Environmental Management Systems in Universities

Occasional Paper for the Environmental Association for Universities and Colleges

March 2004

By Gareth Simkins with Andy Nolan

Contents

Authorship

This report was written by Gareth Simkins with Andy Nolan.

Gareth Simkins completed an MSc in Environmental Impact Assessment, Auditing and Management Systems at the University of East Anglia in August 2003. For the latter his dissertation was entitled "Best Practice in University Environmental Management", upon which this paper is based.

He was formerly SU environment officer and subsequently environmental auditor at the University of York (2001) and following completion of his master's degree wrote a report for the 'Go Green' campaign to improve university environmental performance by the student environment and development organisation People and Planet. The report is available at http://peopleandplanet.org/gogreen/report.php

Andy Nolan is Environmental Manager at The University of Sheffield and former Convenor of the Environmental Association for Universities and Colleges. He was formerly employed as Environmental Projects Manager at Leeds Metropolitan University and was a lead consultant on the development of EcoCampus for ENCAMS. Andy has represented the EAUC on the DfES' Sustainable Development Action Plan 'Sounding Board', the Learning and Skills Development Agency's Learning to Last Steering Group and the Higher Education Funding Council for England's Sustainability Advisory Group.

Contact Details

Gareth Simkins, Freelance Environmental Consultant
        E-mail: garethsimkins@yahoo.co.uk

Environmental Association for Universities and Colleges
        Phone   01242 714321
        E-mail   info@eauc.org.uk
        Website: www.eauc.org.uk

Higher Education Environmental Performance Improvement
        Website: www.heepi.org.uk

Terminology

EAUC	Environmental Association for Universities and Colleges
EMAS	Eco-management and Audit Scheme
EMS	Environmental Management System
HE21	Higher Education for the 21st Century
HEEPI	Higher Education Environmental Performance Indicators
HEFCE	Higher Education Funding Council for England
HEPS	Higher Education Partnership for Sustainability
IER	Initial Environmental Review
IS0 14001	The Environmental Management System standard of the International Organisation for Standardisation
SC-SUI	South Carolina Sustainable Universities Initiative

Introduction

"There's not anywhere quite like a university"
Martin Whiteland, University of Cambridge Environment Officer, 30.06.03

Over the past decade, the higher education sector has taken a more responsible approach to managing environmental performance improvement. This is not isolated to a single country or region, but has been particularly prominent in western Europe and the USA. This has been driven not only by a growing environmental movement, but by the realization that significant cost savings may be generated and by other factors such as public relations, student recruitment and legal compliance.

This is evidenced by the number of declarations (notably the Talloires Declaration[1] and the later Copernicus Charter[2]), reports and initiatives of the recent past, not to mention the emergence of collaborative groups such as HEEPI and the Environmental Association for Universities and Colleges (EAUC) itself. Since 2000, there has even been an academic journal dedicated to the subject, the International Journal of Sustainability in Higher Education[3].

Over the same period, Environmental Management Systems (EMSs) have been adopted by a wide range of organisations in the service sector and public bodies. An EMS is a structured framework for the assessment and management of an organisation's environmental impacts and for the incremental improvement of environmental performance. It incorporates the organisational structure, practices, procedures, processes and resources for environmental management, and can be readily compared to quality management systems, from which they ultimately derive. Like quality management systems, there are standards to which an organisation's environmental management system can be aligned, judged against and compliance with awarded. These are the international standard ISO 14001, and the European Union standard EMAS, which incorporates a greater amount of public transparency.. Other sector-specific EMSs exist, such as GreenGlobe. An EMS standard and award scheme for the higher education sector, EcoCampus, may be relaunched in the near future

While still uncommon in higher education institutions, EMSs are developing a growing prominence in UK Higher Education. Indeed, there are a number of universities certified to ISO 14001, and more are working towards that aim, seriously contemplating it, or aiming for verification to EMAS.

