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Advancing the UK strategy for sustainable development - the role of environmental management and regulation in economic development

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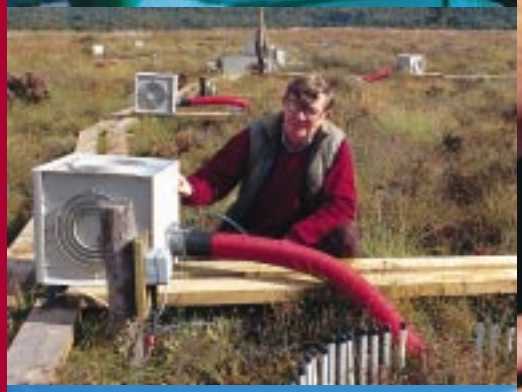

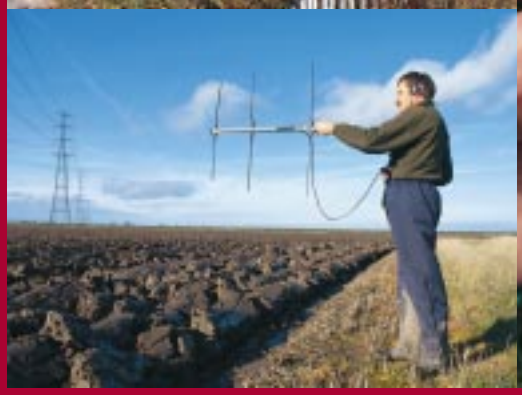

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Advancing the UK strategy for sustainable development – the role of environmental management and regulation in economic development

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Executive summary

The UK strategy for sustainable development stresses the need for effective environmental protection, improved resource efficiency and sustainable consumption and production.

This paper was primarily written as a contribution for the recent review of the sustainable development strategy. It focuses on possible mechanisms for enhancing English Nature's conservation objectives via improved environmental performance in the production of goods and services. Key issues explored in this paper include:

- the role of the environment in supporting economic activity;
- the economic impact of environmental management and regulation;
- the UK's comparative environmental performance;
- opportunities for sustainable development in the agricultural and manufacturing sectors;
- environmental awareness and practices amongst small to medium sized businesses; and
- industry perspectives regarding the future of environmental management and regulation in the UK.

Given the ongoing development of sustainable development policy, it is considered that wider dissemination of this paper would be helpful in raising awareness and understanding about the role of environmental management and regulation in economic development.

The role of the environment in supporting economic activity

The natural environment provides a range of 'goods and services' that are essential for economic activity. These include the provision of renewable and non-renewable resources, ecosystem services such as the assimilation and treatment of wastes generated by humans and crop pollination, and the 'infrastructure' for a broad range of recreational and tourism activities. While the role of the environment in supporting economic activity is increasingly recognised in Government policy statements, research in the UK regarding this matter is limited.

The most detailed study has been undertaken in Wales. This study assessed the economic impact of a range of environmentally dependent activities such as environmental protection, agriculture, forestry, fishing and tourism using an Input-Output model of the Welsh economy that traces flow-on supply-chain and income multiplier effects. Despite limited recognition of manufacturing's environmental dependence, the results highlight the economic importance of the environment. The study concluded that the environment supports about 17% of full-time equivalent employment and about 9% of annual GDP in Wales.

While no directly comparable work to the Welsh study has been undertaken in England or the UK, a number of recent studies in England provide partial indicators of the importance of the environment to economic activity.

A series of eight regional studies in England that focussed on the economic significance of activities which aim to protect the environment including environmental management and conservation activities such as agri-environment schemes, sustainable land use measures such as organic farming and environment dependant tourism found that these activities account for about 4% - 6% of employment and about 2% - 5% of GDP in regional areas.

A more recent study by GFA-Race Partners Pty Ltd and GHK Consulting Ltd estimated that activities which contribute to or benefit from a high quality natural environment accounts for nearly 300,000 jobs and gross value added of about £7.6 billion pa in England, while industry sectors that make intensive use of the environment account for about 2.68 million jobs and gross value added of about £67.6 billion pa in England. While this study is useful for highlighting the significance of activities such as organic farming and the processing and marketing of organic foods, by excluding most manufacturing activity from the analysis, it does not provide a comprehensive estimate of the role of the environment in directly supporting economic activity in England. It also does not fully consider the importance of environment dependant industries to other sectors through multiplier effects.

A recent study by the University of Reading regarding the economic importance of the quality of the environment in rural England which involved 9 regional case studies concluded that the environment is a significant driver of a number of industries that play an important role in rural areas and that as some regions are currently too geographically remote to allow economic diversification, their economies will continue to be based on environmentally dependent industries. This study also found that in many areas, high quality environments are a cornerstone of the economy and that areas of high scenic beauty and landscape quality provide a key capital asset.

A more thorough analysis of this matter, including the importance of the environment for manufacturing activity and multiplier effects using Input-Output analysis would further confirm that the environment is the key basis for a high proportion of economic activity both in England and across the UK. It is considered that this analysis would assist the sustainable development strategy by increasing community understanding of this matter and also by providing detailed statistical information that can be used to enhance policy and program development.

The role of environmental management and regulation in economic development

Given the importance of the environment in supporting economic activity, it stands to reason that environmental management and regulations are also important mechanisms for ensuring development. However, despite this, environment protection agencies are usually forced onto the defensive by claims that environmental management and protection inhibits economic development.

There is now significant evidence from international research that environmental management and regulation does not impede overall competitiveness and economic development, and can in fact be beneficial for development by creating pressure that motivates innovation and alerting businesses about resource inefficiencies. This view is also

supported by the findings of research, which indicates that there are significant opportunities for simultaneous improved environmental and financial performance in the UK agriculture and manufacturing sectors. A recent study by Cambridge Econometrics and AEA Technology indicates that the manufacturing industry in England and Wales could reduce annual operating costs by about £2 - 2.9 billion via investment in best-practice waste minimisation techniques. Potential savings of about £960 million pa in the agricultural sector of England and Wales via a range of improved environmental management practices have also been identified in a recent study AEA Technology.

These findings indicate that sensible use of performance standards to eliminate processes or products with unacceptable environmental impacts or to provide a baseline for improvements should not have adverse implications for overall economic development in the UK and can also help in stimulating investment in environmental innovation. These conclusions are also consistent with views expressed by the Confederation of British Industry in a report it released regarding environmental regulation in the UK.

However, it is acknowledged that care needs to be taken in identifying situations where environmental management is a significant cost burden to industry. According to the Confederation of British Industry, UK industry spends about £4 billion pa on environmental protection, nearly 60% of which is accounted for by 5 sectors (ie chemicals, food & drink, mining & quarrying, power industries and machinery & equipment). With regards to this matter, recent research also indicates that compliance cost estimates presented by industry during the legislative debate phase may need to be treated with caution as it has demonstrated a tendency to overestimate these costs and underestimate the potential for beneficial adaptation to more stringent environmental regulation.

The UK's comparative environmental performance

In 1999, the World Economic Forum (WEF) sponsored a coalition of academic analysts, business leaders and environmental activists to develop an Environmental Sustainability Index (ESI) to measure overall progress toward, and capacity to achieve environmental sustainability for 122 countries. The index covers a broad spectrum of issues that contribute to long-term sustainability including baseline environmental conditions and natural resource endowments, current pollution flows and resource stresses, human welfare, social and institutional capacity to respond to environmental challenges and national contributions to global stewardship. The creators of the index consider that it is primarily useful for comparisons of country performance, as they believe that the current state of scientific knowledge does not permit precise specification of performance levels that are required for sustainability.

The results of this work was published in 2002 with the UK ranked 16th on the overall ESI. While this appears to indicate that the UK's comparative performance is quite good, its position is significantly boosted by its high ranking in certain categories that masks its poor ranking in a number of important areas. It is ranked comparatively highly on social and institutional issues, but is ranked in the bottom 25% for a number of key indicators including stress on terrestrial systems, reducing air pollution, ecosystem and water stresses and also reducing waste and consumption pressures. When compared with its peer countries (as defined by GDP per capita), the UK compares unfavourably in 6 out of 9 core indicators of environmental performance.

Data from the Organisation for Economic Co-operation and Development (OECD) are also consistent with the WEF's findings. OECD data indicates that compared with the US, France, Germany, Netherlands and Italy, the UK's environmental performance is better than the average for these countries regarding water use and hazardous waste production, consistent with average energy consumption (but below average when compared with only these European countries) and below average regarding air quality, recycling and agro-chemical use.

WEF and OECD data indicates that to date, the UK has adopted a 'dirtier' economic growth path than its peer countries and that greater effort will be required for the UK to achieve world-class standards of environmental performance. In this regard the Confederation of British Industry acknowledges that the UK's overall record on environmental performance indicates that it still has some way to go to achieve world-class standards of performance and that business will be expected to play a part.

