MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS

Information Guide

The Code for Sustainable Homes

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Issue Twelve >

MITSUBISHI ELECTRIC
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The Code for Sustainable Homes

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.

Contents

The need for green homes

The Code for Sustainable Homes, introduced at the end of 2006, is part of the growing body of legislation and Government documentation aimed at reducing carbon emissions from buildings in the UK.

More than a quarter of the country's CO_2 emissions result from heating, lighting and running appliances in our homes. The average UK household produces around 1.54 tonnes of carbon per year. CO_2 emissions by end use for the average house are:

- Space heating 53%
- Water heating 20%
- Appliances 16%
- Lighting 6%
- Cooking 5%

There is currently an under supply of housing in the UK. If housing supply remains at 2005 levels, there will be a shortage of 50,000 homes each year across England (ODPM statistical release, household projection figures, 14 March 2006). To meet this demand, the housing sector is set to increase its build rate by 23% over the next 20 years. This means that by 2050 over 30% of the UK's total housing stock will be built in the next four decades. The Government is therefore focused on using this growth as an opportunity to cut energy use in homes, as well as addressing other environmental issues such as water consumption and waste generation.

It is important to note that the new Code is currently voluntary. However, the Government has stated that it is minded to make the code rating mandatory from April 2008. And the Department for Communities and Local Government (DCLG) has issued a stern warning that the Code should be viewed as a forerunner to legislation: "It is intended that the Code will signal the future direction of Building Regulations in relation to carbon emissions… providing greater regulatory certainty for the home building industry."

There are those in the construction industry who may be cynical about adoption of voluntary Codes of practice, since there has never been a mass take-up of these in the past. However, a key driver for application of the Sustainable Homes document is the European Energy Performance of Buildings Directive (EPBD). From June 2007, the EPBD will introduce a system of Energy Performance Certificates. This will require that new homes (and existing homes when they are sold or rented) have an Energy Performance Certificate which contains information on the energy efficiency and carbon load of the dwelling.

From an environmental point of view, this Code and any subsequent legislation will have a positive effect by reducing CO_2 emissions and addressing other problems, particularly the growing pressure on water resources. Furthermore, by encouraging designers and builders to be more aware of the issues, a corollary of the Code should be that future homes are better adapted to climate change.

Consumers should also benefit from lower running costs - an area of great concern now that energy prices have already started to rise rapidly. The Code will also help environmentally aware house buyers lead the trend by assisting their choice of 'green' homes. And for industry, the Code will heighten the market requirement for sustainable and energy efficient technologies such as heat pumps (including ground source heat pumps), combined heat and power and others. This should enable those companies to make greater investments in R&D for this equipment.

Seeing stars

The Code for Sustainable Homes uses a rating system of one to six stars to demonstrate the overall sustainable performance of a dwelling. One star is above the standard of current Building Regulations. The Code is based on BRE's EcoHomes rating system, which has already proved popular in the social housing sector.

There are a number of key ways in which the Code differs from EcoHomes. Firstly, there are now minimum standards for energy and water efficiency at every level. This means that achieving three stars requires a greater level of energy efficiency as well as additional factors such as use of renewable energy.

Secondly, the Code has removed the weighting system used by EcoHomes to simplify the system. And finally, there are now new sustainable technologies and methods included in the rating system.

There are nine categories within the Code, each with minimum requirements. The nine areas are:	
Energy / CO_2 emissions	Minimum standards at each level of the Code
Water	Minimum standards at each level of the Code
Materials	Minimum standard at Code entry level
Surface water run-off	Minimum standard at Code entry level
Waste	Minimum standard at Code entry level
Pollution	No minimum standards
Health and wellbeing	No minimum standards
Management	No minimum standards
Ecology	No minimum standards

Apart from the minimum standards, designers and builders can decide which of the additional standards they adopt to achieve a higher star rating. This gives designers a level of flexibility. Once the dwelling meets minimum standards for water and energy, they can decide what technologies and methods are appropriate; or aim for a certain star rating and adopt the necessary methods to achieve this.

The key areas for house builders to consider at the design stage are energy and water efficiency. Energy targets are set at a rate above those required by Part L of the Building Regulations relating to dwellings. A rating for energy efficiency is allocated according to a percentage improvement on CO_2 emissions for a similar dwelling designed to current Part L standards.

This means that these percentage targets must be met in order to achieve the star ratings. For example, even if all the other criteria were met for a 'three star' dwelling, the rating would not be given unless a 25% CO_2 emissions improvement (against Part L 2006) is achieved. The table below shows how energy and water efficiency levels are translated into points.

The assessment procedure will be similar to that used by BRE for EcoHomes. A network of trained, accredited and independent assessors will carry out design stage assessments, recommend a sustainability rating and issue an interim Code certificate. They will perform a post-completion survey before a final certificate is issued. This survey will be done on a sample basis for developments.

