environmental
SCIENTIST

In this issue:

AN EXCITING YEAR AHEAD FOR THE INSTITUTION

Welcome to the latest issue of the Institution's Journal. Since the last issue of the Environmental Scientist, the IES has undergone a substantial reorganisation following the retirement of the Honorary Secretary, Dr Bob Fuller, in the summer of 2003. There is a new Honorary Secretary and a new administration team in place. Mrs Jennifer Blumhof was invited by Council to become the new Honorary Secretary and Christine James became the part-time Administration Manager for the IES, ably supported by Abhishek Sharma, on placement from StudentForce.

I extend my thanks to Bob Fuller for his long and devoted service to the IES and a warm welcome and thanks to our new Honorary Secretary and admin team. In their short period in post they have overseen a dramatic change in the location of the IES and in the member service organisation and delivery. In the summer of 2003 the IES relocated its registered office from Bourne to Ebury Street in Central London and the new team began to update all the standard operating procedures. This task has now largely been completed and the benefits in efficiency and effectiveness should be noticeable to members.

The IES has had an extremely productive 2003. Our engagement with PP4SD has supported the roll-out of sustainable development training to a wide range of professions including financial services. The PP4SD web site has been refreshed and the latest developments can be seen at *www.pp4sd.org.uk*

During 2003 the IES has continued to support the development of the Institute of Air Quality Management and this has brought a welcome influx of new members. The work of the IAQM can be viewed at *www.iaqm.co.uk*

The IES has entered into an agreement with the publisher Taylor and Francis to make available to members, at a specially discounted price, the International Journal of Environmental Studies. Taylor and Francis publish a range of academic and professional journals in the environmental sciences and IES members have an opportunity to subscribe to other journals at a specially discounted price. Watch out for details of this offer soon.

Members will be aware of the progress IES and its sister professional bodies have made in establishing the Society for the Environment (SocEnv). The objective of SocEnv is to be able to secure approval from the Privy Council for the award of the title Chartered Environmentalist (CEnv). You can keep up to date with progress on securing the Charter at www.socenv.org.uk The Society hopes to be able to make an announcement on the Charter early this year.

IES, in partnership with the Committee of Heads of Environmental Sciences, has been active in the accreditation of undergraduate degree programmes in universities in 2003 and together will be developing a joint agreement for accrediting MSc programmes in 2004.

The Council of IES has also been active in reviewing the policy and strategy of the IES during 2003 and is working towards a new statement of policy and its implementation for 2004-05.

IES has had an exciting and very busy 2003 and 2004 looks set to continue this course. As a voluntary organisation the IES is dependent upon the dedication of its Honorary Officers and Council members and I would like to take this opportunity of thanking them for their efforts on behalf of the IES during 2003.

In conclusion, I would like to encourage members to stand for Council and to play a part in the deliberative and executive decision making of the Institution. If you are interested in becoming more involved, please contact the Honorary Secretary or myself for an informal discussion.

PROFESSOR JIM LONGHURST
CHAIR OF COUNCIL

CHARTERED ENVIRONMENTALIST (CEnv) – A PROGRESS REPORT

Subject to approval by the Privy Council, the Society for the Environment (SocEnv) will be in a position to offer CEnv in 2004. SocEnv currently comprises nine professional bodies, including the Institution of Environmental Sciences. SocEnv was established to lead on the development and regulation of environmental professionals and to be a respected voice in environmental affairs and sustainable development.

If SocEnv is granted a Royal Charter in 2004, it will enable members of the IES to attain the status of Chartered Environmentalist, which recognises their professional status in environmental sustainability. Applicants for CEnv will be required to satisfy certain eligibility criteria, including full membership of one of the 'constituent' professional bodies that are members of the Society. For IES members this will be the full membership (MIEnvSc) level.

In addition, candidates must demonstrate that they have attained 12 units of learning derived from a combination of academic and professional experience. Each year of relevant formal learning will accrue 2 units up to a maximum of 8 units for each candidate. Relevant practical experience will accrue 1 unit for each year of experience. There are obviously many variations which could contribute to the award.

In addition to meeting the eligibility criteria, applicants will be required to participate in face to face peer interviews and prepare portfolios of their experience. Applicants will also be required to sign up and adhere to a rigorous code of ethics as follows:

As a Chartered Environmentalist I will:

◆ Incorporate the best principles of the environmental sciences for the mitigation of environmental harm and the enhancement of environmental quality;
◆ Strive to ensure that the uses of natural resources are fair and sustainable taking account of the needs of a diverse society;
◆ Use my skills and experience to serve the needs of the environment and society;
◆ Serve as an example to others for responsible environmental behaviour;
◆ Not engage in conduct involving dishonesty, fraud, deceit, or misrepresentation or discrimination; and
◆ Commit to maintaining my personal professional competence and strive to maintain the integrity and competence of my profession.

LEARNING TOGETHER: PROFESSIONAL PRACTICE FOR SUSTAINABLE DEVELOPMENT

JOHN BAINES,
Chairman of PP4SD,
welcomes the change in
attitudes to sustainability

Sustainable development and the professions

Increasing numbers of young people are attending university and leaving with degrees that make them eligible to become members of a professional body. As a result, more and more people are working as professionals in the public and private sectors whether they choose or not to join a professional body. The world of work into which they are moving is changing rapidly. Public demand, government legislation and business pressures are persuading many employers that integrating sustainable development principles into all levels of planning and practice will provide them with the most secure future.

'Business is not in opposition to, but has a fundamental role in delivering sustainable development – to meet the needs of today's world without depriving future generations of their means to do so.'

– Lord Browne of Madingley,
Group Chief Executive, BP

It is surprising then that there are still few professional and other courses that give more than cursory attention to sustainable development, even ones where there is a clear link such as business management.

If we are to become a sustainable country, it is the professionals in their day to day work who will mainly be responsible for it happening. They will need the motivation, knowledge and skills necessary to integrate sustainable development principles into all aspects of their work. As few professionals have skills in sustainable development, learning how to do this will need to come through professional development, something all professional bodies are committed to and involved in.

However, until the start of the PP4SD project, few professional bodies were looking at what the implications of sustainable development might be for their profession. What needed to change in the way they thought about and practised their professional skills?

> *'The drive for accountability is forcing many of the 5.5 million people in the UK who call themselves professionals and the professional associations who represent them to rethink their approach to sustainability.'*
>
> – William Pope, Managing Director of The Casella Group Ltd

The origins of PP4SD

It was the Environment Agency and the Council for Environmental Education (CEE) that first recognised the need for some inter-professional learning on sustainable development. Representatives of 13 professional bodies were invited to a workshop in 1998. They were all ones with members working in the Environment Agency. At the end of the day, the representatives said they were all keen to work together on learning about sustainable development and developing professional development materials for their members. A smaller group agreed to develop a project proposal and submit an application to the Government's Environmental Action Fund. The CEE, Environment Agency, Institution of Environmental Sciences (IES) and The Natural Step developed the proposal, succeeded in getting a grant and managed the project. As the only professional institution in the start-up group, the application was made through IES and IES has managed the project ever since.

About PP4SD

PP4SD is a project dedicated to promoting sustainable practice among professionals, through developing and disseminating continuing professional development materials and events that encourage cross-professional dialogue. PP4SD is a partnership project. In the first phase, the management group was joined by the Institution of Mechanical Engineers and WWF-UK. The management group today comprises the Environment Agency, the Institution of Environmental Sciences, The Natural Step and the Royal Society for the Protection of Birds although other members are co-opted onto the management group to advise on particular projects. The professional bodies that form the advisory group are:

Building Services and Research Information Association
Chartered Institute of Purchasing and Supply
Chartered Institution of Water & Environmental Management
Chartered Institution of Wastes Management
Institute of Energy
Institution of Chemical Engineers
Institution of Civil Engineers
Institution of Environmental Sciences
Institution of Mechanical Engineers
Royal Institute of British Architects
Royal Institution of Chartered Surveyors
Royal Society of Chemistry
Royal Town Planning Institute.