Those currently certified to ISO14001 are Glamorgan, Elmwood College, University of Wales College of Medicine and Leeds Metropolitan University,

---

[1] Talloires Declaration www.ulsf.org/programs_talloires.html
[2] Copernicus Charter www.unesco.org/iau/fre/tfsd_copernicus.
[3] International Journal of Sustainability in Higher Education
http://konstanza.emeraldinsight.com/vl=10350769/cl=37/nw=1/rpsv/ijshe.htm

although the certification may not apply to all departments. Others aiming to do so (or use it as a framework for their environmental management without wishing to certify) include Oxford Brookes, Sheffield, Sunderland, Cambridge and Hertfordshire.

Despite these advancements, the response to environmental performance issues remains mixed, much as the "Toyne Report" and "Khan Review" revealed in 1993 and 1996 respectively. Several universities have become acknowledged leaders, by developing effective systems and extensive environmental programmes, whereas others have yet to make significant progress or commit to improve their environmental performance.

This paper seeks to discuss the motivations and barriers to implementing environmental management systems in higher education institutions, and other issues surrounding them, and recommend the adoption of an appropriate standard.

Motivations and Barriers to EMS Implementation

Commonly held[4] motivations for the implementation of an EMS in a university include better regulation of responsibilities, better environmental performance documentation, reduced risk of regulatory breaches, cost reduction, improved personnel motivation and training, and better environmental communication - motivations that could apply to almost any organisation. Specific to universities, an EMS may improve public perceptions by providing evidence of its caliber and social responsibility (perhaps attracting students), assist in student education and training, provide access to research grants and encourage inter-departmental collaboration. Like policies, a full EMS also "transcends personality"[5] and hence removes the pitfalls of staff leaving for new positions. An EMS may also assist in fulfilling existing environmental commitments.

Although environmental performance improvement may be organised without a formal EMS structure, implementation provides a clear strategy for performance improvement which may otherwise be lacking. Martin Whiteland of the University of Cambridge has said that working towards operating an ISO 14001-compliant system "gives a target" towards which progress can be judged.

There may also be a more pressing motivation for creating an EMS - that the Department for Education and Skill's Action Plan for Sustainable Development[6] may force, or provide significant motivation, for universities to do so, the Toyne

---

[4] Derived from interviews with staff at twelve environmentally leading British universities, and from an international literature review.
[5] Interview with Andy Nolan, Environmental Manager, University of Sheffield.
[6] Department for Education and Skill's Action Plan for Sustainable Development www.dfes.gov.uk/sd/docs/SDactionplan.pdf

Report and Khan Review having recommended their adoption. Having an environmental policy and an environmental co-ordinator (or equivalent post) may also be considered likely to be included. However, until the publication of HEFCE's implementation plan, expected in the late summer, this will remain speculation.

Despite these motivations, there remain a number of barriers to EMS implementation. These include the indirect linkage of operational staff activity to "product" (i.e. educated students and sound research), institutional conservatism and inertia, distributed decision-making structures, tensions between "subcultures" (academics, administration, operations managers and students), rapid turnover of personnel and the shear difficulty of auditing and implementation.

Others factors are an unconducive financial system, low priority caused by university growth, lack of senior management support and awareness, longer pay-back periods coupled with significant initial cost, difficulty in changing attitudes, loading environmental duties onto resistant personnel and lack of interest, knowledge, information, incentives, expertise and tradition.

There is evidence that these barriers lessen the longer that environmental measures have been taken, as staff become used to them and managers develop practices that fit around existing university structures and systems.

Deployment of an EMS

The deployment of an EMS in a university environment generally involves a staged, cautious approach - whereby elements of the EMS (e.g. initial environmental review, environmental programme) are introduced slowly, or whereby an EMS is introduced to individual departments or physical areas (piloting), or perhaps to manage individual environmental aspects such as energy and water consumption. This staged approach is becoming more widely accepted and now has its own recognised standard known as BS 8555[7], derived from the Acorn Project.

A staged approach is generally recommended as it would be expected to:
- cost less initially;
- demonstrate the appropriateness and usefulness of an EMS;
- demonstrate that it is not too bureaucratic and not too much work;
- increase confidence in the concept;
- ensure that problems are identified and corrected before their introduction into the university as a whole;
- provide a series of structured goals.

---

[7] IEMA's 'The BS 8555 SME Workbook'
www.iema.net/download.php/AcornSMEworkbookPhase1.pdf

A staged approach is thereby more likely to be accepted by senior management. However, a staged or piloting approach may not be appropriate in small institutions, and other areas may suffer while particular elements are dealt with.

