world's largest firms to request information on emissions. Interest in this project has grown from its initial cycle of enquiry, which was signed by 35 institutional investors in December 2000, to its information request in February 2005 signed by 155 institutional investors with assets of more than $21 trillion. A report based on responses was published on 14 September 2005. Paul Dickinson, the project director at the Carbon Disclosure Project, is reported by Reuters as stating that responses from firms have risen to 71 per cent in 2005 from 49 per cent in 2003 (www.cdproject.net/index.asp).

There is thus growing awareness amongst institutional investors about the importance of the environment. In an article dated 2 November 2005, Reuters reported that 'Businesses are feeling the heat as the world warms up and investors demand to know what companies are doing to curb greenhouse gases'. This report quotes Karina Litvack, head of governance and socially responsible investment at F&C Asset Management, which manages £128 billion in assets, as saying, 'Climate change is one particularly striking example of an environmental factor that can badly damage wealth ... What is clear is that the damage caused by ever more severe and frequent weather events ... ripples across the economy to the eventual detriment of shareholders'.

2.3 Social justice

If human action is causing global warming, then it seems to be widely accepted that the industrial nations have been responsible for the majority of carbon emissions in the past, whilst developing nations (especially small island states) will bear a disproportional level of the consequences in the future. To put matters into perspective, the weather related disasters of the last decade have already impacted the lives of two billion people world-wide according to the New Economics Foundation (see www.neweconomics.org/gen/climate_change_top.aspx for the New Economics Foundation's latest work on emissions and global warming). These disasters have life and death implications for the poorest people on the planet, arising from floods and famines which create environmental refugees on a scale significantly greater than war or the persecution of minorities. Erratic levels of rain and changing sea levels are likely to continue to create the most significant consequences for those least able to respond, whilst 60% of current global industrial CO_2 originates from countries containing 20% of the world's population (for further details, see: www.globalissues.org/EnvIssues).

The modelling which supports these assessments is based upon the prediction that if climate change continues then the melting of ice caps will cause flooding of low-lying coastal areas. A more complex picture of the potential experience for future generations emerges from models which predict different patterns of weather change in different parts of the globe. NASA, for instance, reported in 2004 that global warming would lead to considerable reductions in temperature in certain areas, with North America and Western Europe experiencing long winters within a few decades. This scenario is based on models which predict that melting ice caps will change the flow of the Gulf Stream; with the result that average temperatures could fall between 5° and 10°C (9 to 18°F) in the relatively near future in areas which currently benefit. An article in the journal Nature published in 2005 has suggested that the flows of water in the Gulf Stream are already changing, but there is considerable uncertainty about causes, implications and the validity of the underlying modelling.

Responses to the problem of climate change fall into three main groups, namely (1) 'adaptation' to the problem through better sea defences and flood prevention; (2) 'mitigation' or 'abatement' through fuel switching to lower emission fuels, energy saving to reduce fossil fuel combustion, and substitution of other greenhouse gases; and (3) 'sequestration' in which emissions are captured by means of forestry policies and industrial technologies. Each of these responses has different kinds of implications for future generations and each is associated with a complex set of considerations.

Let us take the example of sequestration, for instance. One approach to sequestration is the capture of carbon through tree growth. This appears at first glance to be a panacea; but further analysis suggests a more complex situation. On the one hand, increased levels of forestry can make a beneficial difference in the short to medium term, as carbon is absorbed through tree growth; but in the longer term, carbon will be released once those trees die or are burned in forest fires. 'Natural' sequestration can thus be argued to be a policy based upon postponement; and future generations may be affected in the longer term. Alternatively, wood may be viewed as a 'carbon neutral' fuel if the carbon released when the tree is combusted does not exceed the amount of carbon absorbed during the growing cycle. Forestry policies must also consider alternative land uses so that sequestration ceases to provide a simple solution in view of complex policy issues.

The achievement of social justice can therefore be seen to be complex and difficult. Nevertheless, it is in this difficult area that we can most easily see the reasons why governments need to take action on a worldwide basis.