Getting started

When the project began in 1999, the first task was to agree expectations, outcomes and outputs for the first three years. A number of obstacles were identified, for example:

◆ The topic is huge and definitions abound. Finding a starting point can be a real obstacle to getting engaged.
◆ The solutions require an unprecedented level of inter-professional learning and co-operation.
◆ Few professionals are aware of the tools available to help them become engaged in sustainable development.
◆ Sustainable development is still not a key feature of initial or professional training.

The idea of producing a Foundation Course in sustainable development emerged as the path the group wished to follow. The concept of systems thinking would underpin the training. Developing the Foundation Course was a real inter-professional learning process in itself as members began producing a framework that would be used to guide activities. The dialogue also generated two documents, one on the business case for CPD in sustainable development and a second on guidance in developing cross professional learning opportunities and tools. These are both available on the Downloads page of the PP4SD website.

The PP4SD framework for sustainable development

In a sustainable society:

1. Any materials extracted from the earth should not exceed the environment's capacity to disperse, absorb, recycle or otherwise neutralise their harmful effects to humans and the environment.
2. Synthetic substances in their manufacture and use should not exceed the environment's capacity to disperse, absorb, recycle or otherwise neutralise their harmful effects to humans or the environment.
3. The biological diversity and productivity of ecosystems should not be endangered.
4. A healthy economy should be maintained, which accurately represents the value of natural, human, social and manufactured capital.
5. Individual human skills, knowledge and health should be developed and deployed to optimum effect.
6. Social progress and justice should recognise the needs of everyone.

7. There must be equity for future generations.
8. Structures and institutions should promote stewardship of natural resources and the development of people.

The Foundation Course is a one-day course for introducing sustainable development principles to groups of professionals. It has been tested with cross professional groups, single professional groups and with professionals working in businesses and NGOs. The course is designed to help participants get on the first rung of a ladder that will lead to fuller integration of sustainable development into working practices. The course has a number of activities that are designed to generate dialogue. A facilitator ensures key points are introduced and considered. Each activity leads naturally into the next and by the end of the day, participants start to plan how they will integrate their learning into their everyday work. The model has proved very successful and is still the basis for many professional development courses with the public and private sectors as well as the professional institutions. The course has been published as a manual that is available through IES.

Building on success

The initial EAF grant was for three years, but funding for a further three years was granted for 2002-05. During Phase 2, PP4SD is extending the professional sectors in which it works and is continuing to organise cross-professional events. It has also established a strategic link with the Sustainability Alliance which is a powerful lobbying body representing professional institutions on issues of sustainability. In November 2003, we held a joint event at which we were able to make a direct input to the authors of the Government's Consumption and Production Strategy.

The two main areas of expansion are with the financial and the land based sectors. Two working groups have been established to identify professional development needs and develop appropriate training materials to meet those needs.

In the financial sector, PP4SD has developed a close relationship with Barclays Bank and for the last two years has trained the entire graduate intake in sustainable development. The training is based on the Foundation Course, but has been modified to include case studies and a role-play that are relevant to their needs. Lucy Shackleton, who administers the induction programme, said of the day, 'It fits in with our aim to turn out well-rounded professionals.' Jennifer Chiu who was on the course felt the training could have a significant impact at Barclays. 'If it could be presented to more people such as Team Leaders, it could instil a change of culture.' The experience of the training is being used to inform our work with the broader financial sector and we are currently exploring how we can assist the FORGE[1] group

with its professional development programme for sustainable development.

Two workshops were arranged by RSPB with the land-based sector, involving representatives from the Environment Agency, colleges, NGOs and land-based professions and associations. The discussions have informed the development of a workplan for a series of events:

a) to identify the needs of a range of professionals in the land-based sector in relation to sustainable development, and

b) to produce a package of materials demonstrating how the concept of sustainable development can be integrated into the practice of land-based professionals.

Progress with the projects and information about PP4SD in general can be found on its new website, where many of the publications can be downloaded. There is also an enquiry page to contact us.

Looking to the future

The EAF grant is limited to 50% of our costs and so we must raise extra funds. These funds can be a mixture of cash and in-kind funding. Our activities generate some income, but we need to raise more to complete the programme. Funding will be an important item on the next agenda of the Programme Management Group when we will discuss our strategy for the project beyond 2005 when the current EAF grant will finish. Meanwhile, a grant of around £30,000 would help us complete our current programme.

The outlook is promising. There is now a strong commitment to sustainable development amongst professional bodies and employers in the public and private sectors that was not there when the project started. PP4SD can claim some responsibility for this change in awareness and attitudes. PP4SD enjoys a lot of support and we want to use this support to expand our programme of activities. In particular we will be looking at what comes after the Foundation Course and how we can best support the growing interest. We are all looking forward to continuing our work and developing our long-term strategy. 🌿

◆ John Baines is a Vice-President of IES and Chairman of the PP4SD Programme Management Group. Further information about PP4SD can be obtained from its website at *www.pp4sd.org.uk*

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1 FORGE is a group of financial professions and institutions working together to produce guidelines and support on issues such as corporate social responsibility and sustainable development.

IMPROVING AIR QUALITY THROUGH LOCAL AIR QUALITY MANAGEMENT: A CRITICAL REVIEW OF BRITISH EXPERIENCE AND PRACTICE

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The Air Quality Management (AQM) framework in Great Britain is an effects-based, risk management process designed to provide a dynamic solution to public health issues associated with elevated concentrations of seven air pollutants. The statutory basis of the AQM process is provided by The Environment Act 1995, which required an Air Quality Strategy to be published by Government that introduced a series of air quality objectives in Regulations. The Act provides a framework in which national and local actions are required to identify and remediate areas of poor air quality. The Act places a series of duties and responsibilities upon local authorities to review and assess local air quality against air quality objectives set on the basis of best available epidemiological information. Local authorities are required to identify areas in which air quality objectives will be exceeded by a target date and to declare them as Air Quality Management Areas (AQMA). In such locations a local authority must develop an action plan detailing both the measures to be taken and the time scale for implementation in order that air quality is improved within the AQMA.

Local authorities began the process of review and assessment in 1998 and the first round of the process concluded in 2001, following which some 130 local authorities have AQMAs. Following the first round of the review and assessment process, elements of the framework were subjected to an evaluation and the essential elements of this process have been confirmed as fit for purpose. Local authorities are now embarking on a second round of reviews and assessments, which although the guiding principles remain the same, the implementation has been streamlined. This paper will briefly review the experiences of local authorities in undertaking the first round of review and assessment and reflect on some early indications relating to the implementation of Round 2. Finally the transferability of the process to other countries will be commented upon.

Introduction

The UK experience of air pollution has changed significantly since the smogs of the 1950s and 1960s (Longhurst *et al*, 2002). At that time, air pollution resulted from the widespread use of coal in industrial processes and for domestic heating. The Clean Air Acts of 1956 and 1968 addressed coal based air pollution, but new emissions sources and pollutants were increasing in significance with regards to effects on health. The most significant source change in Europe in the last 50 years has been the increase of traffic, both in terms of vehicle numbers and vehicle kilometres travelled. The resulting increase in complexity of emissions sources has led to a need for a new regime to control emissions from a variety of sources.