Environmental Awareness and Practices in the UK

A recent extensive survey of small - medium sized enterprises found that only 6% of respondents thought that they undertook activities that could be damaging to the environment and that only 18% could name environmental legislation unprompted. The survey also found that while just over 50% of businesses acknowledged that good environmental practice can reduce operating costs, only 23% of respondents had implemented measures to reduce environmental harm. Recognition of environmental impacts and legal obligations is necessary before businesses will take steps to address environmental issues, and this survey indicates that many businesses in the UK are unaware of their environment impacts and legal obligations. The study regarding potential savings in the agricultural sector via improved environmental performance also revealed a lack of awareness of opportunities for sustainable development.

It is considered that a serious lack of awareness regarding environmental impacts and legal responsibilities and limited recognition of the economic benefits of good environmental practice in the UK business community are acting as major constraints to the implementation of sustainable development initiatives. It is also considered that this situation is likely to have contributed to the UK's relatively poor ranking on key environmental performance indicators by the World Economic Forum and the Organisation for Economic Co-operation and Development.

These findings indicate that significantly greater effort needs to be made to increase awareness in the business community regarding its environmental impacts, legal responsibilities and opportunities for enhanced profitability via good environmental practice.

Contents

1. Introduction

1.1 The 1999 UK strategy for sustainable development, *A Better Quality of Life – A Strategy for Sustainable Development for the United Kingdom* was based on four key objectives ie social progress, effective environmental protection, prudent use of natural resources and maintenance of high and stable levels of economic growth and employment. It stressed the need for improving resource efficiency and sustainable production and provided the basis of a framework for sustainable consumption and production, *Changing Patterns – UK Government Framework for Sustainable Consumption and Production* which focused on the sustainable economy component of the sustainable development strategy. This framework stressed that future prosperity depends on 'decoupling' economic growth from environmental degradation as there are limits to the capacity of the Earth to absorb pollution and provide natural resources.

1.2 Key measures outlined in the 1999 strategy for achieving resource efficiency and sustainable production included:

- Raising awareness of the potential for substantial cost savings via increased efficiency of resource use.
- The use of minimum standards to eliminate processes or products with unacceptable environmental impacts or to provide a baseline for improvements.
- Increasing the commitment of the business sector to assessing their impacts and setting targets by encouraging widespread take up of the European Eco-Management and Audits Scheme (EMAS) and the International Standards Organisation's environmental management systems standards ie ISO 14001.
- Stimulating investment in environmental innovation.

1.3 The sustainable development strategy was also supplemented by *The Strategy for Sustainable Farming and Food – Facing the Future* which stresses the importance of improving environmental and business planning advice via demonstration farms to promote best practice in profitable and environmentally sound farming.

1.4 During 2004 the UK Government undertook a detailed review of its strategy for sustainable development and in March 2005 released a new strategy, *Securing the Future – Delivering the UK Sustainable Development Strategy*. The new strategy focuses on integrating the four key objectives of the 1999 strategy and also reiterates a commitment to sustainable consumption and production. In the new sustainable development strategy, the Government also committed itself to continue developing its policies regarding consumption and production and the release of a progress report and updated plan of action in this area by 2006.

1.5 This paper was primarily written as a contribution for the review of the sustainable development strategy. However, given the ongoing development of sustainable development policy, it is considered that its wider dissemination would be helpful in

raising awareness about the role of environmental management and regulation in economic development.

1.6 The paper focuses on possible mechanisms for enhancing English Nature's conservation objectives, including the protection of ecosystems via improved environmental performance in the production of goods and services. This includes reduced use of natural resources and reduced pollution and waste generation. The issue of individual and community environmental values as reflected in 'willingness to pay' studies, although important, are not discussed in this paper, as it is considered that the key architects of economic policy within the UK Government are primarily interested in wealth generation rather than willingness to forgo expenditure on goods and services in favour of conservation. This paper is therefore intended to address issues that will be of primary concern to these policy makers and Government agencies.

1.7 Key issues explored in this paper include:

- the role of the environment in supporting economic activity;
- the economic impact of environmental management and regulation;
- the UK's comparative environmental performance;
- opportunities for sustainable development in the agricultural and manufacturing sectors;
- environmental awareness and practices amongst small - medium sized businesses; and
- industry perspectives regarding the future of environmental management and regulation in the UK.

2. The role and significance of the environment in supporting economic activity

2.1 Overview

2.1.1 The natural environment provides a range of 'goods and services' that are essential for economic activity. These include the provision of renewable and non-renewable resources, ecosystem services such as the assimilation and treatment of wastes generated by humans and crop pollination, and the 'infrastructure' for a broad range of recreational and tourism activities. The role of the environment in supporting economic activity is well documented in texts on economic theory and increasingly recognised in Government policy statements as reflected in the UK strategy for sustainable development. However, despite this, it appears that research regarding the importance of the environment in supporting economic activity in the UK has been quite limited, particularly regarding ecosystem services.

2.2 Wales

2.2.1 The most detailed research undertaken on this matter has been in Wales. In 2001 the National Trust collaborated with a number of organisations including the Countryside Council for Wales, the Environment Agency Wales, the Welsh Development Agency and the Wales Tourist Board to undertake a study regarding the economic value of the environment in Wales. The study was initiated in response to concerns that whilst the environment of Wales is appreciated for its beauty and contribution to quality of life, its importance as a major contributor to the economy was not so widely recognised.

2.2.2 The study involved the identification and valuation of activities that are most dependent on the environment. Three categories of activity were identified based on their relationship with the environment:

- Activities concerned with the protection and enhancement of the environment such as pollution control and sewage disposal, waste management and recycling, expenditure by industry on environmental protection and public sector administration.

- Activities that make intensive use of the environment in terms of land, air and water as primary resources. This includes agriculture, forestry, fishing, mining and quarrying, electricity generation and water extraction.

- Activities such as leisure and tourism that are dependent on a high quality environment.

2.2.3 It is important to note that manufacturing was generally excluded from these categories. The only manufacturing activities that were included as environment dependant is the production of equipment to minimise or prevent damage to the environment and expenditure by manufacturers on mitigating the environmental impacts of their operations. Although manufacturing is dependant on natural resources, the level of reliance on natural resources relative to other inputs such as skilled labour varies significantly between various manufacturing activities. This created difficulty in determining what proportion of activity in the manufacturing sector could reasonably be attributed to the environment and resulted in its general exclusion from the definition of environment dependant activities.

2.2.4 The economic value of activities that were defined as environment dependant was assessed using an Input-Output model of the Welsh economy. Input-Output models provide financial 'pictures' of economies, showing domestic and international trade flows between industries, consumers and the Government sector. They enable inter-industry transactions to be quantified and estimation of the effects of changes in an industry sector on the rest of the economy. Although the general exclusion of environment dependent manufacturing means that the significance of the environment in supporting the Welsh economy was underestimated, the results of the study that are summarised below clearly highlight the importance of the environment in supporting economic activity.

- The natural environment directly supports about 117,000 full-time equivalent jobs (fte's) and about 52,000 fte jobs through supply-chain and income

'multiplier' effects (ie environment dependent activities purchasing goods and services from other businesses and the consumption expenditure of employees in environment dependent activities) in Wales. About 169,000 fte jobs are therefore heavily dependent on the environment. This equates to about 17% of total fte employment in Wales.

- Gross output directly generated by activities that are heavily dependent on the environment is estimated to be about £6.1 billion pa, while about £2.7 billion pa is also generated in other businesses as a result of multiplier effects. Total gross output that is heavily dependent on the environment is therefore estimated to be about £8.8 billion pa. This equates to about 15% of gross annual output in Wales.

- Value added (ie profits plus wages and salaries) directly generated by activities that are heavily dependent on the environment is estimated to be about £1.6 billion pa, while about £0.7 billion pa is also generated in other businesses via multiplier effects. Total value added that is dependent on the environment is therefore estimated to be about £2.36 billion pa. This equates to about 9% of annual GDP in Wales.

- Industry sectors that are particularly dependent on the environment for generation of employment, output and value added through both direct and multiplier impacts include agriculture and fishing, manufacturing and distribution, hotels and restaurants.

2.3 England

2.3.1 A series of eight regional studies undertaken in England during recent years focussed on assessing the economic significance of activities that aim to protect the environment including public and private organisations involved in environmental management, environmental improvement and conservation activities such as agri-environment schemes and organic farming in industries such as agriculture and forestry and activities such as leisure and tourism that depend on a high quality environment. With the exception of one, these studies did not account for the economic significance of 'mainstream' agriculture, forestry, fishing and mineral extraction, whilst none accounted for manufacturing's dependence on the environment or the linkages between environment dependant sectors and the rest of the economy (ie the supply chain and income multiplier effects). Consequently, they are more heavily focussed on what is spent on the environment than the full extent to which the environment supports economic activity. Their findings are therefore even less reflective of the importance of the environment in supporting economic activity than the Welsh study.