Not all incidences of piloting are deliberate: Noeke (2002) describes an integrated management system (combining quality, health, safety and environmental aspects) that was introduced in a departmental division at the University of Paderborn, Germany. This was deemed so successful that the university as a whole decided to implement an EMS. The South Carolina Sustainable Universities Initiative (SC-SUI) (Barnes and Jerman, 2002) uses a similar, but deliberate, methodology of establishing an EMS in particular departments before applying it to a whole university.

The piloting concept has been adopted at Sunderland and Leeds Metropolitan Universities, the former using a reprographics unit, and the latter having used estates and purchasing departments, both with the intention of steadily increasing the remit of ISO 14001 certification into other areas. While Leeds Metropolitan intends to extend its certification across the entire university, Sunderland does not intend to follow suit, citing cost and lack of motivation.

Many environmental personnel at other universities also favour piloting (although their universities have not committed to EMS implementation as yet), predominantly in estates or facilities management departments, as these are responsible for the management of energy, transport and waste. These are generally the most significant environmental aspects. However, as these are not solely *created* by such departments but by a university as a whole, it is perhaps short-sighted not to extend an EMS to a university as a whole. Furthermore, this ignores other significant aspects, such as purchasing. Therefore, Leeds Metropolitan's approach is surely to be commended.

One of the more innovative strategies of EMS deployment is described in Viebahn (2002). The "Osnabrück Environmental Management Model for Universities" contains ten "building blocks" which are developed by the departments deemed most competent to devise and operate them, rather than by external consultants or an individual manager. For example, the computing department would develop an 'Environmental Information System,' the public relations department would write an environmental report and the law department would create a register of relevant legislation and regulations.

This approach may facilitate the integration of the EMS into the existing structure, decrease staff resistance to the concept and boost collaboration between departments.

Personnel and Training

An EMS is, of course, operated by people, and ensuring that those people are in an appropriate position to improve environmental performance is vital.

In order to be effective, an EMS requires at least one member of staff to co-ordinate, operate, maintain and further its development. All sources of information available recommend this. While some universities operate their environmental management functions via a committe structure alone, this is unlikely to be effective as not enough staff time will be availble to ensure appropriate measures are taken in a timely fashion.

An environmental co-ordinator generally undertakes roles such as responding to queries, collecting ideas, public relations, developing goals, collecting data, ensuring policy compliance, writing reports, consultation with external bodies, liaison with quality and health and safety managers and staff training. Precise functions vary from institution to institution, as does in which department they are located. The majority are within estates or factilities management departments, but others are situated in finance or purchasing divisions, or share environmental responsibilities with health and safety. While there are certain advantages and disadvantages to each, a forthcoming EAUC publication will recommend that environmental staff should work within estates or facilities management, and not have duties other than those related to environmental management.

Wherever they are located, they should report to a senior authority (such as a departmental director, or even the vice-chancellor), which increases their visibility to senior management in general, so presumably securing greater influence and priority, plus access to finances.

A post-holder requires certain personal characteristics: Sharp (2002) identifies these as "a high competency in listening, communication, relationship building, vision development, responsiveness and continuous strategic adaptation" coupled with being able to maintain positive relationships, patience, objectivity and creativity. A co-ordinator should also expect setbacks caused by "inertia, resistance, occasional political backlashing, or territorialism that may be provoked along the way".

The way in which other members of staff relate to the environmental co-ordinator, and vice-versa, must be decided: who has responsibility for which management and operational role, how are decisions made and who reports to whom?

There is considerable variability as to how universities organise this and it is difficult to say which way is better than the other. Some have networks of departmental representatives, operating in parallel to the general management structure (von Oelreich, 2002), whereas others integrate environmental responsibilities into existing roles (Viebahn, 2002).

Leeds Metropolitan has an effective system involving a short, clear chain of responsbility. The board of governors and the executive board authorise and sign policy; the environmental policy steering group authorises objectives and targets; the Environmental Manager facilitates the fulfilment of those objectives and targets; "environmental co-ordinators" are responsible for the fulfilment of objectives and targets, being those responsible for particular areas (such as a heat engineer) and under them are other members of staff to enact measures. This is a mature and well established model in many other of the 'leading' universities with respect to environmental issues.

