

HUMANE

Heads of University Management & Administration Network in Europe

Environmental Issues

Dublin, 5-6 November 1999

Participants were welcomed by the Provost of Trinity College, Dublin, Dr Mitchell, who briefly noted that problems which came from being an ancient university on what had now become an “island” site in the centre of the city. The problems of energy conservation and transport/parking policy were important at TCD, but also dominated the presentations at the seminar, which was open to heads of Estates/Facilities departments.

Energy Conservation at Trinity College Dublin

Tim Cooper, Director of Buildings, Trinity College, Dublin

Abstract

At the time of the first oil crisis (1973-74) the College had taken various steps, including the formation of an in-house team of energy conservation experts, the preparation of a continually updated list of potential energy conservation projects, and the accurate measurement of their performance after implementation. A computer-based energy audit was developed to assist with these appraisals and to provide a method for accurately measuring performance. When this audit was extended to include mains water consumption it drew attention to abnormally high night-time mains water consumption. The cause was eventually found to be a major leak in a water main located just below ground level in College Park. The lack of above-ground evidence of this leak indicated that the sub-soil was highly permeable and (therefore) that it might also allow significant ground-water extraction. This potential was investigated by theoretical studies and practical experiments.

The resultant data were used to re-appraise the possibility of using heat pumps in conjunction with ground water to provide heating on the campus and to support a successful application for EU funding in 1985. This project was completed in 1989 and comprehensively monitored throughout 1989-90. The project highlighted the need for a control system that can accurately predict the daily heat requirement of individual buildings to maximise the use of low-cost night-rate electricity. It also prompted the Government to commission a study of the possibility of replicating the system elsewhere in Dublin, and persuaded the EU to fund a study of the potential for using digital weather forecast data to predict daily heating requirements.

This led to the design of a prototype low-energy building which incorporated services such as solar and wind sources. Funding was obtained for this project under the EU THERMIE programme in 1992 and it was eventually built in 1994 and comprehensively monitored throughout 1994-95. This led to an invitation from Dublin Corporation and a local property company to investigate low energy systems in a new Civic Offices complex and residential developments. Studies indicated that a properly designed CHP (combined heat and power) installation serving the whole neighbourhood would achieve the greatest energy saving. The project, also funded by the THERMIE programme, was completed in 1996 and comprehensively monitored through 1996-97. It demonstrated the technical and commercial viability of this technology, which can result in savings of 25% in primary energy consumption and reductions of 40% in associated CO₂ emissions.

TCD recently sought and obtained tenders for a similar installation serving the entire city-centre campus. A preliminary study indicates that the use of this technology at TCD will result in savings of the order of 43% in primary energy consumption and reductions of 54% in associated CO₂ emissions.

Discussion

There was some interest (especially from those in countries with a great interest in water levels) in the permission for extracting water. Tim Cooper clarified that it was necessary to report on such work, but that present legislation allowed unlimited access unless there was damage. There was scope also for using the water as drinking water, but this had not yet been attempted. Cost savings at TCD had been of the order of 15%. It was theoretically possible to sell any spare energy, but in practice the College re-cycled such spare capacity rather than selling it. He agreed that meters and other measuring devices were often expensive, but argued that any such initiatives depended on accurate measurements

He agreed entirely with the observation that in many cases old or ancient buildings had proved to be more efficient than modern constructions, and illustrated with slides several cases where buildings which were 400 years old were perfectly adapted to weather conditions, whereas new buildings relied on expensive air-conditioning. In this context, all the rooms in the new "Green" building had been designed with natural ventilation, or (in bathrooms) a minimum of secondary ventilation.

Update on the Eco-campus Project

Luciano Galan, Gerente, Autonomous University of Madrid (UAM)

This session derived from the presentation given in September 1998, at UAM. Luciano outlined the four major components of the project at UAM, and noted that there was now an increasing interest in the nature of the indicators used to monitor progress.

There was great interest in the question of whether the University had used sticks or carrots (that is, penalties or incentives) to stop people from bringing their cars on to campus. For Luciano it was very much a question of “carrots”, in the form of increased and improved public transport. For example, it had been possible to create a railway station - but on the grounds that the campus was to be seen as a community like the other small towns in the area, not as an isolated special service. There was no intention of penalties, which he did not think would work. Other members argued in favour of using increased charges in order to persuade car users to switch to public transport, but in Luciano’s view the introduction of parking fees would merely create an extra social problem without solving the parking problem. The physical location of the campus, 15 km from the city centre, was crucial in this regard. He did, however, recognise that it might be possible to use the proceeds from any charges in order to improve public transport.