3. The basics of worldwide initiatives

The impact of greenhouse gases respects no national boundaries; the release of gases such as CO_2 impacts everyone irrespective of where they live even if far from where the gases have been emitted. The scale of the greenhouse gases currently in the atmosphere is therefore what matters and is considered to be significant. This can be gauged by considering the parts per million by volume of CO_2. These have increased from approximately 280 parts per million (ppm) prior to the Industrial Revolution to some 320 ppm in 1959, when accurate records began, to approximately 370 ppm in 2001 (UNEP, 2002; Appendix A provides the background to the measurement of emissions). Increases in concentrations of CO_2 have been associated within the archaeological record with global warming; and virtually all the warmest years in recorded history have occurred since 1990. Looking forwards, the latest predictions are for increases in average global temperatures of between 1.4 and 5.8°C over the next one hundred years (IPCC,2001) against a steady state average temperature of 14-15°C for the past 10,000 years (broader impacts and responses are detailed at www.pewclimate.org/global-warming-basics/basic_science/).

The dominant view informing government policy worldwide regarding these developments is that anthropogenic emissions of greenhouse gases (i.e. emissions caused by human activity) are the fundamental cause of climate change. The need to take action is increasingly recognised at government level. Governmental concern for climate change can be traced back at least as far as the 1960s but the United Nations Framework Convention on Climate Change (UNFCCC, or 'the Convention') dates particular recognition of climate change to the First World Climate Conference, which was held in 1979. This was followed in 1988 by formal recognition within the United Nations. The United Nations and the World Meteorological Organization then established a new body, the Intergovernmental Panel on Climate Change (www.ipcc.ch/) to collect and assess scientific evidence, and this produced its first report in 1990. Its later report (IPCC, 2001) suggested that there was 'new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities'.

UNFCCC was established on 21 March, 1994, and was subsequently signed by 188 'Parties', including members of the European Union, the USA, the Russian Federation, China, Japan and Australia. The panel below is taken from UNFCCC (2003, p. 6) and addresses both objectives and principles. The Convention established a new language and concepts in developing these statements. In brief, UNFCCC established the importance of taking action now, whilst balancing the need for action over climate change with economic and social imperatives (see http://unfccc.int/2860.php for the website of UNFCCC).

The Convention categorised countries according to expectations that might be met. The categorisation established the following terms: Annex I Parties, Annex II Parties and Non-Annex I Parties. Annex I Parties include industrialised countries that were members of the OECD (Organisation for Economic Co-operation and Development), plus 'economies in transition' from the former Socialist Countries of Eastern Europe. Annex I countries were expected to show they were committed to resolving issues of climate change by adopting policies that would reduce emissions to 1990 levels by the year 2000. 'Annex II Parties' referred to the industrialised countries included in the definition of Annex I, but excluded economies in transition. Annex II Parties were expected to provide financial resources to support emissions reductions amongst developing countries and to transfer environmentally friendly technologies to economies in transition and developing countries. Non-Annex Parties are mostly developing countries, sometimes referred to as 'Group-77'. All parties to the Convention agreed to respond to climate change, to produce an inventory of emissions and to submit reports detailing actions to implement the Convention.

Objectives and principles

The ultimate objective of the Convention is:

'to achieve stabilisation of atmospheric concentrations of greenhouse gases at levels that would prevent dangerous anthropogenic (human-induced) interference with the climate system ...'

Defining what is meant by 'dangerous' involves social and economic considerations as well as scientific judgement. The Convention does, however, state that the level of concentrations should be reached in a time frame that allows ecosystems to adapt naturally, food security to be preserved and economic development to proceed in a sustainable manner. The Convention's principles hinge on:

- Equity and common but differentiated responsibilities, which reflect the reality that, although climate change is a global issue and must be tackled as such, industrialised countries have historically contributed most to the problem and have more resources with which to remedy it. Developing countries, for their part, are more vulnerable to adverse effects and their capacity to respond is likely to be lower.
- A precautionary approach, or recognition that though many uncertainties surround climate change, waiting for certainty before taking action, or precautionary measures, runs the risk of being too late to avert the worst impacts. The Convention notes that 'where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures.'
- A recognition that development and climate change are interlinked and that patterns of energy consumption, land use and demographic growth are key drivers of both. The Convention sees sustainable economic growth and development as essential ingredients of successful policies to tackle climate change. It also calls for policies and measures dealing with climate change to be cost-effective, delivering global benefits at the lowest possible cost.

