MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS

Information Guide

Building Energy Ratings

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Issue Thirteen >

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Information Guide

This is an independent guide produced by Mitsubishi Electric to enhance the knowledge of its customers and provide a view of the key issues facing our industry today. The guide accompanies a series of seminars, all of which are CPD accredited. The changing face of construction in the 21st Century demands that designers, specifiers and suppliers work as teams to create better buildings - for occupants and the environment. Mitsubishi Electric aims to be a part of this by encouraging employees and customers to work together to increase their knowledge of the latest technology, legislation and markets.

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Property market takes notice

There has been a great deal of analysis around the effects of Part L 2006 on the design and construction of new buildings. But this is only the beginning of a roll out of new rules on the performance of all buildings - including our existing domestic and commercial stock.

The impact of Home Information Packs on the domestic market is already being seen, as sellers rush to move home before the HIPs, and the associated energy performance certificates, come into force in June 2007. Now we are only two years away from the introduction of building labels for commercial buildings in the UK, to be applied whenever a building is sold or rented out. So the big question is what effect will these rules have on the UK commercial property market - if any?

The potential impact of energy ratings on the commercial buildings market is still being closely examined, but it is clear that this sector is starting to take notice of energy issues. A 2006 survey by commercial property experts GVA Grimley found that respondents in the commercial property sector were attaching increasing importance to the "energy and environmental efficiency of their property". The main drivers for this view are rising energy costs and legislation.

GVA Grimley predicts that energy issues will become more significant for property owners: "Over the next decade, we believe that the introduction of energy performance certificates and possible continued hikes in energy costs will increase occupiers' knowledge of, and demand for, more environmentally efficient property."

UK commercial property consultants King Sturge published a report "European Property Sustainability Matters" in 2007 which examines how property developers across Europe are dealing with green issues. The report warns that in spite of widespread media coverage, some investors still view these issues as unimportant. However, there is growing concern among the majority that some properties are 'valuation time-bombs', which will receive low ratings because of poor investment in improving energy performance.

Architects and consultants Gensler also conducted a survey at the end of last year, and found that 75% of their respondents in the property development field believe that energy labelling will decrease the value and transferability of their existing building stock. There is genuine concern that organisations will not want to occupy buildings which will damage their environmental credentials.

And in an article in The Guardian (November 13th 2006) Brian Berry, head of policy for the Royal Institute of Chartered Surveyors, said the certificates would redress the problem of commercial sector landlords having no incentive to make their buildings more energy-efficient. "It will force landlords to upgrade their buildings. But it hasn't been properly managed by the Government. They should have been looking at this a couple of years ago."

Against this background it is easy to see that investors in the commercial property market will soon begin to take a hard look at their existing stock, resulting in divestment of some properties, and an upsurge in refurbishment of many buildings offices to meet the new standards.

The Government is adding to this pressure with news that operational ratings, initially intended only for public sector buildings, may be extended to the private sector. In June 2006 Yvette Cooper, minister for the Department for Communities and Local Government, said: "We are committed to widening the display requirement to all public and private sector buildings where it can be demonstrated that it is cost effective to do so."

It had been predicted that unless the UK Government included some hefty financial incentives, the property market would not respond to the need to reduce energy use in existing buildings. However, market forces are at work, and developers are gradually getting the message from occupiers that they want a more sustainable property strategy.

Certification for sustainability

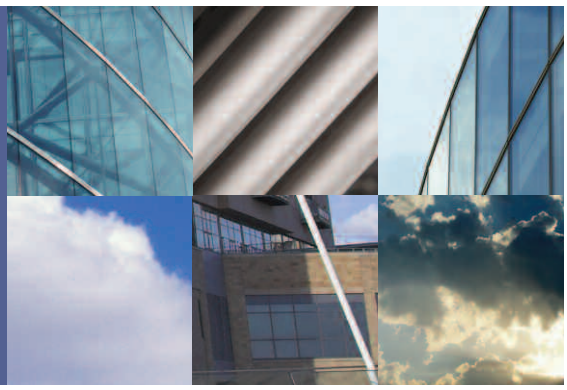
Most people in the construction industry have by now heard of Part L of the Building Regulations, and the impact this is already having on the design and construction of new buildings. Newly designed and refurbished existing buildings must meet targets for reducing CO_2 emissions.

For example, most office buildings will be expected to cut carbon emissions by around 28% (against a similar 'notional' building constructed to Part L 2002 standards). A certificate is issued by Building Control to show that this target has been met.

From early 2009, existing buildings will also be measured in terms of their energy performance, and in some cases they will have to display energy rating certificates. Government and advisors are still working out exactly how this process will work, however two key types of rating have been identified by the Department for Communities and Local Government (DCLG) which oversees the Building Regulations: asset and operational.

The asset rating will be issued on completion, sale or let of a building. It takes account of the building as it is built as well as the performance of certain installed equipment. The EPBD requires the certificate to include energy used for heating, hot water, ventilation, cooling, humidification and lighting. The asset rating calculation assumes a standardised use of the building, as well as standardised conditions of climate, control and management.