2.3.2 These studies found that environmental management and improvement and activities such as leisure and tourism that depends on a high quality environment account for about 4% - 6% of employment and about 2% - 5% of GDP in regional areas. While these figures are indicative of the importance of the environment, as discussed above, they seriously understate the true importance of the environment in supporting economic activity.

2.3.3 A more recent study by GHK Consulting Ltd and GFA-Race Partners Ltd estimates that activities which contribute to or benefit from a high quality natural environment accounts for nearly 300,000 jobs and gross value added of about £7.6 billion pa in England, while industry sectors that make intensive use of the environment account for about 2.68 million jobs and gross value added of about £67.6 billion in England. This study is useful for highlighting the significance of activities such as agri-environment schemes, organic farming, the processing and marketing of organic foods and environmentally 'positive' forestry industry. However, by excluding most manufacturing activity from the analysis, it does not provide a comprehensive estimate of the role of the environment in directly supporting economic activity in England, nor does it fully consider the importance of environment dependant industries to other sectors through supply chain and income multiplier effects (ie via input-output analysis).

2.3.4 The role of the environment in supporting economic activity has also been examined in a study regarding the importance of the quality of the environment for economic development and regeneration in rural areas by the University of Reading. Key findings from 9 English regional case studies undertaken as part of the study are summarised as follows.

- The environment is a significant driver of a number of industries that play an important role in rural areas.
- In many areas, high quality environments are a cornerstone of the economy and that the emphasis here must be the protection of the resource against the damage often associated with increased tourist numbers.
- Areas of high scenic beauty and landscape quality provide a key capital asset and the development of sustainable economies reliant on the quality of the natural environment is a realistic proposition.
- Some regions are currently too geographically remote to allow economic diversification and their economies will continue to be based around environmentally dependent industries such as agriculture, forestry and fishing.

3. The role of environmental management and regulation in economic development

3.1 The initial challenge to the conventional view that environmentalism impedes economic development

3.1.1 Given the importance of the environment in supporting economic activity (notwithstanding the partial nature of existing research on this matter), it stands to reason that environmental management and regulations are also important mechanisms for ensuring development by protecting the natural resources and ecosystem services upon which the economy depends. However, despite this, environment protection agencies are usually forced onto the defensive by claims that rigorous environmental management and regulation inhibits economic development,

reduces competitiveness and can even force industry to move to regions where environmental policies are less burdensome.

3.1.2 Through his 1990 book, *The Competitive Advantage of Nations* and follow up essay, *America's Green Strategy*, Michael Porter from Harvard University was instrumental in initiating a challenge to the conventional view that environmental regulation impedes economic development. Porter found that nations with the most rigorous environmental standards often lead in exports of affected products and recorded better economic performance than nations with more relaxed laws. A discussion of research that has been undertaken since Porter's initial challenge follows.

3.2 Environmentalism and the US economy

3.2.1 In 1992, Stephen Meyer from the Massachusetts Institute of Technology published the results of an extensive analysis of this issue in the USA. Meyer compared the economic performance of the 50 States in the USA during the period 1973–1989 with their environmental measures (i.e. policies, programs and regulations) using statistical assessment procedures. He found a positive correlation between environmental measures and a range of economic indicators including gross state product, labour productivity and employment. In other words, the states with the toughest environmental management regime also had the best economic performance. Strongest construction employment growth was also found to have taken place in states that had the strongest environmental measures, a finding that refutes the view that businesses will migrate to states with more relaxed environmental policies. Meyer also found that these positive correlations remained even after allowing for the effects of factors such as size of state economies, diversity of economic structure and other key Government policy settings. His principal conclusions from this analysis are summarised as follows.

- The hypothesis that environmental policy adversely affects economic growth has no empirical foundation. States can pursue environmental quality without fear of impeding economic prosperity. For those who continue to argue that environmentalism hurts economic growth and prosperity, the burden of proof now clearly 'falls on their shoulders'.

- While environmental policies and regulation can have negative transient effects on specific industries, communities and occupations, they are often barely noticeable at the state level and undetectable at the national level. Furthermore, there are also transient and local effects that have positive impacts that offset negative sectoral impacts. Environmental policymaking provides numerous opportunities for substitution, trade-off, accommodation, learning and adjustment that effectively mitigate what in theory should be an economic burden.

- While the results repudiate the argument that environmental regulation adversely affects economic performance, the data do not unequivocally prove that environmentalism significantly stimulates economic prosperity. Rather, the positive association between state level environmentalism and economic prosperity may be the consequence of a third factor that is positively correlated with both environmentalism and economic growth. For example,

states that tend to favour strong environmental policies may also be more likely to invest in education, health, transportation and communications infrastructure and other elements that support economic development. However, there are plausible arguments and evidence for accepting the positive association between environmentalism and economic growth as an indicator of a partial cause and effect relationship. These are summarised as follows.

1. Regulatory incentives to avoid waste disposal and pollution abatement costs can fuel process and product innovation that improves productivity, increases efficiency and provides substantial cost savings. This has been the experience of prominent firms such as the 3M Corporation, Dupont and Raytheon.

2. US businesses have increasingly sought to comply with environmental standards by incorporating pollution control technologies into their production and management processes and by reducing pollution at the source rather than relying on 'end of pipe' solutions. This strategy has delivered cost savings to businesses by developing new processes that reduce or eliminate pollutants, improve processing efficiency and reduce wastage.

3. A very large proportion of expenditure associated with environmental compliance is ploughed back into the private sector to pay for goods and services. In 1991 just under 10% of US manufacturers operating costs for pollution abatement and control was paid to Government agencies.

- Firms that cannot compete without 'dumping' some of their costs on the environment and thereby compel the public to subsidise their operations are not truly competitive. Inadequate environmental statutes merely prolong public subsidisation of inefficient uncompetitive businesses and deprive the community of an incentive for the development of other innovative businesses.

- The false hypothesis that environmental policy adversely affects economic growth has focussed attention on one of the least influential factors affecting the pace of economic development. A view that is supported by other studies which have found that environmental policy was not a major influence on economic performance when placed in the context of larger forces such as fiscal and monetary policy and the provision of infrastructure.

3.3 Best practice environmental regulation

3.3.1 In 1995, Porter and Claas van der Linde in the Harvard Business Review further advanced the case for best practice environmental regulation. They argued that there has been too much focus on the static cost impacts of environmental regulation while the important offsetting productivity benefits from innovation that can be encouraged by regulation have been ignored. Citing the findings from a series of international

case studies of businesses and industries that are significantly affected by environmental regulations, they argued that properly designed environmental standards can trigger innovations that lower the total cost of a product, or, improve its value thereby making companies more competitive. They contended that the ability of regulation to achieve these outcomes is based on the fact that pollution and waste are signs that resources have been used incompletely or inefficiently and may require additional activities to be undertaken, e.g. disposal of wastes that add to costs but create no profit. Examples of the findings from the case studies they cited are summarised as follows.

- A study regarding waste prevention at 29 chemical plants identified 181 initiatives that provided average annual savings of $US3.49 per $US 1 spent on waste management. Porter and van der Linde also noted that only one of these activities resulted in a net cost increase and that these offsets were achieved with low investments and short payback periods.

- In response to regulatory requirements Dow Chemical closed evaporation ponds at its chemical plant in California and redesigned its production process. This resulted in reduced use of caustic soda, reduced caustic and hydrochloric wastes, and reuse of a portion of the waste stream as a resource providing annual savings of $US2.4 million at a cost of $US250,000.

- The Ciba-Geigy Corporation replaced sludge creating iron with a less harmful chemical conversion agent and eliminated the release of toxic products at its dye plant in New Jersey. This resulted in reduced pollution, a 40% increase in process yields and savings of $US740,000 pa.

3.3.2 Porter and van der Linde acknowledged that the fact that innovation in response to environmental regulation can be profitable raises questions about the need for regulation in the first place. However, they consider that the belief that companies will pick up on profitable opportunities without a regulatory push makes a false assumption about competitive reality, namely that all managers have perfect knowledge about all profitable opportunities for innovation and that organisations' incentives are aligned with innovation. Porter and van der Linde therefore concluded that regulation is needed for a number of reasons including the creation of pressure that overcomes inertia and motivates innovation and alerting and educating companies about resource inefficiencies and the potential for technological improvement.

3.3.3 Porter and van der Linde's article triggered a number of letters of support to the editor of Harvard Business Review. This included letters from the Chairmen and Chief Executive Officers of Texaco, Dow Chemical Company and DuPont who agreed that pollution is a sign of inefficiency, that environmental improvement is good business and that properly designed environmental standards can trigger innovations that lower the total production costs or improve the value of outputs.