The Parties to the Convention set up a series of Conferences, and the 'Third Conference of the Parties' (COP-3) met in Kyoto in 1997, to sign a protocol which envisaged legally binding commitments to reductions in emissions. The resulting Kyoto Protocol was finally ratified in 2004 and implemented as an international treaty in February 2005. The agreements emerging from the 1997 Kyoto Conference are obligatory upon those signatory countries which subsequently ratified the Protocol, with penalties for non-conformance. These agreements envisage reducing the emissions of a 'basket' of greenhouse gases from the industrialised countries by 5.2 per cent of the 1990 levels averaged over a 'commitment period' from 2008-2012 (it is common to refer to a 'commitment year' of 2010 for the sake of simplicity). It was expected that this reduction would be achieved in each Annex 1 country through the introduction of more efficient, and/or less carbon intensive, systems of power generation and industrial processing, with possibilities for sequestration through the development and management of forests and agricultural lands ('carbon sinks') to sequester, or absorb, carbon dioxide from the atmosphere, or carbon sequestration technologies for the removal of carbon from fossil fuel emissions and its subsequent storage . These 'carbon capture and storage' technologies aim to capture carbon dioxide at energy intensive installations, followed by its transport to stores created in depleted oil reservoirs, coal deposits or saline aquifers. Carbon capture and storage has the advantage that the captured carbon dioxide can be used to facilitate secondary oil recovery or coal bed methane extraction, and these technologies are growing in potential attractiveness if gas prices continue to increase faster than those of coal, with associated substitution of coal (a high carbon emission fuel) for gas (a low carbon emission fuel).

The Kyoto protocol includes an 'Annex B' which lists the reduction commitments of the Annex 1 countries. The overall target of 5.2 per cent reduction of greenhouse gas emissions between the baseline year of 1990 and 2010 for the Annex I countries was planned to be achieved through a set of 'Quantified Emission Limitation or Reduction Commitments (QELRCs)', which differed from one country to the next according to their own particular economic and industrial circumstances. Each signatory Annex 1 country has been allocated 'assigned amounts', which are emission allowances based on their QELRCs. The EU, for example is committed to a collective overall reduction of 8 per cent, and assigned amounts within that collective 'bubble' totalling 92 per cent of the 1990 baseline emissions are allocated to individual member countries through allowances or permits (Grubb et al, 1999, pp. 62-80, 118, 122-124). The target for the UK, for instance, is a 12.5 per cent reduction of 1990 emissions during the 2008-2012 commitment period: the assigned allowances for the UK will consequently be some 87.5 per cent of its 1990 baseline emissions.

The Kyoto Protocol envisages the use of market mechanisms to create incentives for efficient emissions reduction through emissions trading. If an Annex I country (or 'Party') reduces its 2010 emissions to below its assigned amount of allowances, it will be able to sell the difference to another Party which has exceeded its assigned amount. The quantities to be sold and the prices paid will be agreed between the Parties, but will probably depend upon the penalties for exceeding the assigned amounts, the expected costs for investment in cleaner technologies, and the amount of carbon emissions eligible or available for trading. A country's assigned amounts may be disaggregated as 'allowances', 'permits' or 'quotas' to companies such as major power utilities and other energy intensive industrial establishments: these entities will be able to trade their allowances amongst themselves, and to also engage in international trade in these documents
(Grubb et al, 1999, pp. 128-131).

In addition, the Kyoto Protocol enables companies to engage in emissions reductions through a framework known as 'Joint Implementation' (JI). Organisations from Annex I countries are allowed to invest in energy saving technologies in each others' industrial facilities, and consequently share the reductions in greenhouse gas emissions according to a joint agreement usually based upon the entities' respective levels of investment. JI thereby enables the organisations concerned to locate investment in areas where the most effective savings are likely to be obtained per unit of investment, and to contribute resources in terms of their respective comparative advantages, such as specific types of technological expertise or labour
(Grubb et al, 1999, pp. 88-100, 198, 199).

The principle of JI was extended to the Clean Development Mechanism (CDM) as a means to establish sustainable technologies in developing countries. The non-Annex I countries argued in Kyoto that they should not be subject to binding commitments to reduce their levels of greenhouse gas emissions as they were only just commencing their industrial development, starting from a very low base. Furthermore, they argued that they have been anxious to utilise energy efficient technologies but have not had the requisite investment capital, and that Western governments have been limited in their assistance, as most of the requisite technologies are privately owned. CDM is thus directed towards the investment in a non-Annex I country of technology from a company based in an Annex I Party. The savings in emissions thereby obtained can be allocated to the Annex I country which is the source of the certified investment. The advantage to the non-Annex I country is the assimilation of expertise in the implementation of novel energy-efficient or carbon-reducing technologies
(Grubb et al, 1999, pp. 133-136, 226-247).