In 1990, the Government (DoE, 1990) introduced a new direction for air quality control building upon the existing technology-based controls by adding an effects-based, risk management approach through the formulation of a series of air quality standards (Longhurst *et al*, 1996). The new framework was termed Local Air Quality Management and was incorporated into the Environment Act 1995 (Part IV, Air Quality) , the primary legislation for the process of air quality management. The Act applies only to Great Britain[1]. The Act required the Secretary of State to publish a National Air Quality Strategy (NAQS) (DoE, 1997), outlining methods and targets to be pursued by Government based on health effects standards for eight pollutants. The NAQS was reviewed in 1998-99 to reflect developments in European legislation, technological and scientific advances, improved air pollution modelling techniques and an increasingly improving understanding of the economic and social issues involved. Government have described the purpose of the Air Quality Strategy as 'to make sure everyone can enjoy a level of ambient air quality in public places which poses no significant risk to health or quality of life' (DETR *et al*, 2000).

The Air Quality Strategy has set out a range of measures and policies to reduce emissions of regulated pollutants. Concentrations of lead, carbon monoxide, 1,3 butadiene are unlikely, to exceed objectives in the relevant year because of the measures and policies introduced nationally and enforced by government and its national agencies. In some industrial locations, sulphur dioxide, benzene (2010 objective) and lead exceedences may occur. However, in the case of nitrogen dioxide, PM_{10} and in some cases sulphur dioxide, local action is needed to complement and enhance the effect of national polices and actions. Such action is defined by the Act and Strategy as Local Air Quality Management (DETR *et al*, 2000). Section 82 of the Act required local authorities to undertake a review of local air quality and to assess the

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1 Northern Ireland introduced a bill in 2002 and intends to bring regulations into force in 2003. The bill in Northern Ireland is based on the experience in GB and in many aspects reflects the issues discussed in this paper.

likelihood of achieving a number of health based air quality objectives. The objectives are derived from the standards but take into consideration economic and other practical implications. Where air quality objectives are not likely to be achieved, local authorities are required to designate Air Quality Management Areas (AQMAs) and put in place action plans to improve the local situation. An Air Quality Objective specified in the Regulations[2] may be exceeded only when public exposure occurs. This is the heart of the risk management approach to Local Air Quality Management, for the process of review and assessment is designed to identify those areas where poor air quality coincides with public exposure.

Local authorities have now finished the first round of reviews and assessments[3] and those local authorities which identified a problem and designated an air quality management area(s) are currently undertaking the action planning stage of the process. This remainder of this paper is a brief review of the first round of air quality reviews and assessments and reflects on some of the issues and lessons learnt prior to the second round of reviews and assessments. In 2003, local authorities embarked on the second round of review and assessment, which is part of a rolling programme of review and assessments under a new annual reporting regime. See Defra *et al* (2003) for details.

Review and assessment: Round 1
The first aspect of the LAQM regime is a three-stage review and assessment of air quality in the local authority's area, whereby each stage of the process increases in depth and complexity, consistent with the risk of failing to achieve the air quality objectives. The first stage of the process is essentially a desktop study of emissions sources within, and impacting on, the local authority area. Stage 2 introduces screening models and interpretation of available monitoring data. Stage 3 is a complex modelling and monitoring exercise assessing air quality concentrations against the specified objectives. At each stage pollutants can be omitted from the process where it can be shown that the air quality objectives are likely to be achieved. On completion of a third stage review and assessment, and in areas where air quality objectives are predicted to exceed by their target date, an Air Quality Management Area (AQMA) must be designated. Where AQMAs have been designated, local authorities are required to prepare a written action plan identifying how

2   The Regulations incorporate the Air Quality Regulations 2000, the Air Quality (England) Amendment Regulations 2002 and their equivalents in Scotland and Wales.

3   Commenced with the issuing of guidance in 1998 with the assessment phase being largely completed by the end of 2001.

4   For more information on research currently being undertaken at the University of the West of England, Bristol, see *www.uwe.ac.uk/aqm/research*

the air quality objectives are to be achieved and improved upon in the designated area.

Review and assessment: Round 2
Defra commissioned an evaluation of Round 1 (Air Quality Consultants Ltd and AQM Resource Centre, UWE, 2002) and acting on the recommendations streamlined the approach for Round 2. Local authorities are now working within a two step process designed to identify those matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective being exceeded (Defra *et al*, 2003). The first step of the process is an Updating and Screening Assessment, which is undertaken by all local authorities. This is based on a checklist to identify those matters that have changed since the first round was completed, and which may now require further assessment. Changes may include new monitoring data, new objectives, new sources, significant changes to existing sources or other local changes that may affect air quality. Where an updating and screening assessment has identified a risk that an air quality objective will be exceeded at a location with relevant exposure, the authority will be required to undertake a Detailed Assessment. The aim of the Detailed Assessment, which is comparable to Stage 3 in the first round of review and assessment, is to identify with reasonable certainty any further exceedence of an air quality objective, or conversely whether an existing AQMA needs to be amended or revoked.

Support mechanisms for local authorities
Following publication of the NAQS, local authorities expressed concern about the lack of necessary tools or indeed expertise to undertake their AQM responsibilities effectively. Central government responded by making available national resources including guidance documents, Internet based information including monitored data, emissions inventories, and telephone and email help desks.

Methods
Data presented here are from work undertaken by the authors for Defra and the devolved administrations (AQC Ltd and AQMRC, 2002) and also research results from a five-year programme examining the implementation of the Environment Act Part IV by urban local authorities in England[4]. The survey work is designed to identify, track and evaluate capacity in local authorities to manage local air quality. The methodology allows both technical (e.g. modelling, monitoring) and managerial (e.g. communication strategies, consultation, policy integration and joint working) capabilities to be considered. The surveys have included environmental professionals, who have been responsible for pollution legislation within local

authorities and are, in most cases, co-ordinating their air quality management efforts, as well as other local authority professionals. For a fuller description of the methodology used, see Beattie *et al* (2001b).

Results

AQMAs designated

Annual mean nitrogen dioxide (NO_2) is the objective for which most exceedences are predicted[5]. There is also widespread exceedence of the short-term PM_{10} objective. Over 95% of AQMAs are designated as a result of traffic emissions. Four of the seven regulated pollutants are predicted to remain below their objective concentrations or to have no exceedences in areas of public exposure, and only predicted exceedences of the sulphur dioxide (SO_2) objectives will require a small proportion (5%) of authorities to declare AQMAs other than for nitrogen dioxide and particulates. Those AQMAs to be declared as a result of SO_2 are due to industrial point source emissions, or combinations of emissions from a number of such point sources, or other sources such as shipping.

Local authority practice

The results of the questionnaire surveys show a gradual increase in the technical capabilities of local authorities for undertaking air quality management. By 2001, all urban local authorities were undertaking some form of monitoring with the pollutants monitored reflecting those causing greatest problems in achieving the air quality objectives. Local authorities' modelling work has increased from just 5% doing some sort of modelling in 1994 to 99% undertaking modelling in 2001. Questionnaire surveys have shown that some 50% of local authorities have an internal group working on air quality and that the majority are engaged in regional working on air quality management. Regional working is undertaken on policy and technical issues.