3.4 Case study assessment of best practice environmental regulation

3.4.1 An interesting case study assessment of best practice environmental regulation was undertaken in 2000 by David Kerins and in 2001 by J. Peter Clinch and David Kerins

from University College Dublin, regarding Ireland's Integrated Pollution Control (IPC) licensing system.

3.4.2 IPC integrates the control of air, water, waste and noise pollution in one licence and is intended to ensure the use of best available technology not entailing excessive costs (BATNEEC), increased uptake of cleaner technology and promotion of waste minimization. In granting an IPC licence for an activity, the Irish EPA must be satisfied that BATNEEC will be used to prevent, eliminate or reduce emissions of pollutants. In this regard, the Irish EPA has published BATNEEC guidance notes to aid firms applying for a licence. These notes identify the technologies used by the EPA to set emission limit values that are used a licence conditions. The key findings of their work are discussed as follows.

- The Annual Environmental Reports submitted to the Irish EPA by 120 firms that were subject to IPC licensing at the time the study was undertaken indicated a substantial improvement in environmental performance (including reduced emissions of atmospheric and water pollutants and improved waste management) at the time of an economic boom in Ireland. During the 1990's industrial output doubled as Irish GDP grew by an average of 8.6% pa.

- A further indication that IPC licensing had not been detrimental to economic activity is provided by sectoral data. In 1998, environmental protection expenditure was heavily concentrated in four sectors ie paper pulp, food and drink, chemicals and surface coatings (these sectors accounted for over 90% of environmental expenditure totalling €151 million). However, output growth in the paper pulp, food and drink and chemicals sectors between 1995 and 1998 was 63%, 6.7% and 113% (no data was available for the surface coating industry).

- A survey of firms subject to IPC indicated that 68% of respondents felt that integrated pollution control had been of benefit to them. IPC licensing had forced firms to critically evaluate their environmental attitudes and resulted in them undertaking a number of initiatives including more efficient use of energy and water, increasing waste recovery and recycling and substituting inputs for more environmentally benign resources such as water-based solvents. However, many firms reported considerable difficulty in estimating private savings generated by IPC principally because environmental accounts are not separate from financial accounts and savings are therefore difficult to identify. Reported monetary benefits was therefore, largely confined to waste recovery and prevention, while despite advising of considerable energy and water savings, these benefits were not quantified in monetary terms.

- A benefit-cost analysis of the IPC licensing system revealed a benefit-cost ratio of 1.2 (ie the benefits exceed costs by 20%) and an internal rate of return of 17% which means that at discount rates up to 17% net benefits remain positive.

3.4.3 The benefit-cost analysis was undertaken using data on environmental expenditure, financial benefits and improved environmental performance provided by 46 of these IPC licensed firms. Valuation of environmental benefits was undertaken using the

results of Irish and European-wide studies on the effects of pollution to assess a range of impacts including health, crop yields and damage to buildings. However, the impacts of reductions in a number of atmospheric pollutants, all water pollutants and noise and odour generation was excluded from the analysis, as was assessment of some types of impacts of specific pollutants included in the analysis (eg on ecosystems and forests) largely due to the limitations of the baseline valuation studies. Therefore, while the full cost of environmental expenditure of these 46 firms was included, the benefits incorporated in the analysis was restricted to the limited reporting of direct financial benefits to firms and a limited range of environmental benefits that corresponded with only 24% of the environmental expenditure by these firms. The benefits associated with 76% of the environmental expenditure of these firms were therefore excluded from the analysis. However, despite the limited assessment of benefits, the analysis still revealed a significant positive benefit-cost ratio for Irelands IPC system.

3.5 Implications for international competitiveness

3.5.1 As a contribution to the World Economic Forum's *Global Competitiveness Report 2001/02*, Porter and Esty undertook detailed statistical analysis of 71 countries to further explore whether strong environmental performance is at the expense of competitiveness and economic development as traditional economic theory has suggested. They compared three indicators of environmental performance that are available with broad country coverage ie levels of urban particulates, urban SO_2 concentrations, and energy usage per unit of GDP, with indicators of the environmental regulatory regimes and economic performance (ie Gross Domestic Product per capita).

3.5.2 Porter and Esty found strong positive correlations between the competitiveness of nations and their environmental regulatory regimes and also between levels of economic development and environmental performance. However, significant variations in environmental performance between countries at similar levels of economic development were also noted which they argued indicates that there are two alternative paths to growth ie a 'clean' path and a 'dirty' path. Furthermore, while the analysis indicated that economic development provides opportunities for improving environmental performance, it also found that countries which pursue a stringent environmental regulatory regime appear to achieve more rapid growth.

3.5.3 Although Porter and Esty acknowledged that these findings do not prove causation, they argued that the fact that the top environmental performers do not appear to have suffered economically strongly supports the argument that environmental progress can be achieved without sacrificing competitiveness.

3.5.4 Cornelius, von Kirchbauch and Mimouni (2002) also examined the impact of environmental regulation on competitiveness by investigating the relationship between international trade performance regarding environmentally friendly products (eg pollution control equipment, cleaner technologies and products and renewable energy plants which now account for around of 5% of world trade) and stringency of environmental regulations. Their analysis revealed a close positive correlation between stringency of environmental regulation and trade performance. They

concluded that it appears that good environmental governance can help to drive innovation, product development and improved trade performance.

3.6 Industry Perspectives

3.6.1 A recent survey by the Confederation of British Industry (CBI) of its members revealed that overall regulation was considered by business leaders to be the third most important factor influencing investment decisions. While the main regulatory concern is employment regulation, nearly half of the survey respondents who identified regulation as an issue, cited environment and health & safety regulations as the second most significant regulatory issue. Labour market quality and relations between business and Government were identified as the most important factors influencing investment decisions.

3.6.2 A subsequent report on environmental regulation in the UK by the CBI provides a valuable insight regarding industry's perspectives on this matter. The report was based on quantitative and qualitative evidence ie statistical information and the judgement and perception of CBI members. The key findings of the report are discussed as follows.

3.6.3 The CBI noted that businesses recognise that regulation is an important part of the Government's policy mix to achieve environmental goals and that properly specified and fairly enforced regulation can create a 'level playing field' which delivers environmental gain at reasonable cost and stimulates innovation.

3.6.4 The CBI supports the view that economic growth can be consistent with a better environment and considers that the drive for a better environment is therefore a commercial issue. It considers that more efficient use of natural resources and the demand for new solutions offer the prospect of commercial gain, while compliance with environmental regulation can also generate wider benefits such as improved public health which in turn helps reduce employee absence. In this regard, it considers that environmental regulation contributed to an improvement in the UK's overall environmental performance during a period of sustained economic growth in the 1990's.

3.6.5 The CBI acknowledges that business expenditure on the environment ie operational and capital expenditure including regulatory charges (expressed as a share of GDP), was significantly lower in the UK during the 1990s than France, Germany, the Netherlands and the US but higher than Italy. It noted that just over half of this expenditure was on pollution prevention rather than treatment which in principle is a more favourable environmental and economic approach and is a higher proportion than in other countries. However, it also noted that for some industry sectors, the cost of environmental compliance is a significant issue. According to the CBI, UK industry spends about £4 billion pa on environmental protection, nearly 60% of which is accounted for by 5 sectors (ie chemicals, food & drink, mining & quarrying, power industries and machinery & equipment).

3.6.6 The warning that the cost of environmental compliance is a significant matter for some industry sectors is also supported by other studies. In challenging Porter and van der Linde's hypothesis that environmental regulation can enhance business

profitability, Palmer, Oates and Portney (1995), cited advice from senior staff at three large corporations that, on the whole, environmental regulation amounted to a significant net cost to the company. Williams, Macdonald and Kind (2002), also urge a degree of caution in interpreting the evidence of a positive relationship between environmental regulation and economic development. They point out that many studies on this matter have been focussed at a macro-economic level (ie on a national basis) rather than at a micro-economic level (ie on an industry basis). With regards to this, they noted that the cost of complying with environmental regulation may vary substantially between sectors and also that impacts on competitiveness may vary between firms competing within an industry depending on their individual cost structures and their response to regulation.

3.6.7 The views of the CBI regarding the UK's comparative environmental performance and the future of environmental management and regulation in the UK are discussed in sections 4 and 7 of this paper.

3.7 An issue of controversy – the estimated cost of regulatory compliance during the legislative debate phase

3.7.1 Notwithstanding the validity of the CBI's concerns regarding the costs of regulatory compliance for some industry sectors, it is also noted however, that a recent report by the International Chemical Secretariat (ICS) (2004) concluded that industry systematically inflates compliance costs to combat new environmental regulations. The ICS undertook five case studies regarding major environmental regulations including the EC Directive on vehicle emission standards, the European auto-oil program, UN/ECE protocols on acidification and the EC Directive on air emissions from large combustion plants, the US Clean Air Act and the Montreal Protocol on ozone layer depleting substances. These studies revealed that industry greatly overestimated cost predictions by during the legislative debate phase. The ICC also examined compliance costs in relation to 9 specific pollutants and production methods including benzene, coke ovens, strip mining and vinyl chloride which indicated that in all but one case, the initial cost estimates were at least double the actual costs.

