This article is reproduced from the March 2006 issue of Essential FM Report 55, Environmental Management, with the kind permission of Tottel Publishing. Details of publisher and subscription rates are on the final page.

It's all in the labelling

The European Commission's Energy Performance of Buildings Directive (EPBD) was published three years ago. Amongst other things, it requires buildings to have energy performance certificates at the point of completion, sale or rental; and for public display in 'public authority buildings and buildings frequently visited by the public' over 1000 m^2 floor area. Certificates, which are for information only, should include reference values or benchmarks against which a building's energy performance or CO_2 emissions can be compared. They should be accompanied by recommendations for cost-effective improvements, but these could be standard checklists.

The task of implementing the EPBD fell to the Office of the Deputy Prime Minister (OPDM), which published a Consultation Document in July 2004, combining its reviews of building regulations Approved Document Part L and of the EPBD. The Consultation Document proposed two types of rating to meet the energy certification requirement:

It is impossible to predict exactly what ODPM will decide. The rating procedure has not yet been determined...The rating scale and the form of the energy certificate are also unknown

- an Asset Rating (AR) based on calculated requirements for heating, hot water, ventilation, cooling and lighting. ARs assess theoretical performance under standard conditions, and are designed to improve market awareness of likely energy performance at the point of sale or rental. For new work, ARs calculated for building regulations compliance purposes are called Design Ratings. When the work is completed, the AR needs to be re-calculated based on what was actually built
- an Operational Rating (OR) for buildings in use, starting with public buildings. ORs are based on actual energy requirements for all end uses and are primarily aimed at getting owners, occupiers, users and managers to understand and improve their building's performance.

Note that ODPM covers England and Wales only. Legislation in Scotland and Northern Ireland will be different, but is likely to be informed by what ODPM does.

The idea of Asset and Operational Ratings, initiated by ODPM's research, was subsequently developed by the European standards body CEN and has been incorporated in its draft standards to help support the EPBD. Following the UK's lead, the principles have been adopted by several EU countries. In the UK itself, responses to ODPM's Consultation Document are understood to have been broadly in support of the certification proposals above.

An ODPM announcement about AD Part L of the Building Regulations and the EPBD had been expected in early 2005, but was delayed owing to the General Election. Proposals for the Building Regulations were made on 13 September 2005, with drafts of the Part L documents that become operative in April 2006 – for non-residential buildings, a Part L2A for new work and L2B for work to existing buildings. At the time of writing, there has been nothing yet on the EPBD, but an announcement is expected soon.

It is impossible to predict exactly what ODPM will decide. The rating procedure has not yet been determined, though it is likely to be based on annual carbon dioxide emissions per square metre of floor area. The rating scale and the form of the energy certificate are also unknown, but it could make use of the draft CEN Standard.

ASSET RATINGS

For Asset Ratings, which will be based on calculation of annual energy use (and the associated CO_2 emissions) from building services (heating, cooling, hot water, ventilation and lighting) under standard conditions, the following seems likely:

- for building work, new construction (including the first fitout) and major alterations, the National Calculation Methodology (NCM)[1] will use accredited software (or SBEM, the Simplified Building Energy Model being developed by the Building Research Establishment) to calculate a Building Emission Rate (BER) and compare it with the emission rate calculated for a notional building to 2002 Building Regulations standards and then reduced by a defined fraction to form the Target Emission Rate (TER). The building passes if the BER is no more than the TER. A similar calculation could potentially be used for Design Ratings
- upon completion of building work, the NCM (e.g. SBEM) could be used to calculate the Asset Rating for the Certificate, based on what actually got built, its equipment as installed and commissioned, and the results of any tests (e.g. the pressure test for air infiltration)
- for sale or let, during or shortly after building work – Design or Asset ratings would have been calculated as above under building regulations, and could be given to the customer
- for sale or let, as a property transaction not connected with building work – in principle, the NCM could be adapted to calculate an Asset Rating. However, in an existing building precise design information will often not be available and could be quite difficult to get. SBEM does allow these values to be estimated from a description of the building (form, construction materials, date of construction, type of building services, and so on) but, as stated on its website, further development is desirable.

