Advanced Building News

International Initiative for a Sustainable Built Environment

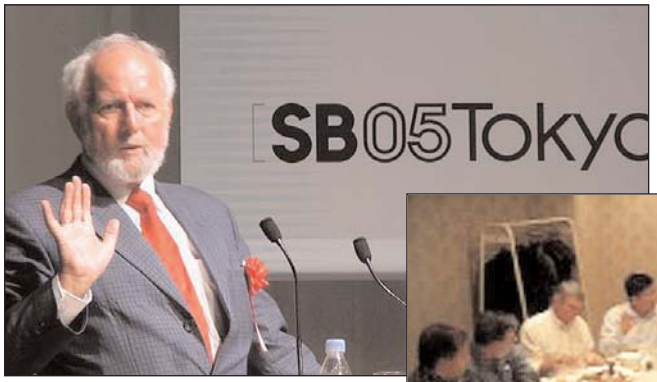
ABN 08, November 2005

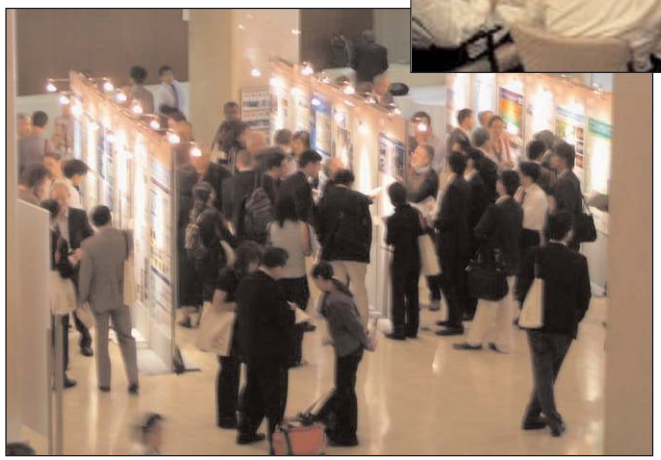
Tokyo SB05

SB05 is over

The global conference which took place in Tokyo during the period September 27-29 is now over. It is always difficult to summarize the results of a large conference,(1,700 delegates) with many parallel sessions and points of view. A few things stand out, however. One was the surprising excellence of a short speech made by Her Imperial Highness, Princess Takamodo. We are all used to seeing notables on the stage at large conferences, and often we gently fall asleep or squirm in our seats from the experience. In this case, however, all delegates I spoke to after the Princess' short speech agreed that it was an outstanding example of its type, remarkably full of meaningful content, while staying at a high level of generality. Unfortunately, when I look at the version of the document, that can be dowlnoaded from the conference site at http://www.sb05.com, it does not do justice to what she delivered. Perhaps she delivered a different version, or it was just something in the air.

On a more mundane level, the conference itself unfolded smoothly. I canvassed my small network for post-conference reactions, and I received many thoughtful comments. Most thought that it was well organized, but that the large size made it difficult to choose which of the many parallel sessions to attend, or to have enough time for informal inter-





Top: Ernst von Weizsacker
Right: debriefing
Below: Poster session crowd
Photos by Ronald Rovers Studio

change. But that criticism applies to all large events, and most respondents were genuinely grateful to the Japanese organizers, headed by Dr. Shuzo Murakami, for their massive organizational efforts.

The comments also indicated that the separate pre-conference student session was an unexpected highlight.

There were parallel sessions on Regional issues, for Case Study Assessments, for Sustainable Education and for the IPCC. None of the papers presented in these sessions were part of the official proceedings, but they will be placed on the SB05 website early in the new year.

The final conference Declaration will possibly be more honoured in the breach than in the observance, but it is worthwhile to provide a short excerpt for the optimists among our readers.

In recognition of:

1. The significant impacts current building practices and human settlement patterns have on resource use, global environmental degradation and climate

change, and,

2. The urgent need to take immediate and permanent actions toward sustainability:

We commit ourselves, as building-related professionals from around the world, to operationalize the notions of "harmony, symbiosis and collaboration" represented with the conference's concept of "wa" (harmony) by:

1. Making strenuous efforts in our home countries to influence colleagues and institutions to:

a. Promote the spirit of the Kyoto Protocol and
b. Implement sustainable building principles.

2. Offering leadership in bridging the gaps between:

a. Regions through closer domestic and international cooperation,

b. Generations through mutual and continuous education and training, and

c. Stakeholders through participation and collaboration.

One of the main events at tthe conference was the announcement of the location selected by CIB and iiSBE for the 2008 SB conference. Out of six high-quality proposals, Melbourne was selected, and Melbourne SB08 organizers were on hand to obsevre and to outline their preliminary plans. For iiSBE and CIB, an urgent task now is to design the process for the 2007 local events that will focus on local and regional issues and provide the regional background for SB08. The RFP for the SB07events is expected to be available soon

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iiSBE Italia

In February 2005 the first National Chapter organization of iiSBE was established in Italy, with its headquarters in Torino. *iiSBE Italia* is a non-profit organisation. The President is (Mr.) Andrea Moro, a research architect at Environment Park (a non-profit municipal organization), and also currently Vice President of the international iiSBE organization.

The overall aim of the new organization is to promote policies, tools, knowledge that will support a more sustainable built environment in Italy. The main activities of the association will include information, publishing and outreach activities that one might expect of this kind of organization, but it will also carry out performance assessments for government and private sector clients, using a version of GBTool adapted to Italian conditions. The consulting work is seen as the best way of introducing the concept of performance rating to the Italian building industry.

The association has a 5-member Board of Directors and also has the support of a Scientific Committee. Both individuals and organisations are eligible to join and the Bylaws are based on those of iiSBE International, with some adaptation to the local legislative context.

Performance Certification

The introduction of commercial performance assessments to Italy stems from an agreement signed in March 2005 by iiSBE, iiSBE Italia, Environment Park and the Building Research Institute of the National Research Council.

Assessment of the first batch of buildings is underway: a hypermarket in Florence, two office buildings in Milan and Lucca and a regional theme park close to Torino. These assessments will be concluded by the end of the year.

The certification system is based on GBTool, the rating framework that has emerged out of the R&D activities of the GBC international process. The assessment system has been adapted to local conditions (priorities, technologies, building traditions and cultural values) by the Italian GBC Team, coordinated by iiSBE Italia.

It should be noted that the GBTool system is based on the use of two complementary files: Module A contains weights and benchmarks that are set by a third party to suit local conditions, the one or more assessors or design teams can use a Module B file to make an assessment. Different versions have been developed to assess the performance of residential, office, commercial and entertainment buildings. Italian-language user manuals and guides have been prepared.