3.7.2 The ICS found that compliance costs estimates by industry are commonly based on the assumption that businesses do not adapt to change by developing alternative production methods and technologies. It argued that use of this assumption is a 'sure-fire' way of arguing that regulations will result in high compliance costs. Examples of their findings are summarised as follows.

- The EEC Directive on vehicle emission standards required the installation of catalytic converters in new petrol-fuelled cars. The automotive industry predicted that catalytic converters would cost £400 - £600 per vehicle and also increase fuel consumption. The actual outcome was no significant change in vehicle prices, whilst the catalyst requirement led to cars being equipped with more sophisticated fuel management technologies, which led to improved fuel efficiency. An evaluation of the environmental and health effects of the introduction of vehicle exhaust catalysts in the UK also concluded that by 1998 the net societal health benefits were about £500 million and were estimated to rise to about £2 billion by 2005.

- The European auto-oil program required stricter provisions regarding emissions of pollutants from automobiles, which in turn required new fuel standards. A report prepared for the oil industry by consultants estimated that this would cost €75 billion - €80 billion. However, as figures became available from countries that had already introduced higher standards (ie Sweden and Finland) the consultants concluded that the costs had been overestimated by up to 55%. Initially, the oil industry and the automotive industry had a common position on this matter. However, the emergence of evidence of lower compliance costs resulted in the automotive industry questioning the oil industry's cost estimates and they also began to emphasise the need for lower sulphur levels to allow the development of more efficient engine technologies. Finally, in response to new sales opportunities and the availability of new technology, the oil industry revised their opposition and progressed with the move to 'greener' fuels.

- The US Clean Air Act was amended in 1990 to set goals for acid rain, stratospheric ozone-depleting substances and airborne toxic substances that had previously not been covered under the Act. During the negotiation phase, industry argued that these amendments would cost $US 51 – 91 billion per year. However, a report from the US Office of Management and Budget estimated that between 1992 and 2002 compliance costs totalled about $US 23 – 26 billion, whilst the health and social benefits from these standards were estimated to be $US 120 – 193 billion for the same period.

- The Montreal Protocol on ozone layer depleting substances was opposed by industry on the grounds that there was no scientific basis for regulation and that compliance costs would be too high, although no specific cost estimates were provided. Industry noted the significance to the world economy of ozone-depleting substances (ODSs) and claimed that no alternatives would become available in the foreseeable future. 'Downstream' users of ODSs initially supported the chemicals industry in opposing regulation of ODSs. However, as alternative substances and technologies became available they started transferring to non-ODS processes. The chemical industry subsequently also followed the movement away from ODSs. The Technology and Economic Assessment Panel of the Montreal Protocol concluded that virtually all the global reduction of CFC use had come at little or no cost to consumers, examples of successful changeovers from ozone-depleting technologies are too numerous to mention individually and that there are numerous examples where the substitute technologies have saved money and improved quality over the CFC technologies they replaced.

3.7.3 The ICS argues that this report reinforces the conclusion previously drawn by the Stockholm Environmental Institute, that the European Union should approach costs presented by industry with caution as in the past it has tended to overestimate the costs of compliance and underestimate the potential for the development of new technologies.

4. Comparative environmental performance

4.1 In 1999, the World Economic Forum (WEF) sponsored a coalition of academic analysts, business leaders and environmental activists to develop an Environmental Sustainability Index (ESI) to measure overall progress toward, and capacity to achieve environmental sustainability for 122 countries. The index covers a broad spectrum of issues that contribute to long-term sustainability including baseline environmental conditions and natural resource endowments, current pollution flows and resource stresses, human welfare, social and institutional capacity to respond to environmental challenges and national contributions to global stewardship. The creators of the index consider that it is primarily useful for comparisons of country performance, as they believe that the current state of scientific knowledge does not permit precise specification of performance levels that are high enough to be truly sustainable.

4.2 The results of this work was published in 2002 with the UK ranked 16th on the overall ESI. While this appears to indicate that the UK's comparative performance is quite good, the following factors need to be taken into account when interpreting this finding.

- The UK is ranked behind a number of other European countries including Finland, Norway, Sweden, Switzerland, Austria, Denmark, Netherlands, France and Germany.

- The UK's overall ranking is significantly boosted by its high ranking in certain categories that masks its poor ranking in a number of important areas. It is ranked comparatively highly on social and institutional issues such as science and technology, regulation and management, environmental information, capacity for debate and private sector responsiveness. However, it is ranked in the bottom 25% of countries for a number of key indicators including stress on terrestrial systems, reducing air pollution, ecosystem and water stresses and also reducing waste and consumption pressures.

- While wealthy countries are generally ranked higher in the overall ESI, they tend to perform slightly below the overall average for reducing environmental stresses and for some indicators such as reducing waste and greenhouse emissions, they tend to perform well below average. However, even when compared with its peer countries (as defined by GDP per capita), the UK compares unfavourably in 6 out of 9 core indicators of environmental quality and performance. Key indicators for which the UK's environmental performance was considered to be worse than comparable countries include air quality, water quantity, stress on terrestrial systems, reduction of ecosystem stress and reduction of waste and consumption pressures. Key indicators for which the UK's environmental performance was considered to be better than its peers included water quality, reducing water pollution and biodiversity.

4.3 Data from the Organisation for Economic Co-operation and Development (OECD) that was cited by the CBI in its report on environmental regulation are also consistent with the WEF's findings. OECD data indicates that compared with the US, France, Germany, Netherlands and Italy, the UK's environmental performance is better than the average for these countries regarding water use and hazardous waste production,

consistent with average energy consumption (but below average when compared with only these European countries) and below average regarding air quality, recycling and agro-chemical use.

4.4 WEF and OECD data indicates that to date, the UK has adopted a 'dirtier' economic growth path than its peer countries and that greater effort will be required for the UK to achieve world-class standards of environmental performance.

5. Opportunities for simultaneous environmental improvement and economic development in the UK

5.1 Manufacturing

5.1.1 In 2003, Cambridge Econometrics and AEA Technology completed a study of the economic benefits of 'greener business' based on 65 case studies of manufacturing companies that participated in the 'Envirowise' programme. Envirowise is a Government programme supported by the Environment Agency and the Department for Trade and Industry that provides businesses with free help and advice on environmental issues, resource efficiency and sustainable business solutions.

5.1.2 The case studies only focussed on the opportunity for cost savings from one part of the resource productivity agenda namely waste minimisation. They examined savings from process improvements that lead to reduced use of raw material inputs, lower waste disposal costs and reduced costs from substitution. Additional substantial savings that may be derived from lower costs of processing and handling raw materials including energy and labour were not examined. The studies provided the basis for estimating the benefits that could be generated if the cost saving processes were replicated by other businesses. The potential for replication was assessed in consultation with industry. The key findings of this study are summarised as follows.

- Manufacturing industry in England and Wales could reduce annual operating costs by about £2 billion - £2.9 billion via investment in best-practice waste minimisation techniques. This equates to about 1.25% - 2% of manufacturing value added and 5% -7% of manufacturing sector profits in 2000.

- The average payback periods from waste minimisation process improvements in the case studies were 12 months or less, suggesting that there was scope for quick wins for manufacturing businesses.

- These findings are supplemented by conclusions of the Energy Review undertaken by the Cabinet Office in 2002. This review estimated that the adoption of cost-effective energy efficient practices could yield cost savings of about £1.4 billion pa in manufacturing industry and about £7.3 billion pa across the entire economy (excluding the domestic sector) with a payback period of 2 – 4 years.

- The case studies were undertaken prior to the Government's announcement that it will steadily increase the Landfill Tax from £13 per tonne to £35 per

tonne, a decision that will significantly increase costs for businesses that do not take action to improve their resource management practices.

5.1.3 The economic benefits of improved environmental performance in the manufacturing sector have also been clearly identified through the assessment of the impacts of the South Australian Environment Protection Authority's Pollution Prevention Fund (Hudson & Cole 1999). This Fund was used to provide assistance for the implementation of cleaner production and waste management projects by local industry. Assistance was provided in the form of consultancy grants to individual businesses and industry associations and interest free loans for the purchase of new technology and equipment.

5.1.4 Forty completed projects that accounted for $A1.15 million dollars in funding assistance and $A1.60 million in additional complementary private sector investment were assessed. The remaining projects were excluded from the study, as they were not sufficiently advanced to warrant their inclusion. Key findings are summarised as follows.