The emphasis throughout his talk was on gaining the trust and confidence of the users of the campus space, so that they would act responsibly in all areas from car parking to waste management, without undue compulsion or checking. This was different from the need for formal measurements or audits - there had been two audits of emissions. Those who had undertaken similar exercises advised that it was better to obtain an outside view, in order to prevent the creation of “green” pressure groups within the organisation. Finally, Luciano explained such features as the counting of different species of birds or plants as being important in the overall awareness and consciousness of the environment.

Betty de Keizer, Environmental manager, Universiteit van Amsterdam

The Universiteit van Amsterdam (UvA), with 22.000 students and a budget of 360 million euros, is one of the major comprehensive universities in Europe. There are nine major faculties, covering humanities, social science, medicine, dentistry and sciences. UvA is decentralised, which means that the heads of faculties have mandates on most management affairs, such as accommodation, work facilities, occupational health and safety, and the management of environmental protection.

The first level of environmental management was introduced at UvA in the 1970s. The three main reasons why universities should bother about environmental issues are:

1. Community responsibility
2. Education of the new generation
3. Sustainable management

Over the years, Dutch legislation, combined university consultation, and the Copernicus charter triggered the development of environmental management at Dutch universities. UvA drafted an environmental policy plan in 1993, which was signed by the Board in January 1994. The plan forms the basic framework; heads of Faculties have to work out the detail, adapting it to their own situation.

Occupational health and safety became an important issue at Dutch universities in the 1990s. Again the main trigger was legislation. The basis of the new legislation is that every company has to seek advice to ensure quality control. This needs the support of a so-called "Arbodienst", a certified organisation with professionals in the fields of medicine, safety and organisation structure. With the help of these professionals a risk inventory and evaluation must be produced to give the information needed for a policy plan on how to improve the occupational health and safety within the company. A continuous process is started of planning, implementing, evaluating and adjusting.

UvA, like most Dutch universities, has its own, internal “Arbodienst”, the Department of Occupational Health and Safety (AMD). The professionals of the AMD carry out the risk inventory and evaluation. They also give advice to heads of Faculties and to individuals on how to eliminate health and safety risks. The AMD also has a section concerned with Environmental Management, and both sectors work very closely together - in fact they form one department. Environmental professionals do environmental audits at the faculties.

To improve occupational health and safety, and to realise environmental protection as well, the measures which are taken can be either curative or preventative. The latter approach gives the best chance of integrating both areas of management. Two examples of the importance of integrating both of these management structures are the use of *dangerous materials* (included dangerous waste), and *sustainable accommodation*. The presentation will include an illustration of daily practice at UvA.

Discussion

There were immediate offers of exchanges of information to see how such work could be compared in different countries. Betty explained how students were involved. Comparing the situation of TCD she explained the position concerning older buildings, and the ways in which governmental funds might be available for sustainable energy programmes. In response to a question about how to ensure a proper purchasing policy she noted that the Government was particularly interested in the question of purchasing policy, especially after the introduction of devolved budgets.

Several members quoted examples of difficulties experienced with architects, who had put design features (and perhaps reputation) before practicality or the constraints of public service. Betty was less bothered by this, and saw advantages in creativity. But she also saw that the more one devolves financial responsibility the less control there might be - and also (of course) that the more that one divides up money, the less one can do with capital sums. Finally, she noted that investments in environmentally-friendly measures could well cost money - in the case of UvA this had been calculated as an additional 2% of costs. This might

lead to longer term savings, as was brought out by Ignaz Bender in the next presentation, the next morning....

Campus Energy Saving Management

Ignaz Bender, Kanzler, University of Trier

The main thrust of Ignaz's presentation was that universities (often huge organisations) are energy-intensive institutions with high consumption of natural resources. Consequently they must try to improve their energy efficiency and reduce the consumption of oil, gas, electricity, etc. The construction and use of buildings will be central to any proposals to save energy. The presentation stressed that universities must organise a specific Environmental Management System, the effects of which would be seen in two main ways:

- after a period of initial investment, energy saving produces financial savings for the institution
- the energy saving behaviour influences the generation of tomorrow.