4. The basics of the European Union's emissions trading scheme

4.1 Introduction

Emissions trading in general must be seen in the context of broader governmental action (an overview, including business impact, is provided by www.co2e.com/carbonbriefing/carbonbriefing.asp). Government intervention has traditionally been implemented in four ways, namely:

a. 'Command and control' of the emissions allowed from each defined installation; with fines levied on any emitter exceeding their allowed or permitted levels;
b. The use of taxes. These could include: a 'global warming tax', which could vary according to the emissions of specified gases and their defined 'global warming potential', or the combustion of defined quantities of fuels emitting the specified gases; a 'carbon tax' which could be related to a fuel's carbon content; or an 'energy tax' which could be based on the amount of energy consumed either 'directly' from fuel combustion (and associated defined amount of emissions) or 'indirectly' from fuels combusted (and associated emissions) to produce a unit of electricity. The use of energy taxes includes the UK's implementation of the Climate Change Levy, based on consumption of electricity and defined fuels;
c. Encouraging technological development. This can take a variety of forms, including tax incentives, capital allowances, or government funding to establish bodies to develop and offer technologies and advice, as in the case of the Carbon Trust in the UK. The Carbon Trust is a government funded organisation set up to advise organisations on options available to lower energy costs and reduce emissions (www.thecarbontrust.co.uk/carbontrust/);
d. The use of the 'flexible instrument' of 'emissions trading'.

Emissions trading is thus just one instrument through which governments seek to influence behaviour. Trading arises from a 'cap and trade' system in which a 'cap', or target, is set for permitted emissions from particular installations, and allowances are issued to the level of that cap. Trade in allowances is allowed so that 'over-emitters' can avoid fines through the purchase of unused allowances from 'under-emitters'. The cap is usually set in relation to emissions in a specified year, which is known as the baseline (for instance, the baseline for the Kyoto Protocol is emissions in 1990). Targets are set for a specified period relative to the baseline (for instance, the Kyoto Protocol sets reductions targets to be achieved during 2008-2012).

Emissions trading is popular at the governmental level because it is perceived to be a low cost scheme, since those who can reduce emissions economically do so, and sell allowances to those who cannot reduce emissions at costs lower than the price of the allowances. The resulting market price of a permit is said to be the social value of emissions, or the marginal cost of emissions reductions, and is commonly measured on the basis of price per tonne of CO_2 equivalent.

4.2 The European Union's emissions trading scheme

European countries, both individually and collectively, have played a leading role in the meeting of greenhouse gas emissions reduction targets and engaging in emissions trading to achieve these reductions. Denmark was the first country in the world to implement a greenhouse gas emissions trading in 2001 (for electricity generation), and the UK was the first country to introduce (in 2002) an economy-wide emissions trading system (Hill et al, 2005; for an assessment of the scheme's success, see www.nao.org.uk/pn/03-04/0304517.htm). Europe is therefore positioning itself in the vanguard of trading blocs which are intent upon the use of emissions trading to motivate reductions in the release of carbon to the atmosphere.

The essential feature of the EU Emissions Trading Scheme is a compulsory 'cap and trade' scheme for CO_2 emissions from defined installations. Governments allocate allowances to companies through National Allocation Plans, or NAPs (for an example, see: www.defra.gov.uk/corporate/consult/euetsnap-stagethree/nap.pdf). Companies must then report their emissions each year and show that they own the equivalent allowances. This enables companies to sell allowances if they emit at lower levels than their cap, or target. Companies which do not meet their targets must buy allowances. The compulsory feature of the system means that fines will be levied for failure to meet targets specified by the allocated allowances. The fine has been set at €40 per tonne of CO_2, against a mid-May 2006 EUETS market price of €8.6, and will subsequently rise to €100. The EU scheme focuses on direct CO_2 emissions from fossil-fuel combustion or from defined processes, and not indirect emissions from electricity savings. This has caused some critical comment, and the panel below presents the views of an interviewee involved in the research on the UKETS from which this report is drawn.

'Say you are burning 100 units of gas and 100 units of electricity. Now what happens if you decide to install a CHP plant so that you need 150 units of gas and 20 units of electricity? Under the EU scheme you need to buy credits because you are burning more gas. You reduce your electricity bill considerably but the power generator gets the windfall benefit not you. So the EU scheme is going to drive adverse behaviour.