Studies of outside agencies in the review and assessment process show that health authorities now give health advice relating to air pollution whilst the Environment Agency, which regulates large industrial sources in England and Wales, has in some areas taken a proactive approach to managing air pollution sources in its jurisdiction. Throughout the four years of the survey its input into local air quality management has remained static. Over 90% of Environment Agency respondents had supplied information to local authorities even in 1998. The Highways Agency, which oversees the management of motorways and trunk roads in England and Wales, has had less involvement. The Highways Agency as a whole had little previous knowledge or expertise in air quality. Many exceedences of the air quality objectives are caused by Highways Agency sources and, with little involvement in the management, solutions will be difficult to secure by the deadline.

Discussion

Local authorities have gained capacity and confidence in the review and assessment process having started from a heterogeneous position. In most cases local authorities have discharged their functions in an effective and efficient manner. Surprisingly however, the survey evidence points to a series of managerial as opposed to technical difficulties being faced by local authorities. Difficulties have been reported in policy integration and communication within local authorities. Questionnaire surveys have shown that local authorities do not appear to have the capability to manage air quality issues between local government departments. There have also been problems in communicating the outcomes of the review and assessment process to the public.

Local authorities have made substantial progress in managing a complex and dynamic atmospheric environment against a legislative framework that has seen substantial changes since its inception. Government guidance issued for the process is intended to provide consistency by way of specifying the minimum expectations for the AQM process. However, survey data has illustrated a divergence in capability and achievement in LAQM practice within urban local authorities in England. A related study investigating rural local authorities has shown urban areas to be in advance of rural authorities, suggesting an even greater divergence in practice between local authorities in the UK. A number of reasons may have caused this divergence, notably the greater experience of urban authorities in addressing more acute air pollution problems. Rural authorities, in contrast, are more financially constrained and have a potential absence of historical air pollution monitoring and modelling data and officer capability. With AQMAs being declared in smaller, rural locations these constraints are likely to hinder the subsequent action planning process.

The amended time-scale for reviewing and assessing air quality has caused problems for integrating air quality objectives into transport planning processes, one delivery mechanism for solutions to identified problems. The UK has, over the time-scale of the first round of reviews and assessments, experienced a rapid change in relation to transport policy. Local Transport Plans (LTPs) replaced the former Transport Policy and Programmes (TPP) system for allocating resources for local transport capital expenditure. The first complete round of LTPs was completed in July 2000. The LTP process bids for funding for the next five years and in many cases the reviews and assessments were not completed in time[6].

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5   An up to date record of declared AQMAs can be found at
    www.airquality.co.uk/archive/laqm/laqm.php

6   There are parallel processes being implemented within the
    Devolved Administrations and London.

Approach for Round 2 and conclusions on the British approach

Some of the difficulties discussed above have been addressed by the change in emphasis for Round 2. The divergence in local authority capacity (Ing *et al*, 2001) has been addressed by a prescriptive approach to government guidance. Local authorities supported this change. Reporting time scales have also been adjusted with a schedule now in place up to 2010.

Local authorities are at the stage of writing and implementing action plans following designation of AQMAs. The review and assessment process up to designation has been mainly a scientific process, although collaboration has been required with other departments and outside agencies, particularly for information such as traffic and health data. However, as local authorities move into implementing solutions through air quality action planning, the collaborative aspects of the process will be central to the success of air quality management.

Conclusions and implications

Evaluation of the evidence presented here suggests that the LAQM process in Great Britain is an effective one, worthy of adoption by other nations. The AQM process in Great Britain is characterised by health-effects based objectives and a risk management approach. It provides a model against which other industrial states could evaluate their existing procedures. Clearly no system of environmental management is directly transferable between different countries without adjustment for local circumstances, history and philosophy. The air quality management process is no different. However, there are certain elements that are judged to work well. These include national support actions for local authority review and assessment such as training, internet support, help desks, prescriptive guidance and a high quality national monitoring network. The existence of a technical consensus about the way in which guidance for review and assessment should be implemented is a significant contributory factor to the success of the British system. In addition to the formal technical guidance commissioned and issued by Government, organisations such as the National Society for Clean Air and Environment Protection provided informal guidance on aspects of the process and this was supported by training activities. Important to the success of these activities was the support of Government for the approach being taken.

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MANAGING THE IMPACT OF VEHICLE EMISSIONS IN URBAN AREAS FOR THE PURPOSE OF LOCAL AIR QUALITY MANAGEMENT

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Road transport is a major source of local air pollution particularly in towns and cities. Road traffic accounts for over half of the emissions of nitrogen oxides (NOx) and over 75% of the areas identified as at risk of failing to meet air quality targets. Local authorities in Great Britain (England, Scotland and Wales) have completed statutory review and assessments of air quality. Some 129 local authorities have identified a risk of one or more air quality objectives being exceeded by a relevant date specified in the Air Quality Regulations, 2000. In such locations, air quality management areas (AQMAs) have been designated. In most cases, AQMAs are designated because of the impact of vehicle emissions of nitrogen dioxide (NO_2) and particulate matter (PM_{10}). Having designated an AQMA a local authority is under a duty to prepare an Action Plan to address the air quality problems found.

National policy responses include regulatory measures to reduce vehicle emissions and improve fuels, tax based measures to encourage the supply and use of cleaner fuels and vehicles and the development of an integrated transport strategy that supports sustainable development. However, national measures alone have been insufficient to reduce air quality impacts. Additional local measures are required if air quality objectives are to be met.

This paper will critically review national and local measures being introduced in the UK and the outcomes of the national review and assessment process to assess the likelihood of air quality objectives being secured in areas where road transport is the major contributor to air quality exceedences.

Introduction

Prior to the 1990s, air pollution was regulated on a reactive basis (Beattie et al, 2000). In 1990 the UK Government issued a White Paper This Common Inheritance (Department of Environment, 1990), introducing a new strategic framework for controlling emissions and improving local air quality in Great Britain (Elsom et al, 2000). This approach introduces the concept of an AQMA as a designated zone for air quality improvements.

The designation of air quality management areas (AQMAs) is a statutory requirement of air quality legislation in Great Britain, where specific air quality objectives are predicted to be exceeded by certain target dates (Beattie et al, 2001). The spatial location of AQMAs reflects the distribution of population within the GB space, with the less densely populated (and thereby less trafficked) administrative areas of Scotland and Wales having proportionately fewer AQMAs. This is also due to lower background concentrations of air pollutants experienced within the northern and western regions of GB, with the exception of urban centres where background concentrations of NO_2 and PM_{10} from vehicle traffic is elevated (Woodfield et al, 2003a).

NO_2 is the pollutant for which most AQMAs are designated in GB (see table 1, Woodfield et al, 2003b), with predicted exceedences of the NO_2 annual mean objective requiring more than 75% of declaring authorities to do so for traffic emissions. A further 20% of AQMAs will see traffic emissions contribute to predicted exceedences.

Table 1. Emission source responsible for air quality objective predicted exceedences

Emission source(s)	% of local authorities
Traffic only [a, b]	74
Traffic mainly (minor contribution from industry) [a, b]	12
Traffic [a, b] and industry [b, c]	5
Industry only [b, c]	4
Traffic [a, b] and construction emission source [b]	1
Traffic [a, b] and domestic source [c]	1

a NO_2 objective(s)
b PM_{10} objective(s)
c SO_2 objective(s)

Local authorities across GB are therefore paying particular attention to the transport solutions to resolve the air quality challenges faced. To date, local authorities have been advised on air quality management, transport planning and land-use planning through national strategies and guidance (DETR et al, 2000; DEFRA and Welsh Assembly Government, 2002). However, national policy measures have struggled to address the air quality consequences of the growth in vehicle numbers and mileage travelled. The policy challenge is illustrated by

the scale of growth in the number of cars registered in the UK, which increased from 17.4m to 26.7m between 1986 and 2000. Today some 82% of journeys by mileage are made by car, demonstrating a clear need for national and local policy to address this increasing reliance on the car. The difficulty for governments, central and local, is to balance public expectations of personal mobility and accessibility with a clean atmosphere that poses no significant risk to public health (Longhurst, 1996).