Ignaz opened his presentation by recalling the way in which the University Library at Trier had been created as a single entity rather than the multiplicity of smaller libraries which had earlier been the norm. The design (with walkways between otherwise separate buildings, and on the first floor) had brought together environmental, economic and security aspects - for example, the fact that single-entry points helped security and emergency planning, while heating and other communal services were easier to install and maintain when in one integrated space with a central control point.

This was developed to examine the ways in which universities might benefit from innovations in the commercial world - in things like movement sensors in communal hallways or stairs, or on paths across green space, thus providing lighting as and when necessary rather than all night long. He advised consultations with staff and students to encourage solutions to particular problems, and recommended that there should be one person with an overall checklist and responsibilities for bringing in changes.

The example of Trier raised several issues concerning the scope for such experiments elsewhere. For some countries, there was still not the autonomy to decide on design structures in this way. Elsewhere geography represented an even more rigid constraint - in the case of northern countries the idea of using glass to allow for extra heating was impractical because of the huge heat loss in

winter. This matched the title of an eco-campus meeting in Helsinki with the theme “Values and Cultures”.

Discussion moved on to the question of space usage and space costs, and the widespread problem of rooms which were due to be used according to the timetable but which in fact lay empty. One university had found that by charging for such non-use it had been able to identify extra rooms which were converted to create postgraduate study areas. Other participants warned that space charging (and especially decentralised energy costs) brought other problems, and that such savings made sense only if there was a real choice on the part of users.

Energy management at the Technical University of Denmark

Anne-Grete Holmsgaard, University Director

Abstract

The Technical University of Denmark (DTU) is located in the northern part of Copenhagen, on a campus built during the 1960s, when the university moved out from the city centre. Most of the 7,000 students are graduate students within all fields of engineering. The university is research heavy and has a good international reputation among scientific universities. Approximately two thirds of the total spending (or turnover) goes into basic and applied research ..

The physical construction is typical of the 1960s, prior to the first oil crises: scattered buildings (covering almost 400,000 square metres), mainly 2 to 3 storey buildings, rather big rooms, space-consuming entrance areas and a rather outdated heating system. However, during the 1990s DTU has gone through a difficult economical period with decreasing income - mainly caused by students moving away from engineering and science - as has also been seen in other European countries.

The programme on energy saving that DTU runs is partly caused by this economic situation, which has motivated DTU to look deeper into its expenditure on heating and power. The other motivating factor has been a wish to be known as a "green" university taking environmental questions seriously.

The energy saving project is a long-term project, where the first phase is concentrated on bringing down the amount of electricity used. The second phase, which has not started yet, will be concentrated on bringing down the heating bill.

The presentation in Dublin will be concentrated on questions such as:

- why engage in a project like this?
- what are the potential gains of running an energy saving project?
- what are the obstacles?
- what are the means or methods chosen ?
- can university scientists be motivated to become engaged in energy saving?

- are there any positive results?

Discussion

Anne-Grete noted in particular that the DTU had 90 separate buildings, one of which was so highly energy-intensive that it consumed 10% of the whole energy cost. Faced with the reality that total energy costs represented about 6% of the State funds for the DTU, the Senate had decided to reduce costs (not only for financial reasons, but also to promote a “green” image). However, deciding on how to make the cuts was predictably more difficult

As in other presentations, there was considerable stress on the need to take measurements, and to ensure that the situation prior to any changes was fully understood. A particularly good example was that of electricity consumption: initial graphs had revealed higher than expected consumption, and there were various theories about daily variations until analyses were carried out on Christmas Day and on Good Friday - the two days when the building was completely unused. This showed that the “base” level of consumption was high, irrespective of any variable human activity. Students had been employed to measure consumption in various areas, and meters had been installed. Each department had a person responsible for energy saving, and discussion groups were encouraged.

There was also discussion of the benefits and dangers of “benchmarking” statistics, well illustrated by the way in which the performance of the DTU could be seen as very poor (when compared - as in official figures - to all education establishments, including primary schools) or as very good (when compared to the very small number of institutions with a similar subject spread). However, in the discussion there were a number of participants - especially from the UK - who felt that the apparently harsh norms in Denmark were by their standards really rather generous. This produced discussion of the value of international benchmarking.