An environmental committee, such as Leeds Metropolitan's environmental policy steering group, is common element of the environmental management at many universities. These are used to liaise between different departments and members of personnel, to debate issues and as a forum for the representation of stakeholders.

Again, there is great variability as to how they are composed and organised. Some are responsible for policy development, and at Cambridge the committee is charged with undertaking the management review function of the EMS. Some universities have one large committee, and others add small groups responsible for particular aspects, such as waste management or transport; some report directly to senior management whereas others have long chains of committees above them. This can create frustrations due to the length of time needed for decisions to be made or approved.

Environmental committees are often chaired by a senior member of staff (such as a pro-vice-chancellor), and made up of academic staff with expertise or interest in specific elements of the committee's brief, with a number of operational and environmental staff in attendance. They may be joined by health and safety personnel, procurement staff, community relations staff and student representatives.

However personnel are structured, the success of an EMS depends on the good will and co-operation of staff. This depends on their consultation and working with them (Holt and Anthony, 2000) rather than against them. Of primary importance is obtaining the support of the vice chancellor and senior managers, so securing institutional commitment to environmental performance improvement. Indeed, the retired Community and Sustainability Strategy Manager of Sheffield Hallam University colourfully stated that without the commitment of the vice-chancellor "you are banging your head against a brick wall.[8]"

However, gaining the support of senior management is unlikely to be the only hurdle - many people are unconcerned with their environmental impact, and

---

[8] Interview with Peter Downey, retired Community and Sustainability Strategy Manager, Sheffield Hallam.

changing these attitudes, vital if an initiative is to be successful, is a slow and difficult task. It is made more difficult by loading extra duties onto pressurised staff and unpopular measures such as parking charges.

Part of changing attitudes is ensuring that personnel have the knowledge needed to improve their own environmental performance through appropriate training. This may be extended to suppliers and student representatives. The training regimes of Bristol, Hertfordshire and Leeds Metropolitan include, respectively, workshops, brainstorms, events, seminars, material on their websites and general awareness-raising, with job and group specific training given as and when needed. Environmental issues are also part of staff inductions at those and other universities. Staff motivation can be assisted by involving as many members of staff as possible, exhibitions, encouraging voluntary participation in working groups, a suggestion pool and action weeks or days.

Initial Environmental Reviews and Environmental Audits

There are mixed attitudes towards the use of internally or externally produced initial environmental reviews (one of the preliminary stages in developing a formal environmental management system), or one-off audits in less formal systems. Their appropriateness may vary from situation to situation.

Both Sunderland and Bristol have no formal method for assigning significance to environmental aspects, both being of the opinion that significance is generally obvious.

At the other end of the spectrum, Hertfordshire has completed its Initial Environmental Review (IER) and developed an ISO 14001-compliant document of its policies, objectives, targets and systems. Leeds Metropolitan used a matrix approach in its IER to assign significance to aspects according to regulatory issues, likelihood of significant environmental impact, volume, magnitude and other factors. Despite this approach, it did not highlight "previous unknowns," so one may suspect that the lack of an IER may not be as much of a weakness as one would otherwise fear.

Those universities that do so may choose an internally or externally produced review. According to HE21 (1998) an 'in-house' review may ignore indirect impacts, require time off from normal duties for staff and may be somewhat partial. On the other hand, external consultants are impartial but more costly and less familiar with the higher education environment - although their use may enhance the status of the investigation.

In the UK, only Glamorgan and Nottingham Trent (as far as the author is aware) have used consultancies to develop their reviews, making it an uncommon choice.

Both the University of York and the South Carolina Sustainable Universities Initiative (SC-SUI) (Barnes and Jerman, 2002) reached two interesting but different compromises between internal and external reviews. At York, a graduate wrote an audit of the campus, who had enough separation from the university administration to remain impartial but enough familiarity with the campus to be informed as to its activities. The SC-SUI uses trained staff and students from one university to audit another in the initiative, and vice-versa.