The certification process follows these steps:

- iiSBE Italia prepares Module A of GBTool, with weight and benchmark values appropriate to the building type and region;
- the client is provided with the "Module B" of GBTool where the data concerning the building (areas, materials, technical installations, context, etc.) have to entered. Each Module B file obtains its values for weights and benchmarks from the related Module A file, but the Module B user cannot change these original settings. The resulting performance score ranges from -1 to +5;

Continued on Page 12

Energy Performance of Non-Domestic Buildings: Closing the Credibility Gap

By Bill Bordass, William Bordass Associates, Robert Cohen, Energy for Sustainable Development Ltd. and John Field, Target Energy Services Ltd

Recital 16 of the Energy Performance of Buildings Directive (EPBD) requires the energy certificate to describe a building's actual energy-performance situation to the extent possible. If we wish to achieve the rapid reductions in energy use and CO2 emissions that the EPBD anticipates, it is vital that this clause is taken seriously. It provides a fantastic opportunity to report actual energy use clearly, to grade it against a clear description of the building in use, and to relate it transparently to expectations at the design stage. This will at last begin to close the feedback loop, reduce the credibility gaps that so often occur between design expectations of energy efficiency and actual fuel consumption outcomes, and consequently lead to more rapid improvements in building energy performance.

Credibility gaps arise not so much because predictive techniques are "wrong", but because the assumptions often used are not well enough informed by what really happens in practice, because few people who design buildings go on to monitor their performance. While some differences are legitimate (e.g. the building is used more, or has more things in it), surveys nearly always reveal avoidable waste - which can arise from poor briefing, design, construction and commissioning, and not just bad training, bad maintenance and bad management. A widespread problem is control systems which just do not work, or have poor management and user interfaces, resulting in equipment defaulting to ON unnecessarily.

To achieve genuine step-change improvements, procuring clients, design and building teams, users and managers will all need to engage much more closely with achieved performance. Better transparency between intentions and outcomes will release drivers towards better assumptions, better predictions, better design, better implementation, and better management of both the procurement and the product. We discuss how certification might be developed to help identify and close the credibility gaps, and present an idea for an energy certificate which takes these issues into account.

Nondomestic buildings in the UK

Nondomestic buildings (commercial and public) account for about one-sixth of the UK's entire CO2 emissions and one-third of the building-related ones. Their proportion of energy (particularly electricity) consumption has also been growing. This paper considers some reasons why these buildings often use much more energy than they could, and suggests ways of improving the situation. It concentrates on operational energy use, and on savings that can be made on the demand side before calling upon external sources of delivered energy (however low in carbon these may be).

Nondomestic buildings often waste energy

Many nondomestic buildings are major energy-wasters (Bordass, 2001a). New buildings are not necessarily better, with energy use often proving to be much higher than their designers anticipated. Norford et al (1994) note the need for considerable caution about what constitutes a low-energy building. Annual CO2 emissions of two - and sometimes even three - times design expectations are far from unusual, a massive credibility gap.

An example

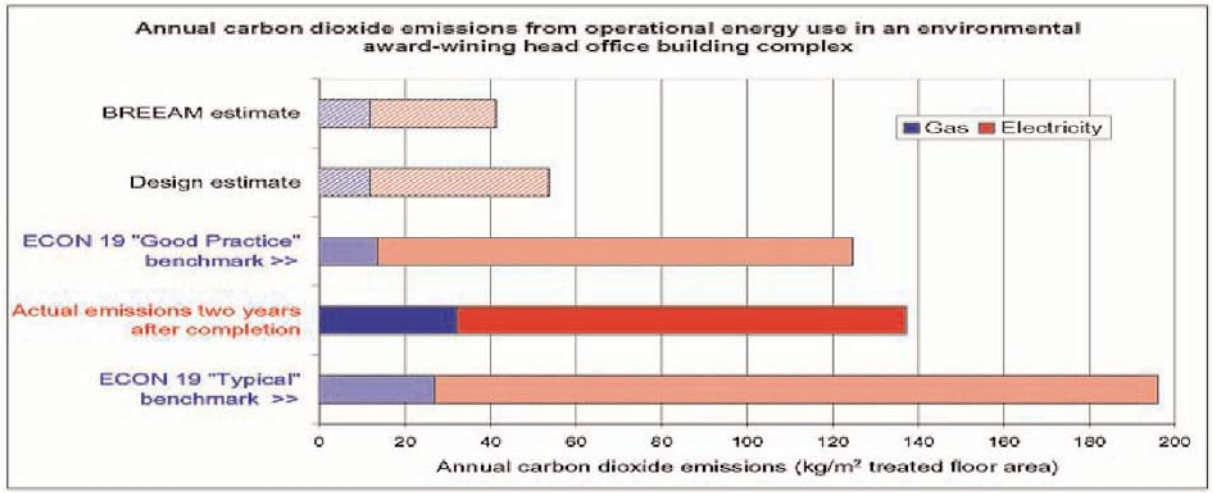
Figure 1 shows data from an energy survey of an environmental award-winning office some two years after its completion (Curwell et al, 1999). The gas and electricity consumption (per m2 of treated floor area) is converted into CO_2 emissions using the published UK factors at the time and compared with:

- the estimates made by the designers;
- the estimates for the BREEAM (BRE Environmental Assessment Method) certificate; and
- typical and good practice UK benchmarks adapted from Energy Consumption Guide 19 (Action Energy, 2003) "ECON 19" for an office of a similar type and use.

The CO_2 factors used throughout Figure 1 are those published in the 1998 edition of ECON 19.

Closing the Credibility Gap

Figure 1. Differences between actual CO_2 emissions and predictions at the design stage



In the example shown in Fgure 1 above:

- The design predictions did not include the electricity consumed by the equipment and HVAC systems in the computer and communications rooms. The ECON 19 benchmarks do.
- The requirements for flexibility and reserve capacity in the air conditioning for the computer and communications rooms, together with the use of the same chilled water system for top-cooling of the offices in occasional hot periods, had led to a design which had relatively high 24-hour loads for fans and pumps.
- The amount of electricity drawn by office equipment when not in use was high, partly owing to the security system adopted which did not allow networked equipment to be switched off.
- The HVAC plant was not operating optimally: the managers had this under investigation but had not yet found a solution.

This draws attention to important issues that significantly affect achieved energy performance but need more recognition in briefing, design and management – and in certification.

Why the credibility gap?

When faced with the credibility gap – and most people neither seem to know nor care about it (Bordass 2003) – the instant reaction of the occupier may be that the designers got it wrong, while the designers complain that the occupier has never bothered to understand the building, is using it in unexpected ways and doesn't operate, maintain and manage it properly. There is often some truth on both sides, but there can be many more reasons.

Slippage during initial estimation

For example the designers may often have:

1. Only estimated the energy use of the typical spaces (e.g. only the office space in an office building), and left out everything else, circulation areas, support spaces, car parks and so on.
2. Only reported the energy used by normal building services (heating, hot water, cooling, ventilation and lighting), not by anything else.
3. Assumed the building is empty at night with most systems off. Often they aren't, see figure 2.
4. Assumed near-perfect control and a close match of supply to demand.

In comparing design options, the above simplifications may be practical and legitimate, but in effect the designers are not predicting the actual energy use but some strange optimal energy use (a bit like the thermodynamic efficiency limit for a heat engine). Then the credibility gap really opens up when designers go on to claim how good their building will be by making direct comparisons between the total primary energy use or CO2 emissions for this subset, with the totals in benchmarks

such as ECON 19 (Action Energy, 2003) which are based on actual energy performance data and take into account all energy uses in the completed and operating building.