One of the main issues with the asset rating is that it requires large amounts of data to produce - around 200 pieces of information. Work is currently being done around the EU to find a way to develop software which will help to ease the data collection and input process.



Some types of existing building will have to go further in demonstrating sensible energy use measures. These are designated 'public buildings' under the EPBD and will be expected to display operational ratings. Speaking in June 2006, Yvette Cooper, minister for DCLG, said: "Public display will initially be for buildings over 1000m^2, occupied by public authorities and institutions providing publicly funded services to large numbers of persons. This is important as the public sector should be seen to be taking the lead in respect of disseminating energy performance and actively seeking ways of reducing their energy consumption."

Operational ratings will be based on all metered energy use in a building, and therefore show exactly how a building has performed over a set period of time. The ratings would be calculated using data such as metered energy, building type and floor area. Operational ratings require less information input than the asset rating.

However, metered energy reflects the past uses of the building, so when the building is sold or let, it would relate to use by previous occupants. The idea therefore is to use the asset rating of the building to compare to the operational rating. Instead of using units such as Kg of CO_2 per year, the differences would be expressed as a ratio and then given an A to G grade according to this figure.

The ultimate aim of building certification and labelling is that it transforms the property market, making energy efficient buildings more desirable to buyers and renters.

Doing the paperwork

1. **At design stage and on completion of a new construction** - Current law
   *Building Control Certificate: use the National Calculation Methodology (through free SBEM software or other accredited software) to show that the Building Emission Rate is lower than its Target Emission Rate.
   *Certificate of air tightness testing
2. **On construction, sale or rent** - From early 2009 asset rating which is valid for not more than ten years. Takes into account the actual performance of heating, hot water, ventilation, cooling, humidification and lighting equipment in the building under standardised conditions of climate, use etc.
3. **For 'public' buildings over 1000m^2** - From early 2009 shows total energy use of the building under actual conditions and use. Compared to the asset rating to give a grading, A to G. Intention is to extend use of operational ratings to private sector buildings.

Improving performance

Whatever the effects on the property market overall, facilities managers are going to be kept very busy over the next few years. The equipment in the average commercial office building is going to come under much closer scrutiny than it ever has, probably since it was designed and installed.

The Energy Performance of Buildings Directive will introduce a new regime of metering and record keeping which will keep facilities managers very busy. On top of this, the F Gas Directive already requires careful tracking of regular maintenance procedures for air conditioning equipment.

Against this backdrop, many local government areas have also introduced new planning rules for new and refurbished properties which require the introduction of 'green' energy sources. Given the usual challenges associated with refurbishment such as finding the space for new equipment, how are designers and installers going to meet all these requirements?

In light of these developments, leading manufacturers are developing systems which can work effectively in refurbishment projects. For owners of older office buildings, the ability to upgrade to more effective and energy efficient air conditioning systems will be a big advantage. In the past upgrading existing R22 systems to the more efficient R410A type has been difficult and expensive. Existing pipework would have to be replaced or cleaned with specialist equipment.

With recent advances in technology, this process is now made much easier. New R22 systems can operate in a 'replace mode' which cleanses the system itself, allowing for much faster installation times, and minimising disruption of business.

For clients looking to add a 'sustainable' element to their refurbished building, finding a feasible technology can be difficult. In an existing site, it can be tough to locate space for renewable energy sources such as wind turbines or solar photovoltaic panels. One option is the ground source heat pump, which taps into the earth as a solar collector and heat storage facility. While ambient temperatures in the UK vary between 0°C and 30°C throughout the year, the temperature just 3m to 4m below the earth's surface remains relatively constant - between 10.5°C and 11.5°C.

Ground source heat pumps utilise this feature, using the energy stored in the ground to provide highly efficient heating and cooling systems. Average coefficient of performance for ground source heat pumps is 6.5.

The advantage for existing buildings is that ground source systems don't have to take up large amounts of space. In one project in London's busy Clerkenwell area a hotel needed a more energy efficient cooling system, without any equipment on the roof as this has been earmarked for new penthouses. It was fitted with a water-cooled VRF system linked to an underground lake 130m below the hotel.

Not all solutions have to be so dramatic. A building with no mechanical cooling can be refurbished with a mixed mode system. This is an extremely energy efficient solution, giving the benefits of natural ventilation: energy saving and good air quality, with those of air conditioning - predictable temperatures and reduced overheating.

Further information

EPBD implementation:
www.diag.org.uk

Part L 2006:
www.communities.gov.uk

Kyoto Protocol:
http://ec.europa.eu/environment/climat/kyoto.htm

European climate change programme:
http://ec.europa.eu/environment/climat/eccp.htm

Energy labels:
www.eplabel.org

If you missed the CPD seminar on **The Building Energy Ratings**, you can call your Mitsubishi Electric Regional sales office to arrange an in-house presentation of this information.

Please call one of the numbers below:

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