This could be resolved through the way in which the government allocates allowances under the National Allocation Plan (NAP). The government has introduced a number of climate change policies: CHP, renewable energy, climate change levy, UK emissions trading scheme, energy efficiency commitment, enhanced capital allowances. It must ensure that these policies do not conflict with each other. Without government action on the NAP, as a company, we will reduce the amount of energy that goes into the CHP. We will reduce the amount of excess electricity we generate (for the national grid) and this is going to be economically bad for us and environmentally bad for the country because we generate electricity at about 70% efficiency and the national average is about 37%.'

The first round of allocations of permits was based on issuing 'free' permits based upon NAPs. There is considerable debate about future allocations and one issue which remains to be resolved is the fair value of the issues. One response is to issue permits based upon an auction. The auction will establish a value for permits which will in turn represent a cost to companies involved in the EUETS irrespective of whether they meet targets. It is possible that the cost may be passed on to customers in the form of higher prices, thus creating commercial risks for those involved in the EUETS.

5. Financial reporting and other regulatory issues

The reporting requirements for emissions trading challenge our fundamental notions of assets, liabilities, revenues, costs and profits. Is an allowance an asset, because it represents a tradable commodity, or is it a liability, because it must be surrendered at a future date to show that emissions are within the target, or cap? Should profits made on the sale of allowances be shown in the profit and loss account, despite the possibility that allowances may have to be purchased at a later date if the company subsequently discovers that it holds insufficient allowances to meet its cap? If profits are to be shown, how is the profit to be calculated, especially for schemes where government allocate allowances at zero cost (e.g. under the EU Scheme)? The questions are problematic, as illustrated, for instance, by the debate initiated by the Canadian Institute of Chartered Accountants and the International Emissions Trading Association (IETA) www.cica.ca/index.cfm/ci_id/ 14158/la_id/1.htm

The International Accounting Standards Board has been considering the issues for some time. The Urgent Issues Task Force published proposals in May 2003 with particular reference to the UK Emissions Trading Scheme. The proposal was that participants should recognise separately an asset (for emissions allowances held), a liability (for the obligation to deliver allowances for emissions that have been made) and a government grant (where allowances are allocated by government for less than fair value). However, this proposal met with criticism. By January 2004, the approach was revised and the new approach, as stated through Inside Track 38, was that, 'The IFRIC (International Financial Reporting Interpretations Committee) has responded to ... consultation by requesting the IASB to consider an amendment to IAS 38 Intangible Assets. IFRIC's recommended amendment would require emissions allowances to be measured at fair value, with changes in value reported in the profit and loss account. The IASB decided at its meeting in December 2003 to propose changes to IAS 38 on the lines recommended by IFRIC and to consider proceeding to withdraw IAS 20 Accounting for Government Grants and Disclosure of Government Assistance. The UITF will monitor the progress of IFRIC's debate in the light of changes proposed by IASB, before deciding on the next steps'. In January 2004, the Board tentatively agreed to withdraw and replace IAS 20. At the Board meeting in February 2004, the staff recommended that the effective date for withdrawal would be January 2006. The debate continued beyond January 2006 and work on IAS 20 is expected to resume around the end of 2006 (www.iasb.org/current/active_projects.asp?showPageContent=no&xml=16_101_116_12102004.htm)

The implications appear to be that allowances should be measured at fair value, and changes in value should be recognized through the profit and loss account. A liability is created as emissions actually occur. As regards corporation tax, the latest thinking appears to be that normal rules will apply; that there will be no special provisions for emissions trading. For VAT purposes, the latest thinking is that allowances will not attract taxation when they are issued, but allowances will be classed as a service and will be subject to taxation when they are traded (www.defra.gov.uk/environment/climatechange/trading/eu/pdf/markdev.pdf).

Views were mixed about the implications of the financial reporting amongst the interviewees involved in the research from which this report is drawn. At one extreme, a company for which emissions trading was of strategic importance believed that reporting requirements were a matter of concern and would make a considerable difference to perceptions of the performance of the business. At the other extreme, an accountant and emissions trader told us that, 'It should be fairly simple and the tax treatment makes life easier as well. ... I cannot see personally how the accounting treatment is going to be the primary driver of the way people behave in this market.'