Of course, it is not only staff that may write an environmental review - universities have an abundant source of informed and no (or low) cost labour in the form of students; the production of an environmental review could be easily integrated into an appropriate course and indeed has been at a number of institutions.

Policies, Objectives and Targets

An environmental policy establishes principles and provides the foundation for a university's environmental management. One of the main functions of an EMS is to ensure compliance with the environmental policy.

A university environmental policy may emphasise "operational" aspects, such as energy consumption and waste production, or its role as an educator, trainer and influencer of future decision makers, this being the case at both Mälarden University in Sweden (von Oelreich, 2002) and in the Sustainable Universities Initiative (Barnes and Jerman, 2002). These universities seek to integrate the concept of sustainable development into the curriculum, and in so doing influence their students to make more sustainable choices in their future careers. Therefore, education for sustainability (Jucker, 2002) should be accepted as an environmental aspect in a university EMS, despite it being a 'positive' impact, alongside more traditional 'negative' impacts such as waste.

The following guidelines for developing a strong university environmental policy have been published by People and Planet in their "Going Green" paper, derived from Gareth Simkins' MSc dissertation. Not all elements may be relevant to all universities.

Management
- Lay out the university's vision, beliefs and aims regarding its environmental performance and how it should be managed.
- Assert the environmental responsibilities of all staff and students.
- Commit to continuous, durable improvement of environmental performance and attaining or surpassing legislative and regulatory requirements.

- Provide mechanisms for the creation of objectives, targets and action plans, the selection of indicators, prioritisation of actions and ensuring policy compliance.
- Provide mechanisms for how environmental factors are to be integrated into the decision-making processes.
- Reference previous commitments such as signing relevant environmental charters such as the Talloires Declaration or Copernicus Charter.

Personnel
- Describe specific personnel responsibilities in overseeing the development and implementation of policy, or reference documentation containing these.
- Describe committee roles, composition and the minimum frequency of their meetings, or reference documentation containing these.
- Declare the need for training of staff and students.

Operations and Facilities Management
- Commit to reduce waste and greenhouse gas production, adopt renewably sourced electricity, increase energy efficiency and recycling, avoid environmentally harmful substances, materials and processes, use recyclable, recycled, reusable and sustainably sourced materials and use environmentally sensitive disposal.
- Commit to providing accessible facilities for recycling.
- Encourage the use of environmentally sound transport.
- Commit to the assessment of purchases on a whole-life basis, and adopting an environmental purchasing policy.

Communication
- Commit to ensuring awareness of the policy among staff and students.
- Reference national and international commitments to sustainable development.
- Promote co-operation with other universities and external bodies.
- Commit to the publication of environmental targets, objectives and other relevant documentation.
- Include environmental report content and frequency.
- Explain how complaints and enquiries are to be handled and provide contact details.

Commitment
- Be signed by the Vice-Chancellor or Principal on behalf of staff, and by the head of the Students' Union on behalf of students.
- Include the date of acceptance of the policy, and intended date of revision

An environmental policy provides a "launch pad" for the creation of objectives and targets. Barnes and Jerman (2002) and Viebahn (2002) both discuss this,

and recommend that they should be set by reference to the results of the initial environmental review, existing policy, regulatory requirements, frequency and severity and the potential for influence on an aspect, while keeping in mind the concept of continual improvement. Best practice is to consult university members, suppliers, funders and the local community on their development, and they should be modified periodically.

Most universities do not have a formalised method of how to set them, however. An innovative exception is Bristol, at which quantitative targets based on UK governmental targets are set against major impacts. This provides a rational suite which may be more easily justified to other parties.

The approach at Leeds Metropolitan is to identify significant impacts, monitor them as needed and then develop targets so that progress may be measured more easily. Similarly, objectives and targets at York and Sheffield are based on environmental audits of the campus which identified major impacts.

Communication and Reporting

Without good communication, both internal and external, an EMS cannot function, as stakeholders will not be aware of policy and procedures, and nonconformances (breaches in designated policy) will not be reported.

A broad variety of communication methods is of course vital to raise the profile of environmental management, and may incude presentations to new staff, personal contact, posters, leaflets, newsletters and events. Both Oxford Brookes and Bristol universities operate "environmental fora", at the former meeting twice-termly to discuss campus enviromental issues and their solution and is open to all. Bristol's is restricted to discussion via e-mail and has representatives from each department.