Establishing a University Transport Policy - a case study at the University of Southampton

John Lauwerys: Secretary and Registrar, University of Southampton

The University of Southampton has its origin in a small college founded in 1862 and received its University Charter in 1952. Its academic spread is broad, with faculties of Arts, Education, Engineering and Applied Science, Law, Mathematics, Medicine and Health Sciences, Science, and

Social Sciences. It has grown very rapidly in recent years and now has some 14,500 full-time students and about 4,000 part-time students. The main campus is located about 5 km from the centre of the City of Southampton (population 230,000). Recent expansion has led to a spread of academic activity on to 5 subsidiary campuses in Southampton and one at Winchester, some 20 km north-east of the main campus. The University has over 5,000 student residential places on several sites which are 2-3 km from the main campus.

The transport 'setting' is important. The area immediately around the main campus is largely residential housing, and car parking in local streets has until recently been unrestricted. This part of the city is not well served by public transport. The increase in student and staff numbers in the late 1980s and early 1990s brought significant increase in car usage and led to growing conflict through the parking of cars in the immediate area. The University was faced with a choice of either building multi-storey car parks or placing limits on car usage. At the same time there was a growing desire to shift towards a more environmentally-friendly policy on transport. In 1993 it decided that a new transport policy should be developed. Shortly thereafter (March 1994) the UK Government issued new planning guidelines which marked a change away from building more roads towards controlling the motor car and encouraging other forms of transport.

Following wide discussion, a **draft transport strategy** for the University was issued late in 1996. The following are the main provisions of the policy:

1. Restrictions in the use of the car

- With the help of the City Council, the introduction of parking controls in a zone surrounding the main campus.
- No increase in car parking places on the main campus above the current number of places.
- An increase in car parking charges in a phased way towards 125 euros per annum, the increased income to be used to subsidise other forms of transport.

1. Alternative transport

- To encourage the use of bicycles, to build new cycle tracks, secure bicycle storage and shower/changing facilities.
- To improve parking for motorcycles.
- To improve pedestrian routes

1. Development of bus services

- In collaboration with the main City bus service the development of new services to link University campuses and residences. Two new routes were introduced served by University sponsored buses (the “Unilink” network).
- The requirement that first-year undergraduates buy a bus pass (150 euros per year) which makes travel between University residences, academic campuses and main City destinations very easy.

Future Developments

- To plan for the introduction of park and ride facilities with the City Council
- To plan actively for a reduction in journeys, including examining the options for teleworking.
- To continue to learn from good experience in Europe and other parts of the world.

Discussion

Questions included discussion of why it had been necessary to create a “Transport Office” with extra staff. John pointed out that the office did other related things, such as issue bus passes, control bike use and actually monitor the service provided by the bus company. He described in more detail the way in which the 12 dedicated buses operated, and clarified that although they carried the livery of the Unilink scheme they were available also to members of the public. There was some discussion of “Park and Ride” schemes, and John noted that the University was exploring this possibility in conjunction with the local authority, but that such schemes needed to be well done, with proper security etc, if they were to be done at all. He explained the subsidies provided by the University.

There was some interest in the ownership of the scheme, with members from other countries interested in the degree of student involvement. John stressed that the student body had a different time perspective in terms of strategic development, with a typical horizon of three years. The “class” distinction between staff and students was also explored, especially the decision to prevent first-year students from bringing cars to the campus. John explained that this decision had been taken only after a lot of debate, but he was sure it was the right practical decision. He pointed out that there was also a scheme for (paid) priority parking spaces, which were available to those with strong cases (for example, certain mature students). It was noted that at Maastricht, staff had been given the opportunity to give up their car parking permits in exchange for a sum of money to purchase a bicycle.

On the Friday evening participants had been offered the exceptional opportunity of a private viewing of the Book of Kells in the University Library, which, with its immense stacks of books on two floors, brought home the contrast between the (physical) pursuit of learning and modern Health and Safety regulations. During this memorable visit both the vaulted grandeur of the library and the illuminated medieval text transported the group far from the present day - so that there is a certain irony in the fact that a month after the seminar a representative of Irish coach drivers proposed that the Book of Kells should be moved from Dublin since - as the biggest tourist attraction in the city - it was responsible for major traffic congestion.)

Following the seminar, the participants proceeded (rather symbolically, on foot) to the nearby Mansion House for afternoon tea with the Lord Mayor of Dublin. Dinner was later held in the University Club, an eighteenth-century townhouse redolent of an age when ceilings did not have to be lowered in order to save energy. The host's injunction that there should be no long speeches was exploited in the best administrative manner in order to allow a considerable number of brief ones!

Summary prepared by Trevor Field

City Council