Slippage during design development

In addition, what was actually specified to be built may have deviated from the design assumptions at the time the options were appraised and the estimates of energy use first made. For instance:

5. Client requirements may have changed, affecting the design and its energy use.
6 The insulation, ventilation, solar and daylight characteristics of the envelope may have changed.
7 The heat storage characteristics of the fabric may have changed.
8. The building services and the controls may have been altered.

But were their effects on the predicted energy use re-calculated, particularly if to do this would have meant having to pay people who had been thought to have completed their tasks (e.g. thermal modellers and BREEAM environmental certifiers), to come back and have another look?

Slippage during construction and commissioning

The building may not be constructed as intended:

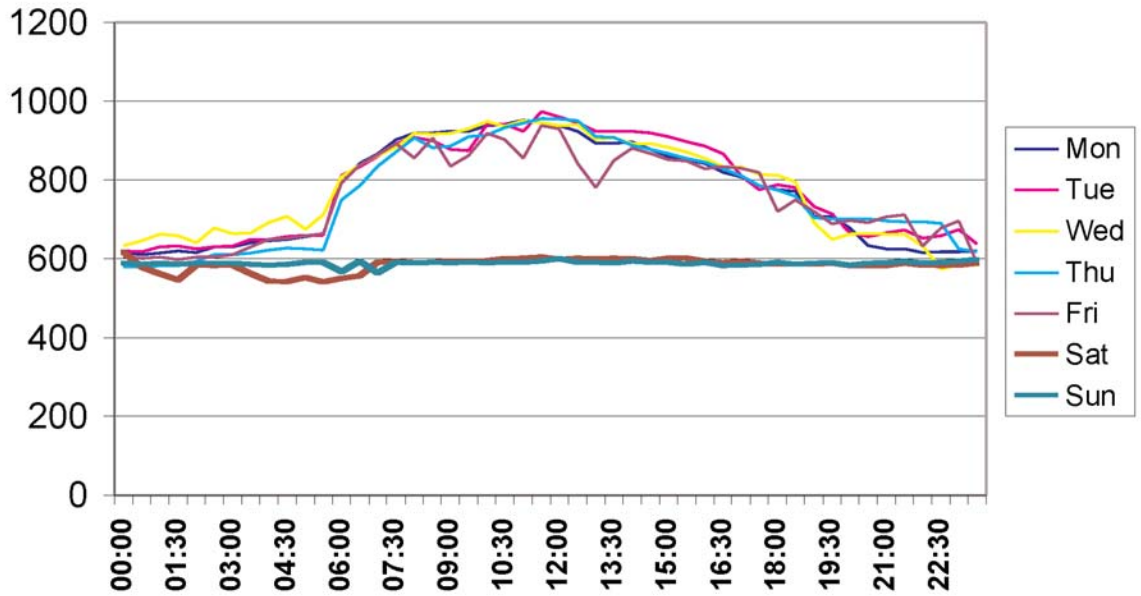
9 If tenders were high, cost savings may have been necessary. Cost cuts often affect thermal characteristics, building services and controls – things that aren't generally seen although they can be felt. Solar and glare control devices often suffer too. Increasingly such negotiations are between clients, project managers, contractors and suppliers and not under full control of the design team – who may sometimes not be involved at all, or only in commenting on the outcome.
10. Elements which include contractor-design (and often cost negotiations too) may not end up as anticipated. For example, it is not unusual for structures to cut into zones which had been intended for insulation, and to make air sealing measures very difficult to install; and for cladding systems not to be of the intended thermal integrity, especially at interfaces with foundations, eaves and other types of wall construction.
11. Building services equipment may have been substituted for that originally specified.
12. Build quality may not have been up to standard, e.g. with degraded insulation and airtightness.
13. Commissioning may not have been thorough. It is not uncommon to find energy-saving devices such as variable speed drives, heat recovery and "free cooling", and plant sequencing systems working very poorly, if at all.
14. Services and controls may not work exactly as intended.

Once completed

15. The building may not be occupied quite as envisaged.
16. The fitout may change the building and its energy systems substantially and clash with some of the design intentions and installed systems.
17. The systems may never be fine-tuned to suit changing occupancies and seasons.
18 Operators and users may find it difficult to understand the control systems and to operate them effectively; and the systems may not always have been usable or manageable in the first place.
19 Maintenance and energy management may not be up to standard.
20 Systems and equipment may default-to-on unnecessarily; or because it is the only way to keep the level of complaints down, see figure 2. A similar example is shown in figure 19.2 of CIBSE Guide F (2004).
21 There may be emergent properties and unintended consequences, for example control systems which irritate the occupants and are therefore by-passed.
22 In rented – and particularly in multi-tenanted - buildings– the split of responsibilities between landlord, tenants and building managers often inhibits investment and exacerbates the wasteful operation of systems.

The extreme but nevertheless real illustration in figure 2 (next page) shows the average electricity demand (in kW) every half hour for a week in October 2001 for an air-conditioned office building in London. There is very little out of what might be expected during Monday-Friday working hours, but the base load at night and the weekend is still about two-thirds of the daytime peak. This baseload might have been largely ignored in design calculations. About half of it is accounted for by computer installations (including their dedicated air-

Figure 2. Half-hourly electricity demand profile in an office building



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About half of it is accounted for by computer installations (including their dedicated air-conditioning systems) and other 24-hour loads such as security lighting (these may be legitimate business requirement, though much avoidable waste can often be found here). The other half is from the air-conditioning which ran permanently during the heating season to avoid complaints of discomfort at the perimeter. Was this a design issue affecting the intrinsic efficiency of the building, or an inappropriate management response? In summer the monitored baseload is approximately halved, while the peak is slightly higher, particularly for pre-cooling on Monday morning.

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Making things better

Improving the process

Ordinary people might reasonably expect designers and builders to be experts on the performance of the buildings they create. This is not normally so: those who produce buildings work on projects. These projects are about producing buildings. Having produced one, designers and builders go on to the next - as do the project managers and the procurement wings of major construction clients. By and large, the providers do not stay around to see how well the buildings they have produced actually work. Consequently, large differences between energy performance expectations and outcomes can occur virtually unnoticed, while designers continue to repeat flawed prescriptions. Designers may also fail to realise when they have a success on their hands which they should be replicating: instead they may attempt to gild the lily and create “solutions” which are more complicated than necessary. “Keep it simple and do it well” is often the most reliable formula for success.

Achieving virtuous circles

Good briefing, good design and good management can deliver buildings which are simultaneously comfortable, productive, economic and energy-efficient, but these are still rare.

Certification and transparency

What is an energy certificate for?

A certificate is not an end in itself, but a means to improvement. It should:

1 Encourage people to commission, design and build better buildings in order to get a better grade.

2 Help occupiers to select and demand better buildings when they are looking for space.

3 Stimulate owners and landlords to compete to offer buildings of good energy performance.

4 Provoke and assist the undertaking of investment and management measures to improve the energy performance of occupied buildings.