Methods

The method used in this paper is one of critical evaluation of primary and secondary sources. Refereed and grey literature is considered. In addition primary data from questionnaire surveys, telephone interviews and case studies are used.

Data are presented from a number of research projects undertaken by the Air Quality Research Group, UWE and also from local authority scientific assessment reports and the AQMA Archive and database maintained by the Air Quality Research Group, on behalf of Defra and the devolved administrations.

Results

Early transport policy in GB was more concerned with how to simply accommodate traffic in towns, with a report on *Traffic in towns* published in 1963 (HM Government, 1963). Sustainable principles of managing and reducing traffic impacts were not then fully appreciated. Indication of an emerging sustainable transport policy came in 1997, with a Royal Commission on Environmental Pollution Report (Royal Commission on Environmental Pollution, 1997) focusing on a need to address congestion and travel behaviour (Bamford, 1998). The main points of the Report were:

◆ that fuel consumption of cars must be reduced;
◆ permitting of heavy lorries on motorways to be introduced;
◆ tighter EU limits for new vehicle emissions;
◆ fuel prices to be raised by more than 6% per year;
◆ local councils should be able to charge for road use;
◆ improved provision of access into towns and cities for cyclists and buses; and
◆ greater integration of transport and land-use planning.

Following the publication of the report, the UK government published various White Papers and introduced legislation to address key transport issues, including *A new deal for transport: better for everyone* (DETR, 1998a), the Road Traffic Reduction Act 1997 (HM Government, 1997). The Auto-Oil programme has, over the last decade, worked to reduce emissions from vehicles, having a demonstrable impact on reducing emissions over the last decade (Longhurst *et al*, 2002).

More recently, within urban and congested areas the attention has focused on how to reduce the number of vehicles on the roads and reducing the demand for specific road space. Proposals for local authorities to charge vehicle users for using certain roads have emerged, and central government has provided local authorities with powers to emission test vehicles on a proactive basis (Longhurst *et al*, 2002).

Reducing emissions from road vehicles involves either specific emission control measures or traffic management measures, or indeed a combination of the two. In terms emission control measures, examples are 'end of pipe' technology (e.g. fitting particulate traps to vehicles), the use of alternative fuels (such as LPG, methane or hydrogen) or the enforcement of emissions standards (e.g. through the use of Low Emission Zones). Transport management measures involve a whole range of public transport improvement measures, parking permitting and measures to reduce overall travel time (Mediavilla-Sahagun *et al*, 2003). At a national and international level, telematic technology is linking urban traffic control systems with air quality management systems (Elsom, 2002), to look at electronic charging, driver communication and other such strategies.

Local action to reduce traffic congestion and impact from traffic emissions in areas of impoverished air quality requires collaboration between Local transport planning departments, environmental health departments and external agencies. Beattie et al, (2002) reports on the lack of involvement of the Highways Agency (the agency and operator of the major trunk road network, including all motorways, in England) with respect to pollution hot spots identified by local authorities. Fifty-six per cent of local authorities envisaged requiring assistance from the Highways Agency to deliver their action plan. Action on the part of local transport planners was much more advanced however, with transport planners taking a lead in implementing action plans in some local authorities.

With many local authorities having submitted action plans, and many more in the process of being developed, local authorities are investigating the potential effectiveness of transport measures in delivering air quality improvements. Measures being considered are road pricing initiatives and Low Emission Zones (Carslaw and Beevers, 2002), particularly within London, and management techniques such as High Occupancy Vehicle (HOV) lanes and vehicle prioritisation schemes (Beattie *et al*, 2002).

Source apportionment is a requirement of an action plan, so as to ensure actions and measures are targeted at the most significant emission sources (Defra *et al*, 2002). Local authorities are also required to consider the effectiveness of potential actions and measures in terms of

the air quality improvement afforded, cost-effectiveness, practicality and perceptions and wider (non-air quality) impacts such as impacts on noise, visual amenity, social equity and sustainability (Defra and Welsh Assembly Government, 2002; NSCA, 2001). Where traffic management options, in addition to those proposed in Local Transport Plans, are proposed to improve local air quality, other local policies must be considered such that wider and unintended socio-economic and environmental impacts are minimal.

Local transport plans, for many local authorities, are the most effective mechanism for implementing actions to reduce air quality problems. Traffic management schemes, where priority is increased for buses, cyclists and non-car modes are local policy measures anticipated to assist with many of the pollutant hot spots. Where emissions from the motorway or trunk road network have led to localised pollution hot spots, regional and national policy, rather than local policy, is more likely to impact upon air quality. Speed controls, demand management and junction configurations all play a role in affecting the speed, composition and flow of the traffic, none of which can be influence through local government policy alone.

Traffic congestion was identified as exerting the greatest influence on the AQMA decision-making process within local authorities (Woodfield *et al*, 2001b), and air quality improvement was considered to be a key additional benefit from finding solutions to local transport problems.

Discussion

Historically, transport policy was less concerned about the potential for traffic-related emissions to impact on health and well-being and more concerned with the physical constraints imposed in towns and cities as the popularity of the motor car increased. In more recent years, the urgency to manage increasing levels of car usage, dependency and miles travelled have led to numerous policy developments, nationally and locally. Transport is widely recognised as a significant and increasing source of air pollution and impact on human health, with the link between air quality and health underpinning the National Air Quality Strategy (DETR *et al*, 2000) and the specific pollutants for which air quality standards and objectives are set.

The success and effectiveness of action plans will require integration of various policy packages (Beattie *et al*, 2002). Funding schemes for action planning measures to be executed are important for effective implementation and a reduction in pollutant concentrations. Much of the financial assistance is likely to be provided through a local

transport bidding process the Local Transport Plan in the short term. These work on a five-year cycle, with local authorities bidding for funding, although the longevity of the systems is in doubt. More recently, Government has speculated that action plans for air quality may not be required by all local authorities with AQMAs, with those local authorities with issues relating to local traffic being incorporated into Local Transport Plans[1].

Local government needs to develop air quality strategies, to ensure that all aspects of local government planning policy considers the potential impact on local air quality (Beattie *et al*, 2001).

Conclusion and implications

If reducing emissions from road vehicles involves either specific emission control measures or traffic management measures (as mentioned), or more likely a combination of the two, then this requires policy integration at the national and local level. In the short to medium term, advancements and developments in vehicle and fuel technology are assisting with an overall reduction in total emissions. Future developments, by way of hydrogen fuel-cell engines and other such technical fixes, for example, will provide solutions to some of our problems. However, local policy implementation will have to be more effective to deliver solutions to address the specific pollution hot spots in the short to medium term for delivering the air quality objectives across Great Britain. Cleaner, quieter vehicles may be in use, but until congestion is reduced and travel behaviour changes more radically, towns and cities will remain choked, noisy and potentially unhealthy environments for future generations to experience.

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THE LINK BETWEEN LEARNING, TEACHING AND RESEARCH IN THE ENVIRONMENTAL SCIENCES IN HIGHER EDUCATION

JENNIFER BLUMHOF

considers the research-teaching nexus in higher education

Investigating a link between learning and teaching and research in the environmental sciences in Higher Education highlights the problem so admirably described by John Passmore (1974) in the early 70s as being 'forced to slosh around in the ooze that is interdisciplinary studies'. Not only are you presented with the problem of defining what is research and considering the many typologies (see details in Healey, Blumhof, Thomas 2003), not only are you presented with the arguments that surround definitions of 'teaching' (Biggs 1999) but you are also faced with the complex nature of environmental science itself.