- A one-off outlay of $A2.75 million is resulting in annual value added benefits to the local economy in excess of $A2.0 million (ie direct and flow-on multiplier impacts).
- The overall benefit/cost ratio for these projects including both the public and private sector investments is 15:1.
- The value added benefits were generated via reductions in a range of operating costs such as energy, water, raw materials and waste management.
- The actual benefits of these projects are likely to be significantly higher given the substantial difficulties encountered by businesses and industry associations in quantifying and valuing the environmental benefits.

5.2 Agriculture

5.2.1 To date, research on the issue of the relationship between environmental management and economic performance has been strongly focussed on overall economy-wide performance and the industrial sector. Less attention appears to have been given to the agricultural sector despite the fact that it is a dominant form of land use in most countries and accounts for 77% of the total land area in the UK. However, during recent times the agricultural sector has been the subject of close scrutiny (eg the Policy Commission on the Future of Farming and Food), a sustainable development strategy (ie *The Strategy for Sustainable Farming and Food – Facing the Future*) and major regulatory change via the reforms to the European Union's Common Agricultural Policy (CAP). Central to these initiatives is the objective of enhancing the environmental and economic performance of the agricultural sector. The UK strategy for sustainable farming and food estimates that the external environmental cost of UK agriculture is about £1billion - £1.5 billion pa.

5.2.2 It is considered that compliance with environmental management requirements under the revised CAP arrangements and the willingness of farmers to go beyond these

requirements could be enhanced via the development and dissemination of sound evidence that good environmental management in the agricultural sector can also generate financial benefits.

5.2.3 In view of this, the Environment Agency and English Nature contracted AEA Technology to undertake a study regarding the potential economic benefits of good environmental management in the agricultural sector. The primary objectives of the study were to analyse 'win-win' case studies of improved farm resource management practices that provide both financial and environmental benefits and where possible use data from these studies to generate estimates of potential for savings in the agricultural sector of England and Wales.

5.2.4 For the purposes of this project win-win case studies were defined as studies of commercial farms where improved resource management practices have resulted in both financial benefits for the farmer (either as cost savings or increased revenue) and environmental improvements. This definition excluded studies of projects involving payments to farmers (eg via agri-environment schemes) to achieve environmental benefits.

5.2.5 The assessment was based on case studies of resource management initiatives that are easily adoptable and widely applicable and also provide financial data on a per unit basis (eg £ per ha or £ per animal). Data was required on a per unit basis to enable extrapolations to be undertaken using agricultural industry census data to calculate national savings estimates.

5.2.6 An extensive consultation process with 115 organisations, yielded 54 case studies that provided sufficient financial data from which national savings could be estimated. An additional 28 case studies that provide financial data were also identified but were but not suitable for use in this project. For most of these studies, the financial data was provided on a farm basis and/or could not be attributed to a specific resource management activity and were therefore unsuitable for extrapolation purposes, while some of the studies also provided data on resource management practices that are not easily adoptable or widely applicable.

5.2.7 It is also noted that the suitable case studies covered a relatively small proportion of the opportunities for improved resource management on farms. They are particularly focussed on nutrient and soil management, water efficiency and waste management. While the large number of case study gaps for potential win-win practices precluded a comprehensive estimation of total potential savings in the agricultural sector, the potential savings via these resource management opportunities in England and Wales were calculated. The savings estimates are based on the assumptions that currently no farmers have implemented these resource management opportunities and that uptake rates are 100%. No allowance has been made for topographical or logistical factors that may render these measures unsuitable on some farms in the sector to which they apply. It is also noted that while the focus of the study was on measures that are easily adoptable, the savings estimates only partially allow for the opportunity costs of farmers' time in implementing these measures. Consequently, these estimates should be considered as maximum possible savings. Key findings of this study are summarised as follows.

- Total potential savings of about £960 million pa were identified.
- Improved soil and nutrient management in the cereals sector offers savings of about £620 million pa.
- Greater water efficiency (particularly via re-use) in the vegetable, dairy and glasshouse propagation sectors offers savings of about £185 million pa.
- Reduced waste in the cereals, vegetables, cattle and poultry sectors offers savings of about £45 million pa.
- Reduced use and more accurate application of chemicals particularly in the crops sector offers savings of about £43 million pa.
- Improved nutrient management in cattle and dairy sectors offers savings of about £32 million pa.
- Increased energy efficiency in the crops, dairy, poultry and glasshouse/poly-propagation sectors offers savings of about £13 million pa.
- Potential cost savings via the resource management opportunities that were assessed are in the range of 0.1% - 11% of farm income for the relevant sector.
- The environmental benefits of the resource management opportunities that were assessed include improvements to drinking water and river ecology due to reduced diffuse source pollution, enhanced sustainability via reduced water and energy use and waste minimisation, and biodiversity improvement arising from various measures including reduced use of chemicals. However, these benefits are rarely quantified because of the difficulties and expenses involved in such a process.
- Notwithstanding the limited number of suitable case studies, it is clear that there are opportunities to both save money and enhance the environment via improved resource management practices without the need to provide grant-aid.
- Information from 'whole farm' planning initiatives supports the view that as more case study data becomes available, identified potential savings should increase. For example, the Westcountry Rivers Trust has completed two catchment-scale projects involving more than 1,000 farmers and other landowners in the South-West of England to reduce diffuse pollution and increase biodiversity. An assessment of the Taw/Torridge Project identified annual benefits of about £2,700 per farm business per year from a one-off investment in farm planning at an average cost £2,200.
- The limited number of fully documented win-win case studies regarding resource management in the agricultural sector appears to be due to a lack of coordination in documenting case studies and systematically capturing full information, rather than a shortage of examples of practices with both

financial and environmental benefits. In the case of whole farm farming planning, reporting of outcomes is also limited by a lack of funding for the production of case studies.

- Discussions with farmers identified a number of barriers to the implementation of win-win opportunities. These include a lack of awareness of such opportunities, difficulty in finding comparative case study information with sufficient detail on which to base business decisions, a preference for 'pay-wins' as a subsidy primes action even if the resource management initiative alone provides a win-win and uncertainty about future viability constricting on-farm initiatives.

- A workshop regarding the project with representatives of 30 stakeholder organisations in the agricultural sector including Government, Non-Government Organisations, academia and consultancy services revealed a consensus that the win-win approach provides a potentially effective tool to improve the financial and environmental performance of the agricultural sector. There also was agreement that these opportunities should be promoted via farm advisory and demonstration schemes and could be promoted via non-traditional sources such as farm accountants and banks.

6. Environmental awareness and practices

6.1 In 2003, NetRegs undertook the largest ever UK-wide study regarding the environmental behaviour of small and medium sized enterprises (ie businesses with up to 250 employees). NetRegs is an initiative between the Environment Agency, the Scottish Environment Protection Agency, the Environment and Heritage Service (Northern Ireland) and the Department of Trade and Industry's Small Business Service that provides internet based resources to help small and medium sized enterprises (SMEs) navigate environmental legislation that affects them (www.netregs.gov.uk). It also provides general management guidelines that apply to most businesses and advice for individual industry sectors.

6.2 The study involved a survey of just over 8,600 businesses across a broad range of industry sectors. The importance of this study in the development of economic and environmental policy is clearly indicated by the fact that over 99% of the 3.7 million businesses in the UK are SMEs and it is estimated that they generate about 60% of commercial waste and as much as 80% of pollution incidents in England and Wales alone. Key findings of the survey are summarised as follows.

- Only 6% of all businesses surveyed thought that they undertook any activities that could be damaging to the environment, whilst only 10% of respondents from the agricultural sector thought that they undertook environmentally damaging activities.

- Only 23% of respondents had implemented measures aimed at reducing harm to the environment. Lowest implementation rates were observed amongst small businesses.

- Businesses from the forestry, mining and quarrying sectors were most active in introducing practical environmental measures, while businesses in the agricultural, construction and textiles sectors had been amongst the least active.

- Only 3% of businesses reported having an accredited environmental management system (EMS) in place and only a further 1% reported that they had plans to adopt an EMS. A higher incidence of EMSs amongst larger businesses in comparison with smaller businesses was also identified.

- Only 18% of respondents could name environmental legislation unprompted.

- Just over 50% of businesses acknowledged good environmental practice can reduce operating costs and 65% of businesses acknowledged that good environmental practice is beneficial for customer relations, while only 27% indicated that they felt that there was no link between good environmental practice and increased sales and profitability. However, despite this only 8% of businesses that had implemented measures to prevent environmental damage cited potential economic benefits as a reason for taking this course of action. General concern for the environment and legislative pressure was cited as the primary reasons for taking action. These overall figures are also reflective of attitudes in the agricultural sector.