Triggers for certification

In relation to the requirements of the EPBD, the Energy Performance of Buildings Directive", the definition of the energy performance of a building (Article 2.2) allows 'the amount of energy actually consumed or estimated' to be used on an energy certificate:

- ❑ Attributes 1 to 3 above are aimed at the point of completion, sale or rental – Article 7.1 of the EPBD. These need calculated predictions of energy performance and grades that can be compared on a reasonably uniform basis.
- ❑ Attribute 4 also relates to the requirements of Article 7.3 for the display of energy certificates for large (over 1000 m2) public buildings (including buildings frequently visited by the public) in operation (with the trigger being the type of building they are and not their construction, sale or rental). This can make use of actual consumption.
- ❑ For buildings certified on predictions only, we would also recommend re-certification after say three years, taking actual performance into account - including modifications made during fit-out.
- ❑ Actual energy performance can also be taken into account when buildings in use are re-certified.

In all certification exercises, we must remember that a critical part of the activity is not calculating the grade, but making improvements in energy and carbon efficiency - identifying the cost-effective energy-saving measures and providing motivation for putting them into effect.

Practicality, consistency and correctness

A suitable certification system will need to be:

- ❑ Practical, with methods to suit the nature of the building being assessed and the skills and experience of those doing the assessment; at a time and cost which suits governments and the marketplace, and avoids accusations of “gold plating”.
- ❑ Consistent, with certificates as compatible as practically possible between countries and sectors.
- ❑ Technically robust, so that certificates can be meaningful even if some precision needs to be sacrificed in the cause of practicality.

Two complementary approaches

For occupied buildings, for which records of energy use are available, how do we deal most effectively with the EPBD’s requirement in Recital 16 to “describe the actual energy-performance situation to the extent possible”?

- ❑ Those accustomed to thermal modelling tend to wish to use the empirical results to re-calibrate their models. However, to provide a model-based certificate can require a large overhead of data collection, particularly where design data is not available. In practice, many recommendations can be made without any modelling at all, though computers can help to manage the calculations.
- ❑ Many of those accustomed to doing energy surveys tend to feel that models do not always describe what actually happens very well – particularly in the more complex buildings, and would prefer a more direct route.

We see the routes using calculated and actual energy as complementary. What one should use at any time is the most efficient and effective for the task in hand.

Using tree diagrams

‘Tree diagrams’ can be used to help to grade the energy performance of buildings in operation, make

comparisons with benchmarks; develop appropriate energy-saving measures, and determine their impact. The same vocabulary can also be used to summarise design expectations and to relate them to performance in use.

Design freedom?

In order not to inhibit innovation, designers often prefer to work to an energy target for the whole building, rather than to have innovation inhibited by too many prescriptive requirements. The intention is admirable, but how far can design data be trusted, given the credibility gaps that can occur? The tree diagram notation offers a common basis to report both:

- ❑ design assumptions and predictions; and
- ❑ data collected from buildings in use.

This potentially allows discipline and transparency to be improved while flexibility is retained.

An example

Figure 3 shows a tree diagram illustrating the elements of electricity consumption by fans in an air-conditioned building, and comparing design expectations with in-use outcomes. The figures here are whole-building averages, but the same approach can be used at any scale, as discussed below.

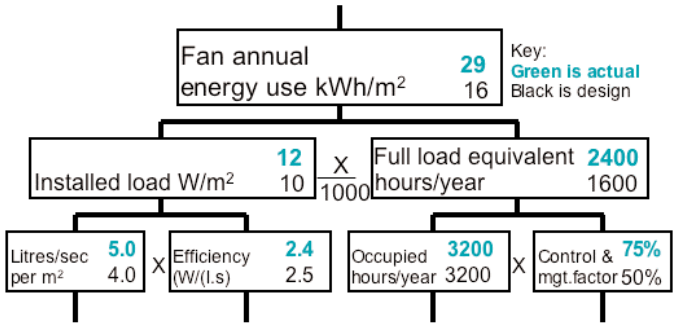
Figure 3 shows how the annual electricity use for fans is made up by multiplying together the installed load for the ventilation system on the left by the equivalent full load hours of operation on the right. In turn, the load can be broken down into:

- ❑ a service standard and an efficiency on the left, representing the characteristics of the constructed asset
- ❑ occupancy hours and a control & management factor on the right, representing how the building is used, controlled and managed.

In this example the actual energy use by the fans is significantly higher than the design estimates. The main reasons for this are:

- ❑ a higher ventilation rate. This may be the result of a new requirement (e.g. higher occupancy densities or internal gain levels – these can also be examined); and
- ❑ an increased control and management factor for the same occupancy hours. How much is this a problem for the design, the installation, the control, the management or the use of the building?

Figure 3. Tree diagram for fan energy consumption



The power of tree diagrams

This relatively obvious tree diagram description can be put to quite powerful uses. It can:

- ❑ Split out energy by end use at whatever scale suits the task in hand, from the whole building down to one specific piece of plant, room, zone or end-use.
- ❑ Permit benchmarking at a whole range of levels (e.g. annual energy use for fans, typical annual full-load running hours, typical installed power density and specific fan power, and so on).
- ❑ Allow the efficiency of any building, system or energy end-use to be summarised in terms of its "AGT factor" – how actual (A) performance relates to Good Practice (G) and Typical (T) levels.

Tree diagrams were also used to harmonise the empirical energy use benchmarks in ECON 19 with industry standards and rules of thumb for engineering systems; and this approach also underpins the system of "tailored benchmarks" for non-standard offices (see www.actionenergy.org.uk).

Using tree diagrams for transparency

Essentially each value in each box in a tree diagram can be regarded as a useful value for the building, system, subsystem or end-use concerned,

and capable of comparison with other data (as in figure 3), or with relevant benchmarks. The boxes can be completed however the value is determined e.g. by measurement, estimation or calculation. Tree diagrams therefore offer the potential for use as a practical language for a whole variety of comparisons. Indeed, they have already been applied in this way using CIBSE TM22 workbooks to summarise the results of design energy calculations and to compare these with energy survey and facilities management data. A standard classification system might also be developed to allow databases to be constructed which could potentially accommodate energy use information from any source, for example as part of an on-line certification exercise.

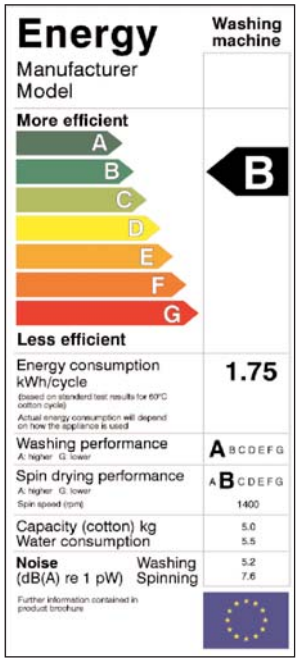
Developing the energy performance certificate

The form of the certificate

It is clear that both professionals and the public like the idea of a certificate with a headline indicator of similar appearance to the familiar EU energy efficiency label used on domestic appliances, as illustrated alongside.

In addition to the energy efficiency A-G grade, the example shows:

- How much energy is used per wash cycle. Normally, but not always, an energy-efficient small machine will use less energy than a larger machine of the same grade.
- Additional information on performance, also on an A to G scale – in this example the washing and drying performance.
- Background information on context, here the spin speed.
- Further information on features, here load capacity in kg.
- Further information on performance, here water consumption and noise levels. Here engineering values rather than grades are shown (though the actual values in this example from www.saveenergy.co.uk seem unlikely, and the units of water consumption are not given).