This complexity was well rehearsed in the work of the Subject Benchmark Panel for Earth Sciences, Environmental Sciences and Environmental Studies (Quality Assurance Agency (QAA) 2000) (ES³) and culminated in the production of a Venn diagram to try and illustrate what the panel thought the contributing disciplines and sub-disciplines were and how they related to each other. In the end the diagram was not included in the statement but the vigorous debates it occasioned highlighted the slippery nature of trying to define the nature and boundaries of the discipline(s) (Eastwood and Blumhof 2002). The panel had to accept that it had a 'wide remit, ranging from the scientific study of the physical characteristics and environmental systems of the Earth, to the social and political issues of human relationships with the environment' (QAA 2000 page 2). This wide remit spanning the 'hard' and 'soft' sciences asks questions of environmental science's position in relation to the argument posed by Feldman (1987):

'that there is some evidence that stronger relationships between research and teaching exist in so-called 'soft' disciplines, such as humanities and social sciences, than in 'hard' ones, such as natural sciences.'

Whether Feldman's assumption is correct is debatable. What is clear is that it is at Departmental or even Programme level that the dominance of one paradigm or another is evident, giving a very mixed picture of the research-teaching nexus in the discipline as a whole.

Despite the 'hard' science 'soft' science (continuum or dichotomy?) and the practical applied or discovery research continuum that is so much a feature of environmental sciences, the Benchmark Panel believed that ES³ Programmes share the following important features:

◆ most tuition has an **holistic, multi-disciplinary and inter-disciplinary** approach;

◆ the integration of **fieldwork, experimental and theoretical investigations** underpins much of the learning experience in Earth and environmental sciences, but may be less significant in, but not absent from, courses in environmental studies;

◆ **quantitative** and **qualitative** approaches to acquiring and interpreting data;

◆ examination of the exploration for and exploitation of, physical and biological resources in the context of **sustainability** (QAA 2000).

The importance of research and for students to experience a 'research rich' environment is evident and this was further highlighted in the Graduate Key Skills that the Panel argued should be developed in ES³ degree programmes. In particular the 'intellectual' and 'practical' skills could have been renamed 'research skills'. As was stated, 'Research and scholarship inform curriculum design of all ES³ programmes. Research-led programmes may develop specific subject-based knowledge and skills.' (QAA 2000 page 6)

Using the typologies described in the Link project report *Knowledge production and the research-teaching nexus: the case of the built environment disciplines* the research-teaching nexus in environmental sciences can be:

◆ 'research-led in the sense that the curriculum is structured around subject content' (as is the case in many final year modules designed to reflect the research interests of members of staff and final year project titles focused on research interests).

◆ research orientated in the sense that the curriculum places emphasis as much on understanding the processes by which knowledge is produced (as evidenced by the emphasis given to the development of skills in ES³ Eastwood and Blumhof 2002). Veronica Edmonds-Brown's case study of the use of Pymmes Brook, North London, as a resource and tool in pollution and monitoring modules is an example of how research skills are

developed in the field by final year environmental science students:

http://www.gees.ac.uk/linktr/EdmundsBrown.htm

◆ research-based in the sense that the curriculum is largely designed around inquiry based activities (as evidenced in the development of problem-based learning and a case study approach Blumhof and Hall 2001 and Honeybone, Blumhof and Hall 2002). At the University of Hertfordshire, first year Environmental Science students have engaged in a problem-based case study (The Broadland Case Study) focused on a real-life real-time problem. The importance of investigative skills and the research process is emphasised.

◆ research-informed in the sense that it draws on systematic inquiry into the teaching and learning process itself. The LTSN-GEES New Teachers Workshops that have run for the last three years with participants from all three GEES disciplines are testament to the interest in learning and teaching theory and practice.

At present there are areas for development but also some unknowns. Though the nexus is multifaceted and arguably embedded in environmental sciences it is not necessarily made explicit and this is clearly an area for development. Additionally, the growing strength of the professional bodies and particularly the independent umbrella body for environmental professionals, the Society for the Environment (at present working to provide an internationally recognised professional qualification for environmental practitioners – Chartered Environmentalist) is going to affect the 'shape' of the nexus, though how is not as yet clear. It is also not clear as yet what will be the long-term effect of the fall-out from the last Research Assessment Exercise and the negative effect this has had on many environmental science programmes, though some go from strength to strength.

Finally, the potential research-teaching divide posed by the White Paper, *The future for higher education* (DfES 2003) raises more uncertainties for environmental science but has also been a catalyst for deep thinking about the research-teaching nexus and the chance to strengthen both. LTSN-GEES offers opportunities, through a whole range of staff development activities, and it is this support that a discipline under pressure needs.

The analysis is mine and does not necessarily reflect the view of the whole of the environmental science community.

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◆ Jennifer Blumhof, Division of Geography and Environmental Sciences, University of Hertfordshire (Senior Advisor for Environmental Sciences Learning and Teaching Support Network Subject Centre for Geography, Earth and Environmental Sciences and Honorary Secretary IES). This article is reprinted by kind permission of Planet (The Journal of the Learning and Teaching Support Network Subject Centre for Geography, Earth and Environmental Sciences (LTSN-GEES)) See Planet December 2003 Special Edition 5 and please note the main article The Research-Teaching Nexus in Geography, Earth and Environmental Sciences by Mick Healey, School of Environment, University of Gloucestershire with Jennifer Blumhof, Division of Geography and Environmental Sciences, University of Hertfordshire and Neil Thomas, School of Earth Sciences and Geography, Kingston University.

SUSTAINABLE DEVELOPMENT IN EDUCATION AND SKILLS

ABHISHEK SHARMA,

Studentforce project worker for the Institution of Environmental Sciences, reports on two important conferences on Sustainable Development

Sustainable Development (SD) has emerged as a new paradigm of development, integrating economic growth, social development and environmental protection as interdependent and mutually supportive elements of long-term development. The 2002 World Summit on Sustainable provided renewed impetus for action on SD both internationally and nationally, the latter of which has caused a tremendous surge of interest of late, especially in its application in Education and Skills sector in the UK. Charles Clarke, the Secretary of State for Education launched a draft Action Plan for Sustainable Development in Education and Skills on 23rd September in Leicester. As a follow-up, he also gave a strong commitment to implementing Action Plan at a conference – Sustainable Development in Education and Skills, funded by the Learning and Skills Council (LSC) – in November in Congress House, London (document available from *www.dfes.gov.uk/sd/action.shtml*)

These recent developments have meant that many in education, NGOs and professional institutions have expressed their interest and engagement, not least due to the fact that this is an unprecedented occasion in which the DfES has sought to engage itself in the sustainability imperative in such a pro-active manner. Although this can be partly attributed to the United Nations Decade of Education and Sustainable Development, which will run from 2005 to 2015, and to which the UK government has pledged commitment to its success, 'the speed and urgency of the draft, consultation and launch of the action plan is not unconnected to a select committee report published in July 2003 (following wide-ranging consultations with members of the government, NGOs education providers) by the The Environment Audit Committee (EAC), on the role of the DfES in Education for Sustainability' (Martin, S and Martin, M, 2003). At the launch of the report, Joan Walley MP, chair of the EAC sub-committee, which conducted the enquiry said: 'Education can be a significant drive for change but the DfES has been slow to grasp its key role in underpinning the Government's sustainable development strategy and ensuring that Education for Sustainable Development (ESD) is integrated into life long learning.'