6. Management accounting and emissions trading

6.1 Introduction

This section is based upon discussions with interviewees who were involved in the research on the UKETS from which this report is taken. All interviewees were chosen for their interest and expertise in the practice of emissions trading as shown by their involvement with the UK emissions trading scheme.

It appears from our discussion with interviewees that there are fundamentally two ways in which companies can comply with targets established through emissions trading schemes. The first is through capital investment appraisal, and the second is through changes in behaviour. Changes in behaviour can result from charging end-users for their use of energy through transfer pricing systems.

6.2 Transfer pricing

Transfer pricing is concerned with establishing internal 'selling prices' in order to create an internal market of buyers and sellers. As goods or services are traded between divisions within a company, so a charge is raised by the selling division and becomes a cost for the buying department.

The transfer pricing of energy ensures that the cost of energy becomes the responsibility of the users of energy. End users are the people who create a demand for energy and may be the ones who can take simple actions in order to reduce energy usage. In this regard, one of our interviewees suggested that in relation to managing energy costs:

> 'The easiest things are housekeeping things. Training people to switch lights off. Being intelligent about heating the buildings; looking at weather forecasts. Energy audits and discovering what is happening in the middle of the night. We don't have processes running at 5 p.m. on a cold winter's day when prices are at their most expensive. The high energy processes are run when the electricity is cheapest.'

These comments are driven by both the need to achieve cost and emissions reductions, and place the need for action at the level of end users.

The company has a division which is responsible for the provision of energy. This division makes decisions on where and how to source energy and also on the development of Combined Heat and Power Schemes, which allow the division to generate energy efficiently (see www.chpa.co.uk/ and www.defra.gov.uk/environment/energy/chp/). Whilst previously the energy division was responsible as a cost centre for managing costs through budgets, the company has now established this division as a profit centre to manage energy. Energy costs are now charged by this division to other profit and cost centres throughout the company. Internal invoices are raised by the energy profit centre and buyers of energy effectively deal on an arms length basis with issues concerning energy usage. The energy division is expected to at least break even over the financial year and divisions treat internal invoices as costs of their operations.

The buying divisions in turn work within the discipline of annual budgets which include targets for energy costs. Energy costs are considered to be controllable by the buying division; that is, energy is taken to be 'above the line' in terms of establishing responsibility. The interviewee from the company considered the transfer pricing scheme to be effective in driving behaviours to reduce energy. The point is that divisions must manage their energy costs in line with budget, and transfer pricing introduces a market mechanism which reinforces the motivation for those at the point of use to take action over the straightforward 'housekeeping' issues such as switching off lights. Divisions are supported in taking initiatives through centralised functions which, for instance, provide technical know how in terms of conducting energy audits.

6.3 Performance measurement

The balanced scorecard is an obvious candidate for extending management accounting's scope of influence to include non-financial issues relating to the environment. Environmental measures such as the output of emissions might represent a fifth segment that extends the scorecard beyond its current scope, as reported by Robert Kaplan at a recent INSEAD conference. Targets remain potentially powerful. For one of the interviewees involved in our study, targets were of utmost importance within the company, and meeting the target for emissions reductions was argued to be more influential in determining the level of reduction commitments than financial incentives from the UK Emissions Trading Scheme.

The need to report upon emissions has been given added impetus by recent changes in thinking about the Operating and Financial Report (OFR). DEFRA and Trucost have issued a joint consultation document in which they list 25 key performance indicators (KPIs), including emissions of greenhouse gases, within a broader range of indications of environmental performance (www.defra.gov.uk/corporate/consult/envrep-kpi/envrep-kpi.pdf). The report gives guidance on measurement and refers readers to more detailed explanations of measurement requirements available on other web-sites.

6.4 Capital investment appraisal

The alternative to changing behaviour through transfer pricing and performance measurement systems is investment in new processes and the relocation of facilities under JI and CDM arrangements. Investments to meet targets are likely to be sufficiently substantial to warrant capital investment appraisal and all of our interviewees referred to the importance of this management accounting technique to emissions trading; and vice versa; emissions trading therefore has important implications for capital investment appraisal. For instance, in one case, emissions trading had provided a way of strengthening a proposal for CHP that had previously been rejected. The panel below presents this particular case.