A certificate for buildings

We have discussed the possible first page of a certificate for buildings with industry representatives in the UK, our colleagues in two EU research projects (Europrosper & Green Effect) and other contacts. Generally, those consulted have thought that the front page of a nondomestic building energy certificate should show a similar amount of information to the appliance certificate. A few people also thought the front page should include the main energy- and CO_2-saving measures proposed.

However, a strong recent opinion, with which we agree, is that the certificate should show both:

- a standardised "Asset Rating", which takes into account the potential of the building for energy efficiency with standard patterns of use for its type; and
- an "Operational Rating" based on the efficiency of the building's performance in use, and which takes into account its actual occupation, management and fuel consumption.

The Asset Rating can be calculated first as a "design rating" and then confirmed upon the completion of the building in relation to what actually exists and how good its installation, commissioning and control potential appears to be. Following experience in use, the Asset Rating could also be updated based on the Operational Rating.

A possible format for the first page of a certificate

Figure 4 (next page) is an example of a possible first page. The headline grading shows:

- The familiar A to G scale (we suggest it might be extended to H for buildings with very poor energy efficiency and A*, A**, A*** etc. for buildings with very low energy use or CO2 emissions).
- Twin "sliders", one for the Asset (or Design) Rating and the other for the Operational Rating.

Taking account of the credibility gaps

Credibility gaps are exposed – first by correcting the Asset Rating first for build quality and then in the light of actual energy performance (where this uncovers shortcomings in intrinsic efficiency); secondly by comparing the Asset and Operational Ratings; and thirdly by a sub-rating for management. In this particular example, although the CO2 emissions are more than in the Asset Rating owing to a higher intensity of use, an excellent level of management has led to a better Operational Rating. Sadly – at least at present – the opposite normally prevails.

Both ratings do not always have to be shown

While the certificate would be to a standard format, it will not always be possible to show both Asset and Operational Ratings: sometimes one of them will be blank. In particular:

- For a newly-completed or refurbished building, no actual energy performance data will be available, and so only the Asset Rating is capable of being shown.
- For space on the market, although past data on actual energy performance may be available, it may not be relevant to how the building will perform for a new occupant.
- For occupied buildings obliged to display a certificate under EPBD Article 7.3, the Operational Rating is paramount. However, ideally an Asset Rating would be calculated at the same time.

Other detail proposed on the first page

- Above the scales, showing the type of certificate, the building type (here an office but it could include sub-types or mixed uses), and whether the certificate is for the whole building, a part of it (e.g. an individual tenancy), or perhaps even for Landlord's Services only.
- Below the scales, there are the quantitative performance indicators and further information:
- On the methods and units used. In particular, the UK is likely to use CO2 for final comparisons, while many other EU countries will want to use primary energy. Different countries and sometimes sectors are likely to use different methods and floor area definitions.
- Then on key numbers, for example occupancy levels – which are critical inputs to models and critical outputs from in-use assessments.
- Finally on the energy efficiency grades for subsystems and management.
- There is also space for an indicator of internal environmental quality.

Some people think the first page needs to be simpler. If so, some detail could go on later pages, which will need to show the recommended savings measures (unless they are on Page 1) and supporting input and output data on both the design, its performance in use, and to identify the specific methods and assumptions used in making the assessments.

Conclusions

If we are serious about reducing CO2 emissions from nondomestic buildings, then it is vital to use the EPBD to address achieved performance and to close the credibility gaps. Major opportunities lie in:

1 bringing into use newly-completed, newly-refurbished and newly-occupied buildings;

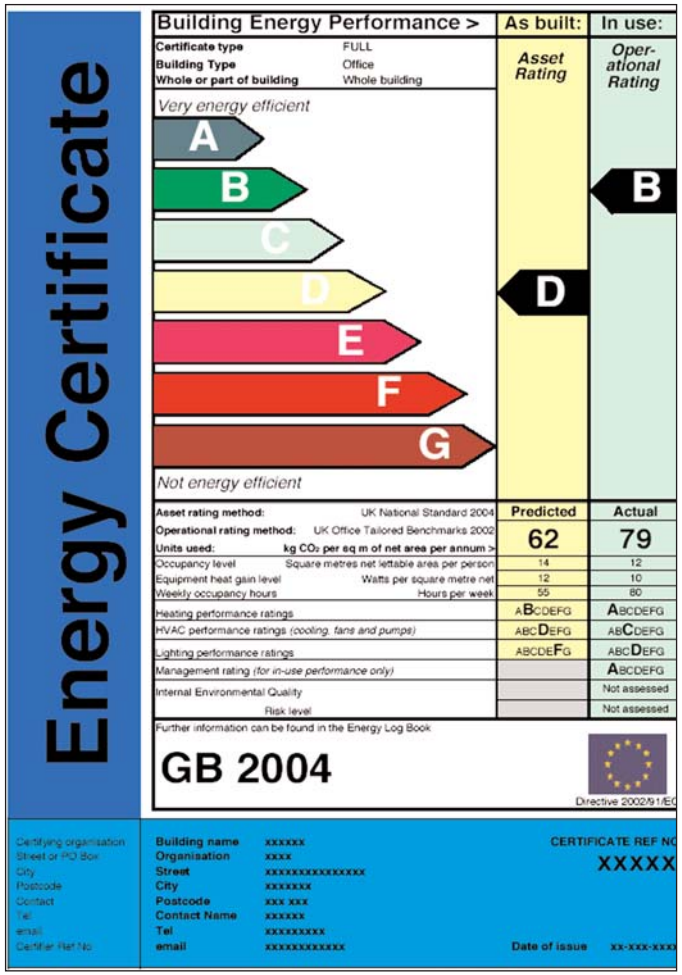
2 fit-outs - these may be trapped by Building Regulations in the UK, but not necessarily elsewhere;

3 improving the management of existing buildings (including newly-occupied ones, for example by re-certifying them some three years after occupation, taking account of actual energy use); and

4 helping to close the feedback loop into procurement, design, construction and handover so that the supply side learns how to achieve true performance improvements in practice, and building operators learn to make better use of the latent potential of a building and its systems.

We hope that the design of the certificate finally chosen, together with the underlying procedures, will enable these objectives to be achieved in an efficient and cost-effective way, and stimulate rapid reductions in energy use and CO2 emissions by taking account of how buildings actually work and are used and managed.

Figure 4. A possible first page of an energy certificate with both Asset and Operational Ratings



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The construction of buildings that use energy and natural resources wisely are essential for the preservation of our environment. If we are the dominant species in terms of numbers and if we have taken upon ourselves the leadership role, then we have a duty to all existing life forms to maintain the harmony and balance of the earth's eco-system.

Her Imperial Highness Princess Takamado of Japan, in her opening adress for SB05 Tokyo, September 27, 2005

Continued from Page 2

- the “Module B” submitted by the user is checked by iiSBE Italia to verify the propriety of the data provided by the client.;
- the assessment technical reports and the GBTool are sent to iiSBE International, which will issue the performance certificate.