The use of electronic communication is of great importance for the communication of environmental information and EMS documentation in a university. Universities are IT-literate environments with institutionalised use of computers; IT can facilitate and encourage the free flow of information and ensure documentation is kept current. The sophistication of its use varies from using a website to hold the environmental policy, handbook, contact details, etc and using e-mail, to a dedicated environmental information system to "collect, administrate and present all...relevant [environmental] data regarding the university," to assist training and facilitate the preparation of the environmental report (Viebahn, 2002).

A number of institutions report through Business in the Environment's 'Index of

Corporate Environmental Engagement'[9], a simple league table of environmental management attainment. While public knowledge of the index itself may be low, high attainment may create a sense of pride and create a useful rivalry between institutions.

Although the situation may change in the near future, only Leeds Metropolitan currently publishes a full environmental report, on a bienial basis. Some universities, such as Sheffield Hallam, include a short environmental section in their annual reports. Mark Warner, LMU's Environmental Projects Manager, believes an environmental report displays "a level of accountability to users [and] shows integrity and transparency." He also believes that that the government is likely to make it compulsory and that it is good for public relations. While it is somewhat more brief than, for example, (Canadian) Mount Allison University's environmental audit[10], it is rather more readable.

Despite these factors, Sunderland has ceased the publication of its report, due to the time needed to compile it causing distraction from other activities.

One alternative to an environmental report is a regular bulletin, such as "Green Lines" at Cambridge, which acts as both a reporting mechanism, a way of announcing future events and projects, and ensuring university-wide communication, although there has been a recent hiatus in its publication.

Case Studies

University of Glamorgan
The University of Glamorgan's programme of environmental performance improvement started in 1993 with a finding that it was not in compliance with the law. To rectify this, implementing an ISO 14001-compliant EMS was proposed in 1999, the university gaining certification in 2002. Factors critical to the university's success were corporate commitment, resourcing, enthusiasm and specialist support and advice – a consultancy was brought in to assist.

An interesting element of their EMS is the "environmental handbook" – a cut-down version of the environmental manual (which contains all EMS documentation) for day-today use. It contains the environmental policy statement, contact details, responsibilities and commonly used procedures and relevant regulations. It additionally holds information for use in emergencies, training, a list of environmental courses offered and the location of official records.

---

[9] Business in the Environment
www.bitc.org.uk/programmes/programme_directory/business_in_the_environment/index.html
[10] Mount Allison University Environmental Audit
www.mta.ca/climatechangecaravan/audit2000.pdf

A full environmental audit is carried out on an annual basis and a smaller one every six months by two consultancies.

Further details are at www.glam.ac.uk/news/releases/000603.php

Leeds Metropolitan University
Leeds Metropolitan was the second UK university to gain ISO 14001 certification. The EMS currently applies to the estates and purchasing divisions, with the intention of extending it across the campus.

It has a regularly updated environmental policy, full-time environmental management staff, the active support of senior management, and published a biennial environmental report. Its pro-active approach to environmental management has achieved a series of savings, despite an annual increase of 2.5% in student numbers and a 13% rise in floor space, which includes:

- A 4% reduction in water consumption, through investment in supply infrastructure and conservation technology;
- Limiting their increase in gas consumption to 1.7%;
- Reducing the weight of the prospectus, saving thousands in postage, printing and paper costs, and reducing paper consumption by five tonnes.

The university also sets impressive targets, such as a 5% reduction in CO_2 emissions, a 5% reduction in water consumption over two years and a 25% reduction in waste going to landfill by 2006.

Further details are at www.lmu.ac.uk/the_news/sep03/iso.htm

Conclusions

While an EMS may not be vital for good environmental management, good environmental performance is encouraged and facilitated by its adoption. Furthermore, they display corporate responsibility, can reduce expenditure and are valuable as marketing tools. An EMS methodology is expected to spread to more universities in the coming years, perhaps under the influence of HEFCE, although this remains to be seen.