'The CHP scheme that we are looking at generates about half a megawatt of electricity and the scheme will cost us just over a million pounds so with the government grant that takes it down to around £600,000. That will pay for itself at the moment within 5 years. The CHP plant will last us between 15 and 20 years. We had to justify the proposal in terms of payback and net present value. This is based on straightforward energy savings including the climate change levy. It is exempt from the climate change levy as well as being a greener electricity supply. The CEO asked me why all the other businesses in our sector were receiving energy grants to put in CHP. He picked it up at an industry conference. I replied that unless we change the way we think about payback we will never get into CHP.

Emissions trading acted as a lever. We previously presented two proposals, which were rejected, and emissions trading gave us an excuse to present a third proposal, which was accepted.'

Emission's trading complicates the process of capital investment appraisal simply because it broadens the alternatives faced by any company seeking to manage energy. Imagine that a company is deciding upon an investment in new plant which will reduce energy costs. Prior to emissions trading the cash flow forecasts would reflect the initial cost of the plant and the subsequent costs savings. Under the EUETS, cost savings remain, but there is an additional incentive to invest where this allows the company to beat targets and thus to sell allowances. Alternatively, where market prices for allowances are low, there may be an incentive to purchase allowances rather than to invest in energy saving technology. For half the companies involved in the review of the European Union Emissions Trading Scheme, conducted under the guidance of McKinsey & Company, emission's trading is a key issue in long term decisions, whilst it was one of a number of issues considered by the remainder.

7. Conclusions

In a recent appraisal of global warming, the author and scientist Tim Flannery presents an informed and highly readable account which shows that global warming is a pressing issue that is already impacting life on this planet. Flannery makes a number of points. CO_2 is long lived, so that around 56% of all CO_2 released into the atmosphere through the burning of fossil fuels remains active today, causing 80% of all global warming. The planet will continue to warm even if the release of CO_2 could be stopped immediately, and current projections suggest that we are close to or past the point at which energy demands and the consequent emissions are sustainable. There are currently around 790 gigatonnes of CO_2 in the atmosphere and the sustainable threshold for the planet is set by some commentators at 1,170 gigatonnes. CO_2 levels in the atmosphere increased at the rate of 13 gigatonnes per annum during the 1990s, 21 gigatonnes were released in 2002 and annual emissions increases are expected to rise by a possible 52% by 2030 unless action is taken. At this rate, it is possible to predict that we will reach critical levels of CO_2 in the atmosphere in less than 50 years. The significance of Tim Flannery's contribution is in presenting dangers such as these but also in arguing the feasibility of averting catastrophe through relatively small measures if everyone works to reduce emissions.

Management accountants have an active role to play; both in the cost reduction which can be achieved from reducing organisational demands on fossil fuels through energy use and transport policies, and through providing information relating to emissions. Management accounting systems are currently a central part of the decision making through which organisations respond to the natural environment. Capital investment appraisal, for instance, can support the case for technological advances which reduce emissions. Emissions trading in this case encourages investment within the world economy at large where such investment is cost effective with regard to the market price of allowances: those who can invest efficiently will do so, whilst others will buy allowances to meet national and international targets. Performance measurement systems and transfer pricing systems provide the motivation for organisations to reduce emissions by achieving changes in behaviour. These result from pressures to conform to performance requirements for financial and non-financial targets and norms.

Businesses and investors are increasingly aware that emissions make a difference. The worse case scenario is that the planet will cease to be able to support life because of the warming effects of CO_2. This may be an excessively pessimistic view (see Lomberg's arguments in 'The Skeptical Environmentalist' and the subsequent debate: www.lomborg.com/books.htm; www.cambridge.org/uk/economics/lomborg/), but even optimists recognise that energy will gain in importance on the strategic agenda in future years; if for no other reason than the increasing prices of energy. Emissions trading provides a new challenge; in providing a mechanism which gives emissions an economic value and sets the management accountant the task of accounting for allowances. But it also provides a new opportunity for management accountants to become involved in an issue which could turn out to be the most important challenge facing life on this planet.

This involvement will continue to be important as the EUETS continues to operate until the end of 2007 in a business environment in which some future allocations may be auctioned rather than issued free of charge, and in which the Scheme may be extended from fossil-fuelled electricity generation and large energy-intensive installations to a more diverse range of industries and transportation. Furthermore, it is possible that the emissions trading schemes in other parts of the world (e.g. Canada and the Russian Federation) may become linked with the EUETS, thereby extending the geographical possibilities for emissions trading (Hill, 2006). Finally, the EUETS may be assimilated into a global emissions trading scheme during the 2008-2012 Kyoto Protocol commitment period, although the focus of trading during that period may be between Annex 1 Parties rather than installations. Finally, all Parties to the Kyoto Protocol are engaged in discussions on the policies and frameworks for mitigation of climate change post-2012: these decisions will undoubtedly have a commercial effect on companies and their individual installations and hence the professional importance to management accountants to remain informed of these developments.