It is possible to certify any kind of building at design and operative stage, as long as the appropriate weights and benchmarks are established. The cost of the certification is based on the building’s size and functional complexity.

The role of the National Research Council and Environment Park is to provide scientific and technical support in the development of the weights and benchmarks used in GBTool and in the actual execution of the assessment , including simulations. A strong interest has been raised by this initiative, both in the private and public sector.

Pirelli Design Competition

A recent competition for the design of a new office building for Pirelli Real Estate in Milan concluded with awards to two firms: Archea in Florence and Michael Maltzan in Los Angeles. The designs are interesting, but it also marks the first time that a rating tool to assess the sustainability performance of entries has been used in a competition in Italy.

Pirelli Real Estate wanted the design competition to result in a high performance building that could be considered a demonstration project for all of Italy. It was decided that a rating system would be the best way to reach this objective.

The Maltzan design for Pirelli

The rating system was integrated with the competition process so that the commission could have an objective assessment of the environmental performance of the proposals. Of exceptional interest is the fact that the system, calibrated to reflect the priorities of the competition, was also used as a design tool by the candidates during the process.

Environmental sustainability played a very important role in deciding the winners, with the assessment results constituting 25% of the total possible score for each proposal.

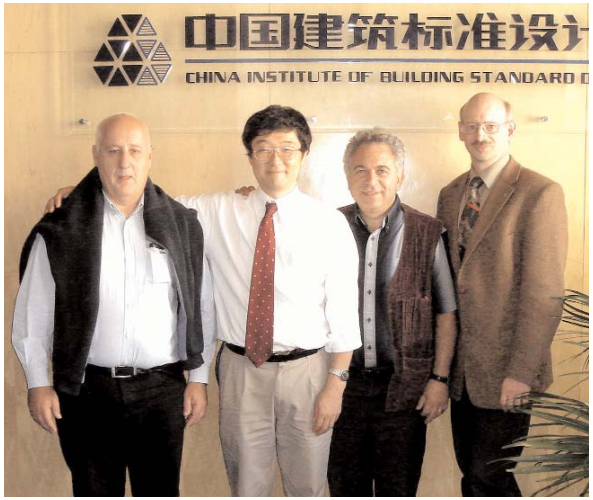
The assessment tool, based on the international GBTool, was developed by iiSBE Italia in partnership with the National Research Council of Italy. The system allows users to assess the environmental performance of a building in the design stage. The performance is assessed with respect to 27 criteria and sub-criteria, organized under 5 performance issue headings.

Andrea Moro, andrea_moro@envipark.com

iiSBEat ISO-meetings in Beijing

During the time 10-14 December 2005 the ISO plenary meeting as well as the meeting of the working groups 1 to 4 of the international standardisation activity in the area of sustainable construction (ISO TC 59 SC 17) took place in Beijing, China. The following countries were represented: Canada, Finland, France, Germany, Japan, Korea, Netherlands, Norway, Spain, Sweden and the UK. Based on a liaison with ISO TC 59 SC 17, iiSBE (represented by Thomas Luetzkendorf) officially participated in ISO’s plenary meeting – iiSBE now has an own seat at the ‘ISO-table’. During the plenary meeting iiSBE’s representative had the opportunity to briefly explain the goals and functioning of iiSBE as well as to formulate iiSBE’s expectations upon the results of international standardisation activities in the area of sustainable construction. It

Below: Some ISO participants
photo Thomas Luetzkendorf



turned out that common interests exist particularly in the area of developing and applying indicators for the description and assessment of a building's sustainability as well as in the area of developing methods and tools for an assessment of a building's environmental performance. It also turned out that iiSBE is already capable of supporting ISO's activities by providing experiences made by researchers and practitioners of iiSBE's international network.

The status of work achieved within each working group can be described as follows:

WG1 is concerned with the general principles and with the terminology in the area of sustainability in building construction. WG1 covers the full range of all three dimensions of sustainability. One major task of WG1 is translating the general principles of sustainable development into the area of building and construction. In doing so, WG1 forms the basis for the work of the other working groups and partial norms. Interim results of WG1 will be discussed in the near future. WG1 is open for comment through the national standardisation organisations.

WG2 is concerned with the design of a framework for the development of indicators for buildings. The interim result of WG2 will be tested in the near future in order to obtain experience reports from the users of the framework. The actual work at the respective partial norm will be continued in the mid of 2006. In the medium- and long-term WG2 plans to provide the methodological basics concerning indicators for constructed works as well as to produce core lists of indicators in order to harmonise the use of indicators and, if applicable, to create a minimal list of indicators.

WG3 deals with the issue of providing product information through environmental product declarations (EPDs). This approach – which involves immediate consequences for the construction industry – is nearly aligned and verified. In the near future comments can be submitted through the national standardisation organisations. WG3 decided further improving the consistency between data on building products and the information necessary to assess and evaluate constructed works.

WG4 looks at questions related to the environmental performance of constructions works – part1 buildings. At the moment WG4 intensively discusses the impacts and aspects that need to be considered within the scope of an assessment as well as the description of the whole life cycle of buildings. With regard to the assessment of buildings WG4 has worked out the necessity of taking into account the specific interests and viewpoints of the different actors/stakeholders involved. Again, comments can be submitted through the national standardisation organisations in the near future.

The work of iiSBE's representatives at ISO is not restricted to observation and commentatorship. Besides using the national standardisation organisations to submit comments on activities of the different working groups, it is also possible submitting and inserting comments and standpoints on the basis of iiSBE's liaison with ISO. Anyone who wants to actively participate and submit comments can directly contact iiSBE's secretariat which coordinates the necessary actions.

During ISO's plenary meeting an additional information exchange between ISO TC 59 SC 17 and the European standardisation initiative 'CEN TC350 Sustainability of construction works' has been agreed upon. Also at CEN several members of iiSBE participate in respective activities.

Besides the official ISO meeting an informal workshop has been held with colleagues from China in order to inform them about ISO's work and activities. The Chinese colleagues have been very well informed and have already intensively analysed both international assessment tools and published case studies. Within the scope of informal talks the goals and functioning of iiSBE have been explained. As a result, first applications for collaboration are already on hand. Surely, we will soon welcome new iiSBE members from the Beijing area.

Thomas Luetskendorf, iiSBE ISO coordinator
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Toronto Regional Green Building Festival

This regional conference marked the first real attempt at cooperation between several organizations involved in sustainable development regionally and nation wide: the Toronto and Region Conservation Authority, the Canadian Urban Institute, Sustainable Buildings Canada and the Canada Green Building Council.

It is evident that politicians are getting the message that a green building approach is important: the Ontario Minister of Energy, Donna Cansfield announced the province's goal of reducing government energy use 10%, greatly increasing renewable energy production and removing building code's barriers to building green, all by 2007. There was a certain degree of disbelief evident

about these pronouncements amongst the audience.