The question remains, which EMS standard should a university adopt – ISO 14001 or EMAS? Despite significant support from the original pilot members, it would be inappropriate to recommend EcoCampus as it is not yet operational or finalised. However, its flexibility, staged structure and award scheme combine to make a system that every university should bear in mind for the future. Of course, a university may choose to use one of the standards as a guide and not seek third-party compliance. This avoids the cost of certification and any

unwanted binding commitment – but also avoids valuable third-party scrutiny, which some may perceive as suspicious.

ISO 14001 is the most well known and only internationally recognised standard, and more people have experience of it that EMAS. It has been proven in the university sector, but there have been difficulties in its interpretation, there is no official guidance for universities adopting it and it was not designed with universities in mind. There remains an opportunity for EcoCampus to offer a clear pathway to an ISO or EMAS standard, understanding there are several ways of achieving these standards.

Several continental universities are verified to EMAS, and the Polytechnic University of Valencia have taken this approach. Another Spanish university was involved with the development of "EMAS II." As a system endorsed by the government, there is a significant body of experience in implementing it in public sector bodies, and one may expect that if having an EMS is made compulsory in the future, EMAS will be at least strongly favoured. On the negative side, it is not internationally recognised, is more expensive to implement and has more onerous requirements than ISO 14001, through the publication of validated environmental reports, improvement of *performance* rather than *management*, and requiring audits at least every three years.

EMAS II incorporates ISO 14001, and hence provides an easier path to "upgrade" than was once the case. To conclude, a university should adopt ISO 14001 as its EMS standard, and then contemplate the adoption of EMAS in the light of future government policy.

References and Further Reading

Barnes, P. and Jerman, P. (2002) Developing an environmental management system for a multiple university consortium. Journal of Cleaner Production, 10: 33-39.

Creighton, S.H. (1999) Greening the Ivory Tower. Improving the Environmental Track Record of Universities Colleges, and Other Institutions. MIT Press, Cambridge,MA.

Dahle, M. and Neumeyer E. (2001). Overcoming barriers to campus greening: a survey among higher education institutions in London, UK. International Journal of Sustainability in Higher Education, 2 (2): 139-160.

Herremans, I. and Allwright, D.E. (2000) Environmental management systems at North American universities: What drives good performance? International Journal of Sustainability in Higher Education, 1 (2): 168-181.

HE21 (1998) Environmental Management Systems: A Guide for the HE Sector. Forum for the Future, London.

Holt, D. and Anthony, S. (2000). Exploring green culture in Nortel and Middlesex University. Eco-Management and Auditing, 7: 143-54.

Jucker, R. (2002) "Sustainability? Never heard of it!" Some basics we shouldn't ignore when engaging in education for sustainability. International Journal of Sustainability in Higher Education, 3 (1): 8-18.

Khan, S.A. (1996) Environmental Responsibility: A Review of the 1993 Toyne Report. HMSO, London. (Known as the "Khan Review")

Noeke, J. (2002) Implementation of Environmental Management Systems in Universities – Practical Experiences. In: Environmental Management Systems for Sustainable Universities Conference 2002, Rhodes University, South Africa, pp. 268-275.
www.brookes.ac.uk/services/environment/emsu2002.doc

von Oelreich, K. (2002) Environmental Certification of Mälarden University. In: Environmental Management Systems for Sustainable Universities Conference 2002, Rhodes University, South Africa, pp. 295-132.
www.brookes.ac.uk/services/environment/emsu2002.doc

People and Planet (2004) Going Green. People and Planet, Oxford.
www.peopleandplanet.org/gogreen/gogreen.report.pdf

Sharp, L. (2002) Green campuses: the road from little victories to systemic transformation. International Journal of Sustainability in Higher Education, 3 (2): 128-145.

Simkins, G. (2003) Best Practice in University Environmental Management. UEA MSc Dissertation. (Available from the author)

Toyne, P. (Chair) (2003) Environmental Responsibility: An Agenda for Further and Higher Education. HMSO, London. (Known as the "Toyne Report")

Viebahn, P. (2002) An environmental management model for universities: from environmental guidelines to staff involvement. Journal of Cleaner Production, 10: 3-12.

van Weenen, H. (2002) Towards a Vision of a Sustainable University. International Journal of Sustainability in Higher Education, 1 (1): 20-34.