8. Glossary

The following site provides a useful glossary:

www.co2e.com/common/glossary.asp

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Appendix A
Measuring emissions

CO_2 accounts for the largest single contribution of any gas to the greenhouse effect (i.e. some 55 per cent of the contribution of anthropogenic greenhouse gases to 'radiative forcing' between 1980 and 1990. The major source of anthropogenic greenhouse gas emissions is CO_2 from the combustion of fossil fuels (i.e. coal, oil and natural gas). Consequently, large installations in power generation, heavy industry and large domestic heating plants (or 'point sources'), are the major emitters, together with transport (or 'mobile sources'). 'Radiative forcing' refers to the extent to which emitting a greenhouse gas into the atmosphere raises global average temperature) (IPCC, 1990, p. xx). Methane (CH4), which is emitted mainly from gas pipelines, agriculture, coal mines and waste disposal, is the second major source of greenhouse gas emissions, accounting for some 18-20 per cent to radiative forcing between 1980 and 1990 (IPCC, 1990, p. xx, xxi). The remaining four greenhouse gases are nitrous oxide (N2O), sulphur hexafluoride (SF6), hexafluorocarbons (HFCs) and polyfluorocarbons (PFCs).

The measurement of greenhouse gases is usually related to their relative heating effect compared to that of CO_2. The global warming potential (GWP) of a range of gases has been established, taking into account how long a molecule of each gas remains active in the atmosphere over a period of 100 years. Carbon dioxide is used as the reference, with a 100-year GWP of 1. It is customary to use the measure 'CO_2 equivalent', 'tonnes of CO_2 equivalent', or even 'million tonnes of CO_2' ($MtCO_2e$ or Mtonnes) or 'giga grammes of CO_2 emissions' (Gg) to establish a measure for the total of emissions for all gases which are currently considered to have an impact on global warming. The measurement of emissions is based upon taking activity measures such as the amount of fuel used and converting these into a universal measure such as tonnes of CO_2 based upon conversion factors related to the carbon content of the fuel and its global warming . Tonnes of carbon (C) are also sometimes used to measure emissions, but it is important to bear in mind that a tonne of C is not the same as a tonne of CO_2. Details can be found via DEFRA's website: www.defra.gov.uk/environment/business/envrp/index.htm . DEFRA also recommend the following site as a source of background information and links to further sites: www.naei.org.uk/

Appendix B
UK national expenditure information

According to the DTI spreadsheet, www.dti.gov.uk/energy/inform/energy_stats/total_energy/dukes05_1_1_6.xls industrial expenditure in the United Kingdom on energy amounted to £6,900 million in 2004. Of this sum, spending on electricity was £3,200 million; petroleum £1,800 million; natural gas £1,400 million; and coal £500 million. In addition, expenditure on road transport is substantial, relative to expenditure on energy by industry (£46,000 million in total in 2004; compared with £6,900 million).

Prices on these sources of energy are increasing, although the table below shows that prices relative to 1990 were advantageous in 2004 with the exception of heavy fuel oil; and electricity prices in 2004 were lower than in 2000.

Industrial sector energy fuel prices (1990 = 100)

	2000	2004
Electricity	68.3	61.2
Heavy fuel oil	123.6	135.0
Gas	59.1	82.9
Coal	60.6	65.5

Source: DTI (see website below)

In addition to direct expenditure on energy, the Department for Environment, Food and Rural Affairs (DEFRA) estimates that expenditure on environmental protection by UK industry in 2003 was approximately £3,400 million, or 0.6% of turnover, of which the food, drink and tobacco sector spent £410 million; power industries £470 million and chemical products £620 million (www.defra.gov.uk/news/2005/050705a.htm).

Supporting web site:
www.dti.gov.uk/energy/inform/energy_in_brief/energyinbrief2005.pdf

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The Chartered Institute
of Management Accountants
26 Chapter Street
London SW1P 4NP
United Kingdom

T. +44 (0)20 7663 5441
F. +44 (0)20 8849 2262
E. technical.services@cimaglobal.com
www.cimaglobal.com

REF: TE038V0606