Following various sets of recommendations and conclusions proposed by the EAC, the DfES Sustainable Development Action Plan for Education and Skills was drafted and launched and the very public commitment to the plan advocated by Charles Clarke at the Congress House conference was attended by professionals from various walks of life, including practitioners, managers, policy-makers and other education and training professionals from across the learning and skills sector, including schools, colleges, local education authority and higher education institutions. Sir Geoffrey Holland from the Learning and Skills Development Agency chaired the event, and the key speakers also included Caroline Neville, Director of Policy and Development from the Learning and Skills Council (LSC).

The conference provided an opportunity to hear the government's vision for sustainable development education. Alongside formal key sessions, the attendees were also given an opportunity to participate in a discussion forum, where the issues arising from the discussion groups were highlighted and put forward to the key speakers to respond to.

Charles Clarke said the DfES has significant impact on the social and economic aspects of sustainable development in England through its core business of raising educational standards and improving skills, including education for sustainable development. The recent developments recognise that every one of us, whether at home, in the workplace or in the wider community makes decisions that impact on consumption and production of resources. How we interact with the natural and physical resources of Earth is of critical importance if we are to achieve a better quality of life in the future. DfES has recognised that effective engagement with such issues can only be achieved through capacity building via education in sustainable development.

The Secretary of State provided an overview of the Action Plan, in terms of support to the education providers to operate in a more environmentally sustainable way, and ensuring that people engaged in learning are given the opportunities and inspiration to think about and really appreciate their role as world citizens. The DfES Action Plan is organised around four objectives:

◆ Education for sustainable development.
◆ The environmental impact of the DfES and its partner bodies.
◆ The environmental impact of the education estate.
◆ Local and global partnership activity.

Charles Clarke also stressed that the plan is not a bureaucratic add-on, but is aimed at promoting local activity, and forms an integral part of the skills development of this country and its economy. The intention is to encourage and support schools and other educational institutions to develop coordinated ways of teaching about and implementing sustainable approaches.

Caroline Neville provided an overview of the emerging LSC strategy for meeting the DfES Sustainable Development Action Plan for Education and skills and highlighted the key messages for the sector arising from the experience of Learning to Last Projects. The LSC reiterated its pledge towards commitment to ensuring that sustainable development is integrated into its policies and practices. Ms Neville also stressed that the LSC was committed to focusing on sustainable development as a priority area for the post-16 education and training sector in terms of learning and skills, responsible estates management and building effective partnerships. 'There has been a lot of good work already done by the LSC and partner organisations but now is the time to join up and make a lasting difference,' she said. 'The action plan gives us a starting point but that shouldn't be all we do. The LSC wants to champion sustainable development and encourage networking, ideas and above all, action.'

The conference also marked the launch by the LSC of a new online resource aimed at providers of education and skills training – the 'learning to last' toolkit – a website showcasing 11 projects funded by the LSC where colleges explored integrating sustainable development into the curriculum. This is a practical resource, which will help institutions set up, manage and evaluate their projects (*www.lsda.org.uk/sustainable/toolkit/*) .

The Learning to Last projects, which focus on the need to integrate sustainability principles and practices into all aspects of post-16 education and training, were also discussed. The projects have involved neighbourhood renewal, curriculum development, management and procurement issues and local economic development. One of the projects, 'Greening the Curriculum' in St Helens, Merseyside, where themes from sustainable development were related to programmes of study, was also presented at the event. Some of the themes of the project include catering students being taught about fair trade coffee and organic farming while business students learnt of corporate social responsibility (CSR) and multinational corporations. This was all in addition to various estates management measures already underway such as reducing water use, the use of locally sourced produce and environmentally friendly forms of transport to college.

The LSC also spoke about the establishment of an external Advisory Partnership Group to facilitate the development and delivery of a strategy for sustainable development. These partners include: Forum for the Future, LSDA, Association of Colleges, Council for Environmental Education, Sector Skills Development Agency, Environmental Association for Universities and Colleges, Higher Education Funding Council for England, Development Education Association and Black Environmental Network. Many of these groups have already worked together during the 'learning to last' projects

and will build on that work to help the LSC further.

The commitment of the Education Secretary to deliver the planned actions on this critical agenda was welcomed by many in the learning and skills sector. Stephen and Maureen Martin, in their paper *Education for Sustainable Development*, argue however that the success of these actions will only come about if there is a clear and unambiguous recognition that the action needs:

i. effective partnerships with other organisations;
ii. a change in behaviour and attitudes;
iii. sufficient capacity;
iv. effective targeting of existing and future resources;
v. increased and sustained emphasis by everyone in the government that sustainable development is of critical and unavoidable importance to us all as individuals, business, societies, and as a species.

Moreover, as well as setting out clearly the strategic/policy context, they argue that it will be important to set out some clear operating principles as critical success factors for the plan including:

i. Inclusiveness. Successful implementation will only be achieved through an inclusive approach to action. Any hint of an 'exclusive' relationship between the department and one or more NGOs or other agencies will reduce the effectiveness of the plan.
ii. Systems approach. Successful implementation (and integration) requires recognition that we are dealing with highly complex issues and that logic alone is an inadequate means to deal with sustainable development. This is because there is no simple cause and effect relationship. Systems thinking looks at the complicated pattern of multiple causes and relationships that make up a whole, and can simplify by taking multiple partial views or perspectives.
iii. Capacity building. There is insufficient experience and learning about sustainable development in many education and training organisations. There will need to be a huge initial push on capacity building in all sectors if we are to achieve significant change from the action plan.
iv. Monitoring and evaluation. Successful evaluation will only come from clearly defining the temporal and spatial dimensions of the action plan. There will also be a need to define what trade-offs there are between the need for sustainability and other desirable goals (such as economic growth) of the various actions. And how should we define a sustainable university, college or school or indeed a government department?

THE INSTITUTION OF ENVIRONMENTAL SCIENCES

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IES NEW MEMBERS

The Institution is pleased to welcome the following new members (with membership numbers in brackets):

Miss V Johnston	Chemist, SEPA (2361)
Miss S Laidlaw	Environment Protection Officer SEPA (2362)
Mrs R Neilson	Trace Organic Chemist, SEPA (2363)
Dr H Trevallion	Assistant Environment Protection Officer SEPA (2364)
Dr EL Spence	Senior Environmental Consultant Atkins Global (2365)
Mr D Muir	Senior Scientific Officer Bristol City Council (2366)
Dr RA Barnes	Independent Consultant (2367)
Mr CD Haigh	Principal Consultant Entec UK (2368)
Dr DJ Hall	Chairman & Director of Research & Consultory Services Envirobods Ltd (2369)
Mr DL Hall	Consultant, Entec UK (2370)
Mr K Morris	Manager, Environmental Affairs British Airways (2371)
Dr S Vardoulakis	Project Development Officer Sussex Air Quality Steering Group (2372)
Mr NB Jenkins	Pollution Officer Brighton-Hove Council (2373)
Mr WF Pegram	Landscape Architect Aylesbury Vale Council (2375)
Dr DO Harrop	Managing Director BMT Cordah Limited (2376)
Dr AK Namdeo	Senior Research Fellow Institute of Transport Studies (2377)
Mr IR Sims	PhD Student WRC – NSF (2378)
Mr A Owoeye	Technical Support Engineer Comshare Ltd (2379)
Mr TC Dukes	Authorisations Officer Environment Agency (2380)
Mrs HD Andrews	Environmental Scientist ARUP (2381)
Mr KH McKenna	Environmental Scientist AEC UK (2382)
Mr EC Adams	Senior Environmental Engineer Parsons Brickleford (2383)
Mr DW Jones	Principal Environmental Engineer Cheshire County Council (2384)
Mr R McDermott	Scientist – Chemistry Department SEPA (2385)
Ms FH Logan	Hydrologist, SEPA (2386)
Mr C Mason	Senior Consultant Halcrow Group (2387)
Mr MC McMullan	Senior Environmental Planner Mott MacDonald (2389)
Ms AM Sheridan	Environmental Consultant BRE UK (2390)
Mr GT Walker	Policy Development Officer (Waste) SEPA (2391)
Dr EJ Morrey	Senior Fire Research Scientist QuinetiQ, UK (2392)
Ms VL Sykes	Senior Environmental Consultant Atkins Global (2393)
Mr J Riggal	Environmental Consultant Subadra Consulting Ltd (2394)