OPERATIONAL RATINGS

For Operational Ratings based on actual energy use, the situation is less clear. Some people argue whether we need ORs given that the Asset Rating needs to be calculated for the purposes listed above. However, for buildings in use – and in particular for public buildings which do not get sold or let – there is a strong technical case for ORs: they are easier to do, more relevant and make sure we save real, not just virtual, carbon dioxide. Many facilities, environmental and energy managers prefer ORs to ARs, as ORs would reinforce their existing procedures and reward ongoing energy and carbon management activities.

How would an OR be calculated? Being based on actual annual fuel consumption and CO_2 emissions, it will tend to include all energy uses in the building and sometimes outside it (e.g. car park lighting), and not just the building services subset used in the asset rating, under actual, not standard conditions.

A paper by the Usable Buildings Trust (UBT) proposes the following approach to undertaking ORs:

- first one needs to get good data on the building's annual energy use by fuel; and the CO_2 factors appropriate for each fuel. These data are not always readily available
- in order to calculate an energy performance index, one needs an accurate 'measure of extent' of the building, by which to divide the annual energy use (weighted by fuel type as necessary) or CO_2 emissions. This denominator (usually the floor area, though there are alternatives) can often be of poor quality, so needs careful attention
- the resulting energy (or in the UK probably CO_2) performance index can then be compared with benchmarks for the type of building concerned, to produce an initial rating
- where the building type and use is fairly standard (e.g. for many primary schools), comparison with standard fixed benchmarks may be sufficient for a fair assessment
- for more complex buildings with unusual features, equipment levels, or patterns of use, the benchmarks may need to be adjusted to take account of these. If quality-assured information on some or all of these features were available, one would be permitted to take them into account and produce a revised rating which could replace the initial one.

The UBT paper discusses how these complexities can be tackled at three levels:

- a quick and simple entry level that will suit the majority of buildings, at least to start with
- a second level which can correct for readily-verifiable exceptions (e.g. a swimming pool, a data centre, or a restaurant in an office building)
- a third level which can account for the density, intensity and hours of use. In rented buildings, the situation is further complicated by the split of energy use into landlord's and tenant's services. Ways of dealing with this are currently being considered by the British Property Federation, with support from the Carbon Trust.

GETTING STARTED

For construction and alteration work, the link of the EPBD to building regulations compliance by the NCM/SBEM calculation permits an early start on Asset Ratings. However, by far the largest number of AR certificates will be required for sale or let. Here it may take some time to get the system to work reliably, both technically in getting consistent results using the limited information available, and in practice owing to the need for trained assessors.

The EPBD requirement for certificates to be displayed in public buildings over 1000 m^2 is most appropriately met by ORs, based on actual energy use. Reportedly, the opinion of European Commission and ODPM solicitors is that initial application of ORs should be to public buildings frequently visited by the public (i.e. not including buildings such as hotels, supermarkets and offices occupied by public authorities). However, other bodies are arguing that the application should be widened to more types and sizes of non-domestic building.

In any event, some leading public and commercial property organisations are already interested in developing assessment and certification systems on a voluntary basis if necessary. This will help them to develop best practice (e.g. for Corporate Social Responsibility), to demonstrate achieved performance to their tenants, and to prepare their sectors better for the time when certification based on actual energy use eventually becomes mandatory.

References

Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings, Official Journal of the European Communities, L1/65-71 (4 January 2003).

Proposals for amending Part L of the Building Regulations and Implementing the Energy Performance of Buildings Directive, ODPM – Office of the Deputy Prime Minister (July 2004).

Usable Buildings Trust, Onto the Radar: How energy performance certification and benchmarking might work for nondomestic buildings in operation, using actual energy consumption (June 2005). Downloadable from www.eplabel.org/Links/Onto_The_Radar_Final.pdf

Bill Bordass is research director of the Usable Buildings Trust, www.usablebuildings.co.uk

1 For the latest information on the National Calculation Methodology NCM and the Simplified Building Energy Model SBEM, go to www.ncm.bre.co.uk/index.jsp

Published 10 times a year by Tottel Publishing Ltd,
Maxwelton House,
41-43 Boltro Road,
Haywards Heath,
West Sussex RH16 1BJ.

ISSN 1471-9835

Annual subscription: £239
Overseas: £253
Individual reports: £35

Managing editor
Linda Whittle

Series editor
Sarah-Jane North
01903 885323

Copy editor
Claire Banyard

Subscriptions/individual sales
Customer services
01444 416119

Email customerservices@
tottelpublishing.com

Design and layout
sandifordesign 07850 898083

Printed by
Hobbs the Printers

Tottel
publishing