6.3 The findings of this survey reveal some interesting issues regarding environmental awareness, attitudes and practices by SMEs in the UK. The reasonably high proportion of businesses which acknowledge that good environmental practice can also provide economic benefits is quite heartening. However, it also begs the question that if this is the case, why then are businesses not making more use of this opportunity to enhance their commercial position? Clearly, recognition of adverse environmental impacts and legal obligations is necessary before a business will take steps to address environmental issues, and this study suggests that SME's in the UK are largely unaware of their environment impacts and their environmental obligations.

6.4 NetRegs believes that time and resource pressures on small businesses, together with limited knowledge about action that can be taken to address environmental issues are also major constraints on the adoption of more active environmental management initiatives by SMEs. It considers that ultimately environmental issues are unlikely to take precedence over the day-to-day running of businesses, but if they can be addressed as an intrinsic part of everyday business activity, then environmental improvements can be made that also have a positive impact on business profitability. In this regard NetRegs believes that the most important factors in encouraging businesses to initiate more positive environmental measures is raising awareness about regulations that govern their activities and further promoting the business benefits of good environmental practice.

6.5 The findings of this survey and NetRegs' conclusions are consistent with the views of Porter and van der Linde and also Cambridge Econometrics and AEA Technology who argue that a lack of information, especially for small businesses and inadequate environmental accounting can result in cost savings from the more efficient use of

resources not being taken up even though such measures may be profitable and yield a relatively quick payback on the initial outlay.

7. Industry's views regarding the future of environmental management and regulation in the UK

7.1 In its report on environmental regulation, the CBI acknowledges that the UK's overall record on environmental performance indicates that it still has some way to go to achieve world-class standards of performance and that business will be expected to play a part. It also acknowledges that in the future, UK firms may have to invest at a higher rate than their counterparts in France, Germany and the Netherlands to match and then keep pace with their levels of environmental performance and that regulation is set to remain part of the operating landscape for business. The CBI concludes that businesses therefore face the prospect of not only more regulation but also greater diversity in its form and notes that businesses fear that this will result in additional unnecessary costs and complexity. It therefore considers that the challenge for policy makers is to approach the issue of regulation in a way that is business-friendly.

7.2 Key recommendations from the CBI for enhancing the environmental management and regulatory regime in the UK include the following.

- A widening of the focus of attention from industrial operations to better engage 'under-involved' sectors of the economy such as agriculture, commerce and smaller businesses in general.

- Continued efforts to help SMEs comply with environmental regulation.

- Development of a strategy to address the business opportunities and challenges arising from the Government's main environmental goals as part of the UK strategy for sustainable development.

- Incorporation of the following principles in regulatory development and enforcement.

    1. Intervention must as far as possible be based on sound science and a reasonable interpretation of the precautionary principle.

    2. Equitable effort between business and other stakeholders.

    3. The detail of regulatory measures should be clear and avoid over-prescription to enable businesses to comply without incurring excessive cost.

    4. Use of a risk-based approach to enforcement to ensure that resources are targeted towards persistent offenders rather than responsible businesses.

- Development of a program for managing the impact of regulation including reviewing the cumulative impacts of regulation and the provision of

appropriate support to help businesses contribute efficiently to the achievement of environmental goals.

8. Summary

8.1 The role of the environment in supporting economic activity

8.1.1 The role of the environment in supporting economic activity is well documented in texts on economic theory and increasingly recognised in Government policy as reflected in the UK strategy for sustainable development. However, it appears that there is limited rigorous information regarding the relationship between the environment and economic activity in the UK.

8.1.2 A more thorough analysis of this matter, including the importance of the environment for manufacturing activity and multiplier effects using Input-Output analysis would further confirm that the environment is the key basis for a high proportion of economic activity both in England and across the UK. It is considered that this analysis would assist the sustainable development strategy by increasing community understanding of this matter and also by providing detailed statistical information that can be used to enhance policy and program development.

8.2 Economic implications of environmental management and regulation

8.2.1 There is now significant evidence from international research that rigorous environmental management and regulation does not impede overall competitiveness and economic development and can in fact be beneficial for development by creating pressure that overcomes inertia and motivates innovation and alerting businesses about resource inefficiencies and the potential for technological improvement. This view is also supported by the findings of research, which indicates that there are significant opportunities for simultaneous improved environmental and financial performance in the UK agriculture and manufacturing sectors. These findings indicate that sensible use of performance standards to eliminate processes or products with unacceptable environmental impacts or to provide a baseline for improvements should not have adverse implications for overall economic development in the UK and can also help in stimulating investment in environmental innovation. These conclusions are also consistent with the views of the Confederation of British Industry regarding the potential benefits of environmental management and regulation.

8.2.2 However, it is also acknowledged that care needs to be taken in identifying industry sectors, businesses and also specific issues where environmental management and regulation is a significant cost burden to enable assistance measures such as the provision of grant-aid to be appropriately targeted. With regards to this, research by the International Chemical Secretariat also indicates that compliance cost estimates presented by industry during the legislative debate phase may need to be treated with caution as it has demonstrated a tendency to overestimate these costs and underestimate the potential for beneficial adaptation to more stringent environmental regulation.

8.2.3 These findings accord with the network of European Environmental Advisory Councils' caution to the European Union and national Governments against an

imbalanced move towards deregulation in environmental policy and its call for the maintenance of existing capacities for direct regulation as well as the development of additional capacity for strategic target setting and regulation.

8.3 Opportunities for simultaneous environmental improvement and financial gain in the agricultural sector

8.3.1 The UK sustainable development strategy gives explicit recognition to economic opportunities associated with improved resource efficiency in the manufacturing sector. However, the economic benefits of improved resource management in the agricultural sector are largely overlooked. While, the strategy for sustainable farming and food acknowledges the need to promote best practice in profitable and environmentally sound farming, it does not promote win-win opportunities in the agricultural sector in a strong manner.

8.3.2 It is considered that compliance with environmental management requirements under the revised CAP arrangements and the willingness of farmers to go beyond these requirements could be enhanced via the dissemination of sound evidence that good environmental management in the agricultural sector can also generate financial benefits. The research project regarding win-win opportunities in the agricultural sector has generated information that can be used to enhance the case for sustainable farming via both the sustainable development strategy and the strategy for sustainable farming and food. It is recognised however, that the knowledge base regarding this matter needs to be further strengthened and regularly updated.

8.4 Scope for additional research regarding the economic benefits of improved environmental management in the agricultural sector

8.4.1 The project regarding win-win opportunities in the agricultural sector identified that the limited number of win-win case studies appears to be due to a lack of coordination in documenting case studies and systematically capturing full information, rather than a shortage of examples of practices with both financial and environmental benefits. Whilst in the case of whole farm planning, reporting of outcomes is also limited by a lack of funding for the production of case studies.

8.4.2 While the agricultural win-win project is clearly a step in the right direction, the difficulties in measuring the environmental benefits of enhanced resource management and the consequences of not taking action to enhance such measurement also need to be considered. Unless action is taken to facilitate measurement of the environmental benefits of enhanced resource management, organisations that are trying to promote the benefits of sustainable farming will remain reliant on a partial evidence base to justify their case. This partial evidence base comprises of indicators of direct benefits to farmers, while public benefits such as reduced water treatment costs and enhancement of conservation areas will remain unquantified and therefore will continue to only be discussed in qualitative terms. With regards to this matter, the report for this project has suggested that indirect indicators such as energy use per head of livestock, fertiliser applications per hectare, water or fuel use per hectare, or waste production per hectare or per head of livestock, or more direct measures such as faecal coliforms per litre in streams running past farms, or nutrient levels in receiving waters after fertiliser applications could be used. However, these indicators would

require research to develop easily usable measurement methodologies and monitoring to assess their value in driving best practice. The development of such indicators of environmental performance therefore also presents itself as a challenge for environmental protection and conservation organisations.

8.5 Environmental awareness and practices

8.5.1 The NetRegs survey has revealed a serious lack of awareness regarding environmental impacts and legal responsibilities and limited recognition of the economic benefits of good environmental practice in the UK business community that are acting as major constraints to the implementation of sustainable development initiatives. The study regarding win-win opportunities in the agricultural sector also revealed a lack of awareness of opportunities for sustainable development.

8.5.2 It is considered that this situation is likely to have contributed to the UK's relatively poor ranking on key environmental performance indicators by the World Economic Forum and the Organisation for Economic Co-operation and Development.

8.5.3 These findings indicate that significantly greater effort needs to be made to increase awareness in the business community regarding its environmental impacts, legal responsibilities and opportunities for enhanced profitability via good environmental practice.

9. References

AEA TECHNOLOGY. 2004. *Assessment of "win-win" case studies of agricultural resource management*.

BILSBOROUGH, S., & HILL, S. 2002. *Valuing our environment: the economic impact of the environment of Wales: technical summary*. Countryside Council for Wales & University of Glamorgan.