Mr RI Pettigren	Environment Protection Officer SEPA (2395)
Mr JDG Carlyle	Director of Sales – Measurement Division, Casella Group Ltd (2396)
Mr MK Cheng	Enviromental Engineer Hip Hing Construction Co Ltd (2397)
Miss SM Scott	Air Quality and Noise Consultant Scott Wilson (2398)
Mr D Walters	Pollution Control Officer Northwarks Council (2399)
Miss JL Huntley	Environmental Scientist Wardell-Armstrong (2400)
Dr HE Stewart	Air Quality Information Scientist Environment Agency (2401)
Mr SG Hoskin	UK Sales Supervisor, ET UK (2402)
Mr AR Bean	Environmental Consultant Hyder Consulting (2403)
Miss CI Beattie	Research Associate University of West England (2404)
Mr RA Hannaby	Ambient Team Leader, Air Quality Group Watercare Services Ltd (2405)
Mr P Wright	Environmental Consultant Wright Environmental Services (2406)
Mr GD Mahoney	Air Quality Manager Sefon Council (2407)
Dr IL Gee	Research Fellow, Manchester Metropolitan University (2408)
Ms PJ Moys	Noise and Air Pollution Manager Suffolk Council (2409)
Mr RJ Anderson	Senior Environmental Engineer Alcan UK (2410)
Mr TW Lewis	Environmental Protection Officer Huntingdonshire Council (2411)
Mr E Mowat	Environmental Team Leader LDG Grampian Soil Surveys (UK) Ltd (2412)
Mr DJ Garvey	Project Environmental Engineer ARUP (2413)
Mr CJE Heather	Career Grade Planner Cheshire County Council (2414)
Mr GM Bollan	Senior Consultant, Air Quality Atkins Environment (2415)
Dr NC Courthold	Environmental Monitoring Technical Officer (2416)
Mr R Barrowcliffe	Partner and Head of Air Quality ERM (2417)
Mr C Gall	Environmental Protection Officer SEPA (2418)
Mr R Odle	Postgraduate Student University of Greenwich (2419)
Ms F Murphy	Environmental Quality Officer SEPA (2420)
Ms M Hackman	Senior Air Quality Advisor Highways Agency (2421)
Dr D Broomfield	Technical Manager Enviros Consulting Ltd (2422)
Mr D Mounsor	Operations Manager Enviro Technology Services Plc (2423)
Dr C Holman	Senior Associate Peter Bretts Associates (2424)
Ms L Beaumont	Env Control Officer Sedgefield Council (2425)
Mrs J Ferrari	Environmental Consultant Symonds Group Ltd (2426)

IMPROVING COMMUNICATION BETWEEN LEARNED SOCIETIES CONCERNED WITH THE EARTH AND ENVIRONMENTAL SCIENCES

Consultations are under way about improving communications between the learned societies concerned with the earth and environmental sciences.

Discussions were initiated by the Geological Society of London in March last year and continued at a meeting in November where the following were represented: the Royal Geographical Society, Royal Meteorological Society. Mineralogical Society, IMAREST, Geological Society of London, Estuarine and Coastal Science Society, British Hydrological Society, Institution of Environmental Sciences, Geologists' Association, the Micropalaeontological Society, Society for Underwater Technology, Challenger Society for Marine Science and the British Geomorphological Research Group.

The aim is to improve links between societies within the association and between those societies and the outside world. Individually, the small societies do not have sufficient resources for effective communication with all the other societies in the group, for responding to or communicating with government, research councils and the media, for sustaining and developing international links, and for supporting initiatives in education. This division causes particular difficulties in representing the importance of earth and environmental sciences.

The vision of the association is centred on a website, maintained and updated by just two part-time employees – an executive officer with broad interests across the earth and environmental sciences and an administrative officer. The website would include:

◆ An introduction and an accessible web link to all participating societies in the association, with a brief description of their scope.

◆ A calendar section where all of the meetings of the societies would be entered for the purpose of disseminating information to as wide a community as possible about any relevant forthcoming meetings.

◆ A section devoted to generation of new meetings, where ideas for future interdisciplinary meetings could be posted by potential convenors.

◆ Discussion pages, accessible to all members of the societies in the association.

The admin officer would be responsible for maintaining the website, updating it with new material and maintaining correspondence via e-mail with designated contacts in the member societies. The executive officer would have a more proactive role, maintaining contact with critically important individuals with particular skills or interests.

Materials for the noticeboard section of the website would be contributed by contacts in individual societies, while material for discussion pages could be submitted by any member of the societies involved through the society contact. The website content would then be updated by the admin officer.

The association would register its interest in receipt of requests for comment, and a brief summary of the content would be placed on a noticeboard section of the website. The material would then be forwarded by the admin support electronically to contacts in all societies of the association, and the executive officer might directly approach individuals in various societies.

Discussion of the likely cost produced a rough estimate of £25,000 per year, calculated at approximately £1 per member of each society. Membership would be determined by filtering the number of members of each society resident in the UK working in the field of science and technology covered by the interests of the association. Each society would make its own calculation and declare that figure to the association.

The association would not attempt to speak on behalf of member societies. The societies would remain fully autonomous and would only use the association as a means of promoting their own scientific interests.

Mr D Phillips	Scientific Officer, Air Quality Management Ntl World (2427)
Mr S Moorcroft	Managing Director Casella Group Ltd (2428)
Dr L Salter	Research Director Cornwall College (2429)
Mrs B Parsons	Head of Air Quality Unit Cornwall College (2431)
Mr C Hazell	Environmental Consultant Enviros Consulting Ltd (2432)
Mr S Read	Managing Director Enviro Technology Services Plc (2433)
Mr P Baker	Senior Environmental Policy Officer, Hammersmith & Fulham Council (2434)
Mr B Coakley	Strategic Environmental Protection Officer Chiltern County Council (2435)
Mr M Webley	Technical Director Enviro Technology Services Plc (2436)
Ms L Fernie	Section Head, AK EMS and Risk Aker Kvaerner (2437)
Dr C Hawkins	Senior Associate Peter Bretts Associates (2439)
Ms A Spanton	Director of Modelling Services Envirobods Ltd (2440)
Ms A Tod	Air Quality and Projects Officer Camden Council (2441)
Mr I Stone	Environmental Scientist Advanced Environmental (2442)
Ms L Vining	Senior Consultant Environ Corp (2443)
Mr B Fotheringham	Planning Liasion Officer SEPA (2444)
Mr C Whall	Senior Air Quality Consultant Entec UK (2445)
Ms Z Waterford	Environmental Projects Officer Breckland Council (2446)
Mr B Martin	Environmental Services Assistant Hanson Building Products (2447)