Leading Canadian and American green experts provided their views on the emerging issues in the fields of green and sustainable design and construction. Bob Berkebile presented several US projects with a note about the global shift and inevitable change of the way we will build our environment. Some of the more interesting statements were made by participants:

- Architect Adrian Di Castri said that green building is 60% common sense and 40% rethinking and new technology.
- To considerable applause from the audience, DiCastri also stated that there is a lot of bad design in Toronto and that the architects responsible for such a state should be locked up.
- The idea of open competitions, not used much in Canada, was suggested as a means to improve the quality of designs.
- The issue of legal liability for designers who do not meet required green standards was raised. It was concluded that such a liability should not be regulatory, but rather a moral obligation of architects, analogous to the Hippocratic oath for medical doctors.

Lifetime Achievement Awards were presented to three individuals whose professional life was focused on green and sustainable design long before it became part of mainstream thinking: Greg Allen, President of Sustainable Edge Ltd., Steven Carpenter, President of Enermodal Engineering and Martin Liefhebber, Breathe Architects.

During two days of presentations and charrettes the 200+ participants were exposed to examples of green building and sustainable planning principles to some very large projects, such as the Toronto Waterfront redevelopment. New initiatives, such as Net Zero Energy Healthy House were also presented and discussed.

Woytek Kujawski,Canada Mortgage and Housing Corporation, wkujawsk@cmhc-schl.gc.ca

Update from Chile

Norman Goijberg writes to us from Santiago that there is an increasing level of activity in the region with respect to sustainable building.

First, the Holcim regional awards took place in Rio de Janiero on October 21. Norman was one of the jury members and the head of the jury was Vanderely John, one of the main organizers of last year's Sao Paolo regional SB conference.

It is interesting to note that the three Holcim prizes went to ...*a conceptual project aimed at improving urban policy by proposing rooftop gardens throughout the city of Buenos Aires*... while the second prize went to a minimum energy school and the third to an urban improvement project for a large shanty town in Caracas, Venezuela. All the winning projects had major social content.

Norman also tells us of a seminar on *Energy Efficiency and Sustainability,* held in Santiago on October 27. In the Latin American context, this is a good sign of increasing interest, especially in view of the participation of Otto Kunz, President of the Chilean Chamber of Construction, Nicola Borregaard, Advisor to Minister of Economy and Energy; and Iván Couso, Coordinator of the National Program for Energy Efficiency,

Finally, it looks as if the foundations are being laid for the launch of a permanent local organization. A meeting with a working group, with the participation of the same ministries, some universities, some private companies, will take place in a few weeks.

For further information, contact Norman Goijberg at goijberg@greenbuilding.cl

Holcim Awards

In our news from Chile (above) we have brought you news about the Latin American Holcim winners. You should note that Holcim defined five regions, and winners have been announced for all of these. The other regions include Europe, North America, Africa and Middle East and Asia Pacific. For website access to all information, please go to http://www.holcimfoundation.org.

From the press release....*The first prize of USD 100,000 went to a hybrid of urban, architectural and landscape design that guides the sustainable construction and renovation of 187 housing units. "Greening the Infrastructure at Benny Farm" in Montreal, Quebec, Canada, integrates socio-economic processes and low-cost sustainable measures such as water treatment, geothermal heating and cooling systems, as well as provisions for waste management. Head of the regional jury, Prof. Santos said that the entry of Daniel S. Pearl from L'OEUF/ Pearl Poddubiuk et Associés, Architects (Canada), showed an ambitious social vision aiming at integrating stakeholders and exceeding the scale of individual interventions. The project was*

also praised for its financial viability and aesthetically sensitive contribution to neighborhood planning. The project displays an ambitious social vision that aims to effectively integrate stakeholders and offers potential reductions in health care and utility costs.

Holcim Awards Silver 2005 to a synthesis of function, form, technology, and nature The second prize of USD 50,000 went to the "The New Sustainable California Academy of Sciences" ‹ a major public building project in San Francisco, California, USA. "This outstanding project is not the work of one individual, but of several teams from industry, universities and public institutions. This kind of teamwork is typical for projects in the field of sustainable construction ‹ because sustainability always involves a whole range of aspects," commented Prof. Santos.

Holcim Awards Bronze 2005 for innovative materials research of concrete Third prize of USD 25,000 went to a project that challenges the construction industry to achieve increased levels of efficiency and environmentally sensitive techniques for production. By using flexible fabrics instead of conventional rigid molds, concrete elements are able to vary according to structural requirements, promising significant savings in embodied energy, material and transport weight. Project owner, University of Manitoba Associate Professor Mark West (Canada), was congratulated on the degree to which his innovation is both highly transferable and context sensitive, providing an innovative technique for preformed concrete production.

It is interesting to note that two of the three North American winners were Canadian, notwithstanding the ten-times larger U.S. population.

We do not have space to bring you details of the other regional awards, but it is well worth an hour of your time to browse through the Holcim site to see them. The combination of large cash awards and good selection criteria have made the Holcim process a very positive contribution to sustainable building.

The processisn't finished yet: following five regional competitions, 15 Award-winning projects will now compete in the first global Holcim Awards competition for sustainable construction projects. The global phase of the competition showcases the best entries from more than 1500 submissions from 118 countries, and encourages innovative, future-oriented and tangible approaches within the building and construction industry.

The Northern Light Shines

From October 7-16, Canada joined 18 other teams from across North America and around the world, to take part in the 2005 Solar Decathlon in Washington, D.C. It was an interesting and well organized event and a great learning opportunity for the students and public alike. Thousands of people visited the homes daily, (25 thousand visitors on one Sunday alone!), including the Canadian Minister of the Environment, Stéphane Dion. The Canadian Team was also invited to a special reception for them at the Canadian Embassy in Washington.

The 2005 Solar Decathlon pitted 18 collegiate teams from the U.S. including Puerto Rico, Canada and Spain in a competition to design, build and operate the most attractive and energy-efficient solar-powered home. Students competed in ten

Photo by Thomas Green, CMHC

areas, ranging from architecture, livability and comfort to how well the homes provide energy for space heating and cooling, hot water, lighting, and appliances. Each house also had to produce enough "extra" power for an electric car. The primary sponsor of the Solar Decathlon is DOE's National Renewable Energy Laboratory within the Office of Energy Efficiency and Renewable Energy. Private-sector sponsors include the American Institute of Architects, the National Association of Home Builders, BP Solar, the DIY (Do It Yourself) Network and Sprint Nextel.

Canada Mortgage and Housing Corporation (CMHC), Natural Resources Canada (NRCan), Sociéte d'habitation du Québec (SHQ) and several private sector companies sponsored the Canadian entry, involving a team of engineering and communications students from Concordia University with participation from architectural students from l'Université de Montréal, in the development and construction of their home, the "Northern Light". After a week of work to assemble their homes as

part of the Solar Village on the Washington Mall, the Decathlon teams hosted 10 days of public tours and continuous competition evaluations as part of the event. The weather was cloudy during the whole Decathlon, so it was not much of a solar energy production competition - more of a battle of the batteries. All week before the event the weather was sunny, and right after the winners were announced it became sunny again! This led to some strange behaviours by teams, choosing to not participate in some competition tasks in order to conserve energy and gain points in other tasks.