CABINET OFFICE PERFORMANCE AND INNOVATION UNIT. 2002. The energy review. London: Cabinet Office. Available from: http://www.number-10.gov.uk/su/energy/1.html

CAMBRIDGE ECONOMETRICS, & AEA TECHNOLOGY. 2003. *The benefits of greener business*. Cambridge: Cambridge Econometrics. Available from: http://www.reward-uk.org/EnVagWaste29Apr03.pdf

CLINCH, J. P. & KERINS, D. 2002. Assessing the efficiency of integrated pollution control regulation. *Journal of European Environmental Policy*, 12(5), 269-283.

CONFEDERATION OF BRITISH INDUSTRY. 2004. *The UK as a place to do business – environmental regulation*.
Available from: http://www.cbi.org.uk/bookshop

CORNELIUS, P.K, VON KIRCHBACH, F., & MIMOUNI, M. 2002. Creating green markets: what do the trade data tell us? *In:* D.C. ESTY, & P.K. CORNELIUS, eds. *Environmental Performance Measurement: The Global Report 2001-2002,* 82-91. New York: Oxford University Press.

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS. 2002. *The strategy for sustainable farming and food: facing the future*. London: Defra. Available from: http://www.defra.gov.uk/farm/sustain/newstrategy/index.htm

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS. 2002. *Farming and food's contribution to sustainable development: economic and statistical analysis*. London: Defra. Available from: http://www.defra.gov.uk/farm/sustain/newstrategy/index.htm

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS, & DEPARTMENT FOR TRADE AND INDUSTRY. 2003. *Changing patterns: UK Government framework for sustainable consumption and production.* London: Defra. Available from: http://www.defra.gov.uk/environment/business/scp/changing-patterns.pdf

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS, SCOTTISH EXECUTIVE ENVIRONMENT AND RURAL AFFAIRS DEPARTMENT, DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT (NORTHERN IRELAND) & WELSH ASSEMBLY GOVERNMENT, THE DEPARTMENT FOR

ENVIRONMENT, PLANNING AND COUNTRYSIDE. 2004. *Agriculture in the United Kingdom: 2003*. London: The Stationery Office.

DEPARTMENT OF THE ENVIRONMENT, TRANSPORT AND THE REGIONS. 1999. *A better quality of life: a strategy for sustainable development for the United Kingdom.* London: DETR.

EAST MIDLANDS DEVELOPMENT AGENCY. 2002. *The environmental economy of the East Midlands*. Nottingham: EMDA. Available from: http://www.emda.org.uk/documents/EMDA%20Enviro%20Economy.pdf

ENVIRONMENTAL RESOURCES MANAGEMENT, ADVANTAGE WEST MIDLANDS, ENVIRONMENT AGENCY. 2001. *The environmental economy of the West Midlands.*

ENVIRONMENTAL RESOURCES MANAGEMENT. 2001. *Valuing the environment of the North East of England*. London: ERM

ENVIRONMENTAL RESOURCES MANAGEMENT. 2000. *The environmental economy of the North West: a driver for economic and social progress.* Manchester: ERM

GFA-RACE PARTNERS PTY LTD & GHK CONSULTING LTD. 2004. *Revealing the Value of the Natural Environment in England.*

HARVARD BUSINESS REVIEW, November–December, 1995, Letters page. Correspondence relating to: PORTER, M. E, & VAN DER LINDE, C. 1995. Green and competitive – ending the stalemate. *Harvard Business Review*, September–October 1995

HM GOVERNMENT. 2005. *Securing the future – delivering UK sustainable development strategy*. Available from: http://www.sustainable-development.gov.uk/publications/uk-strategy/uk-strategy-2005.htm

HM GOVERNMENT, SCOTTISH EXECUTIVE, WELSH ASSEMBLY GOVERNMENT & NORTHERN IRELAND OFFICE. 2005. *One future – different paths, the UK's shared framework for sustainable development.* Available from: http://www.sustainable-development.gov.uk/publications/uk-strategy/framework-for-sd.htm

INTERNATIONAL CHEMICAL SECRETARIAT. 2004. *Cry wolf – predicted costs by industry in the face of new regulations*. ICS Report, No. 6:04. Gothenburg: ICS. Available from: http://www.chemsec.org/documents/Cry%20wolf%20final%20220404.pdf

KERINS, D. T. W. 2000. *A cost benefit analysis of integrated pollution control licensing in Ireland*. MSc Thesis. Dublin: University College Dublin.

LAND USE CONSULTANTS, SQW LTD, & CAMBRIDGE ECONOMETRICS. 2002. *The environmental economy of the South East of England*. London: Land Use Consultants. Available from: http://www.seeda.co.uk/publications/docs/environmental_economy/environmentaleconomyfullreport.doc

LEVY, M. A. 2002. Measuring nations' environmental sustainability. *In:* D.C. ESTY, & P.K. CORNELIUS, eds. *Environmental performance measurement: the global report 2001-2002*. New York: Oxford University Press.

MEYER, S. M. 1992. *Environmentalism and economic prosperity: testing the environmental impact hypothesis*. Cambridge (Mass.): Massachusetts Institute of Technology.

MEYER, S. M. 1995. The economic impact of environmental regulation. *Journal of Environmental Law & Practice*, 3(2), 4-15.

MEYER, S. M. 1993. *Environmentalism and economic prosperity: an update*. Cambridge (Mass.): Massachusetts Institute of Technology. Available from: http://web.mit.edu/polisci/mpepp/Reports/eepup.PDF

MEYER, S. M. 1993. *Environmental protection and economic development in New England. A presentation to the New Hampshire State Senate Economic Development Summit*. Cambridge (Mass.): Massachusetts Institute of Technology. Project on Environmental Politics and Policy, Working Paper, No. 3. Available from: http://web.mit.edu/polisci/mpepp/Reports/neee.PDF

NETREGS. 2003. *SME-nvironment 2003: a survey to assess environmental behaviours among smaller UK businesses*. Bristol: Net Regs.

NETWORK OF EUROPEAN ADVISORY COUNCILS & THE ADVISORY COUNCIL FOR RESEARCH ON SPATIAL PLANNING, NATURE AND THE ENVIRONMENT OF THE NETHERLANDS (MEULEMAN, L., NIESTROY, I., & HEY, C., eds.) 2003. *Environmental governance in Europe*. Utrecht: Lemma Publishers.

PALMER, K. OATES, W. E. & PORTNEY, P. R. 1995. Tightening environmental standards: the benefit-cost or the no-cost paradigm? *Journal of Economic Perspectives*, 9(4), 119-132.

PARK, J., and others. 2004. *The importance of the quality of the environment for economic development and regeneration in rural areas.* The University of Reading. Available from: http://www.defra.gov.uk/rural/research/default.htm

PHILLIP HUDSON CONSULTING & COLE SOLICITORS. 1999. *Final report on the environmental and economic impacts of the Pollution Prevention Fund*. Report prepared for the South Australian Environment Protection Authority.

PORTER, M. E. 1990. *The Competitive Advantage of Nations*. New York: Free Press.

PORTER, M. E. 1991. America's Green Strategy. *Scientific American*, 264(4).

PORTER, M. E. & ESTY, D. C. 2002. Ranking national environmental regulation and performance: a leading indicator of future competitiveness? *In:* WORLD ECONOMIC FORUM, ed. T*he Global Competitiveness Report 2001-2002*. New York: Oxford University Press.

PORTER, M. E, & VAN DER LINDE, C. 1995. Green and competitive – ending the stalemate. *Harvard Business Review*, September–October 1995, 119-134. Available from: http://www.solonline.org/repository/download/Porter%20Green%20&%20Competitive.pdf?item_id=364533

SOUTH WEST ENVIRONMENT PROSPECTUS GROUP. 1999. *An environmental prospectus for South West of England: linking the economy and the environment*. Available from: http://www.swenvo.org.uk/documents/Economics/Environmental_prospectus.pdf

SQW LTD., & LAND USE CONSULTANTS. 2001. *Environmental prosperity: business and the environment in the East of England.* Available from: http://www.rspb.org.uk/Images/env_e_full_tcm5-45208.pdf

WILLIAMS, E. MACDONALD, K. & KIND, V. 2002. Unravelling the competitiveness debate. *Journal of European Environmental Policy*, 12(5), 284-290.

YORKSHIRE FORWARD. 2002. *The environmental economy of Yorkshire and Humber*. Leeds: Yorkshire Forward. Available from: http://www.yorkshire-forward.com/view.asp?id=1280&pw=

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Top left: Using a home-made moth trap.
Peter Wakely/English Nature 17,396
Middle left: Co_2 experiment at Roudsea Wood and Mosses NNR, Lancashire.
Peter Wakely/English Nature 21,792
Bottom left: Radio tracking a hare on Pawlett Hams, Somerset.
Paul Glendell/English Nature 23,020
Main: Identifying moths caught in a moth trap at Ham Wall NNR, Somerset.
Paul Glendell/English Nature 24,888