The Canadian team received two awards during the competition: placing first for the "Most Energy Efficient Design", a separate competition organized by the National Home Builders Association (NHBA) and DOE; and also received the BP Solar award for best roof integration of photovoltaics. In addition to the NHBA trophy, two students will get all expenses paid to go to Orlando in January 2006 at the NHBA conference to make a presentation about the house.

In the overall Decathlon competition standings, the Canadian house placed only 14th out of 18 teams. The house lost a lot of points in the Architecture and Dwelling competitions, but did quite well in many of the other tasks. Not having an integrated design team throughout the entire project development process, involving architectural and interior design students as well as the engineering students, was probably the biggest factor contributing to our team's overall score.

Overall though, the Decathlon event offered an impressive collection of creative sustainable housing design ideas and approaches - one might like some ideas and not others, but the total experience for all participants has definitely been positive and an eye-opener for what is possible with collective minds, a creative vision and a lot of hard work in the right direction. The Northern Light home is currently back at Concordia, where it has been given a permanent foundation at the university's Loyola campus in Montreal and will serve as a solar housing research and learning centre.

Further information is available at the US DOE Solar Decathlon website:
http://www.eere.energy.gov/solar_decathlon/

Thomas Green, Canada Mortgage and Housing Corporation, tgreen@cmhc-schl.gc.ca

iiSBE holds meetings in Tokyo

Taking advantage of the presence of many members at the Tokyo SB05 conference, iiSBE held an Annual General Meeting and a Board meeting during the conference.

We won't bore you with administrative details, but it does seem wortwhile to point out that iiSBE is spreading its wings, with local organizations being established in Italy, Poland, Czech Republic, Chile, China, Israel and Florida. Representatives selected for 2005-2006 include the following:

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Ilari Aho
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Thomas Luetzkendorf, ISO Liaison
Aleks Panek, CEN TC350 Liaison

For further information, contact Nils Larsson at larsson@iisbe.org.

Ashden Awards

"The Ashden Awards for Sustainable Energy are now looking for entries from ... *inspirational and innovative local sustainable energy projects from across the globe to compete for £350,000 of prize money.*. The Ashden Awards reward outstanding projects which can demonstrate how local sustainable energy can be used not only to slow down the factors contributing to climate change, but also to

radically improve the lives of poor communities who lack access to essential energy resources.

For more information please visit http://www.ashdenawards.org or contact: Danielle Jones on + 44 207 410 0330; email: info@ashdenawards.org "

Inter-Disciplinary Mis-understanding?

Recenetly we had the opportunity to spend a day with university students in Montreal. The students, from several universities in the city, were getting to grips with the concept and use of the Integrated Design Process (IDP).

The organizers, Danny Pearl and Spencer Mann, organized a very good session, with students from backgrounds as diverse as architecture, engineering, management and social work. One aspect was especially ingenious: they distributed slips of paper to half a dozen students chosen at random. Each piece of paper contained a single word frequently used in sustainable building circles. During the session, the students were asked for a definition of the words and expressions. The results were very interesting and underline the need for ensuring that everyone understands what is going on when people from diverse backgrounds are involved..

Carrying capacity, for example, was defined as modular and portable buildings;*Barrier Free* was interpreted as meaning landscape that is open as far as you can see, while *Circulation* was understood as meaning efficient communication between groups. I highly recommend this procedure to test understanding of basic terms !

Nils Larsson, larsson@iisbe.org

Ecobuild and AEC Science & Technology Events 2005

The Ecobuild Federal and AEC-ST Conference will be held in Washington DC during *December 13-16, 2005*, at the Washington Convention Center,.

SBIC's (Sustainable Building Industries Council) Ecobuild Federal focuses on sustainable and environmental design, products, and tools to improve the affordability, energy performance, and environmental soundness of America's built environment. This event addresses the special needs of those who design, build, and manage government facilities.

AEC Science & Technology (AEC-ST) Federal "Lifecycle Strategies for the Built Environment" examines technology tools and methods to improve the use and sharing of information in multiple data formats both within and between each stage of the built environment lifecycle.

Attendees include representatives from all segments of the public sector plus private sector professionals from the entire building and construction industry.

For details, see http://www.ecobuildfederal.com

Two brief announcements from iiSBE:

1. If you have an interest in launching a local iiSBE organization, contact Andrea Moro at andrea_moro@envipark.com.

2. iiSBE has launched a *Sustainable Education* working group. For details contact Ray Cole or Peter Graham at raycole@arch.ubc.ca or PeterG@fbe.unsw.edu.au.

Rethinking Sustainable Construction 2006: Next Generation Green Buildings

Sarasota, Florida, USA — 19-22 September 2006

Call For Papers

Rethinking Sustainable Construction 2006 (RSC06) is an international conference being organized to develop a vision for future green buildings and it will be held in Sarasota, Florida, USA in September 2006. Although this is a Call for Papers, a wide variety of delivery methods is envisioned for RSC06, from research papers by academics, to building models by design professionals, policy papers by public sector representatives, Power Point presentations from industry, and other effective means of communicating ideas. The organizers anticipate that this flexibility will encourage a dynamic interchange among the participants and help add sorely needed direction and energy to the international sustainable construction and green building movement. Please be sure to note your desired means of presentation in your abstract. :

Website: http://www.treeo.ufl.edu/rsc06

Special Reminder: The deadline for submission of abstracts is 15 November 2005. We encourage early submissions so you don't miss an opportunity to share your views and innovations.

Joining iiSBE is cheap at $75 Canadian(about 50 Euro) per year, and only half of that for students of residents of developing countries. For that low cost, you help to support our GBC project and the ABN newsletter, get access to downloads on our database at <www.sbis.info>, and you also will be able to subscribe to the refereed journal *Building Research & Information* (BRI) at a saving which is greater than your membership cost!

There is now a new reason to join iiSBE: our Skills Registry database. You can browse at http://www.sbis.info:8101/iisbeRegistry, but you have to be a member to register. This resource should be a useful way of establishing contacts between project managers and specialists in various aspects of SB.

To join iiSBE, download a PDF form from http://www.iisbe.org.

Story contributions and letters to the Editor sent by sane and coherent people are always welcome !

ABN is a publication of iiSBE, the *International Initiative for a Sustainable Built Environment.* ABN specializes in information related to sustainable building, and is distributed freely.

To join, see http://www.iisbe.org or contact <membership@iisbe.org>

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2005 GREEN BUILDING International Conference GBIC

Next Week !
Next Week !
Next Week !
Next Week !

2005 Subtropical Green Building International Conference

Date: 20-23 November , 2005

Venue: GIS Convention Center/NTU, Taipei

Website: http://2005sgbic.cabc.org.tw

Directed by Architecture & Building Research Institute, Ministry of Interior, Taiwan

Hosted by
Chinese Architecture & Building Center
National Cheng-Kung University
Taiwan Green Building Council

The 2005 Subtropical Green Building International Conference focuses on the issues of the “Subtropical zones”. The major programs of the Symposium include academic program, and technical visit to several green buildings in Taiwan. This action plan will showcase the fruitfulness of green building policies from the government sector, and the developments from the private sector. Being a member of the global partnership, the local, subjective, and unique of Taiwan experience can provide other countries in the subtropical zone an environmental education base.