Code level (Stars)	Percentage improvement required
*	10%
**	18%
***	25%
****	44%
*****	100%
******	Zero Carbon Home

Minimum standards

	Energy		Water		
Code level (Stars)	Percentage improvement on Part L 2006	Points awarded	Litres per person per day	Points awarded	Other points awarded
1*	10%	1.2	120	1.5	33.3
2**	18%	3.5	120	1.5	43.3
3***	25%	5.8	105	4.5	46.7
4****	44%	9.4	105	4.5	54.1
5*****	100%	16.4	80	7.5	60.1
6******	Zero Carbon	17.6	80	7.5	64.9

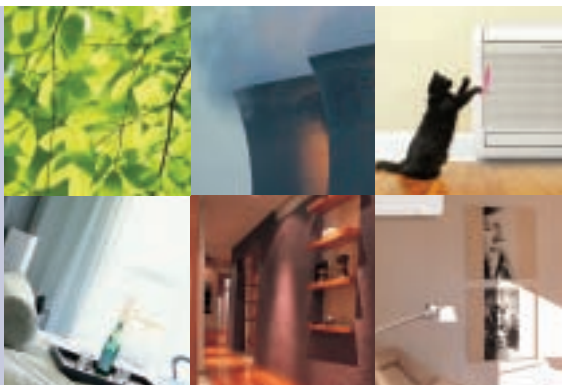
Making it work

UK house builders face pressure from two sides. They must increase the housing stock by 50,000 units a year over the next two decades, requiring a major increase in speed of build. As well as this, they must also ensure that these new homes meet increasingly stringent energy efficiency and other 'green' targets.

One of the key questions arising from the new Code is what will a sustainable home look like? Are we likely to see wind turbines and solar panels on roofs? For many people, the typical 'green' home probably looks something like the Beddington Zero Energy Development (BedZed). Developed by the Peabody Trust, this is one of the UK's largest carbon-neutral mixed-use developments and it successfully utilises a variety of sustainable design techniques and renewable energy sources.

However, while some housing associations and local governments may want to pursue this level of carbon neutral homes, not all house builders will want to go in this direction with their design. It seems likely that for the mainstream domestic market, builders will want to retain traditional architecture - even if the technology inside the home is different.

Also, given the amount of new housing required, particularly in the South East of England, it seems likely that mixed-use developments will become more common. This means that individual installations of wind turbines or solar PVs will be difficult to install. Instead, more collective approaches to sustainable technology may be used. For example, in January 2007, approval was given to a mixed-use development in London's Elephant and Castle area. The £70 million Oakmayne Plaza project will include homes, shops and leisure facilities. Carbon emissions will be minimised through use of combined heat and power and a geothermal heat pump system.



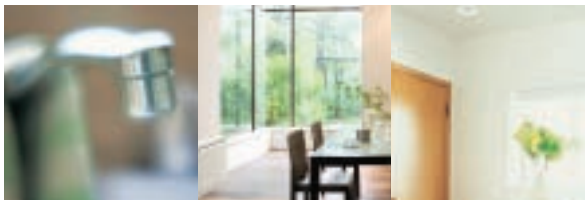
Use of a heat pump for domestic heating is more often seen in the rest of Europe, but it is becoming a more popular option in the UK. Between them, domestic water and space heating account for over 70% of the average home's CO_2 emissions. Heat pumps provide one of the lowest carbon emissions options for heating a building - 45% less when compared to a gas condensing boiler of 93% efficiency with a heat pump with a COP of 3.5.

The heat pump is a flexible technology, with excellent energy efficiency and CO_2 mitigation properties. COP is 4 to 4.5, which compares very favourably to a gas boiler which has a COP of around 0.95.

Electrically driven heat pumps for buildings can supply 100kWh of heat from 20 to 40kWh of electricity. They achieve the highest efficiencies when they can access a heat source which is stable and relatively high. They also work best with heating systems which do not require very high input temperatures. For example, they are often linked to underfloor heating systems, rather than radiators.

One of the main advantages of heat pumps is their flexibility in application. For example, a heat pump using air as a heat source can simply supply water at 45°C to an underfloor heating system during the winter season. The same heat pump can also be used to cool the building in summer using the same underfloor water piping as the heating system. Supplying chilled water between 17°C and 18°C, can provide up to 40W/m2 of cooling. Alternatively, normal air conditioning fan coils can be used. This is a large advantage over a traditional boiler, which can only heat.

It is always difficult to predict the direction of new technologies, however it is clear that house builders will have to explore technologies they have previously not considered. Meeting the new targets (which look likely to get tougher in the near future) will require some new thinking, and they will require good technical advice and support from their suppliers.



Further information

For more information and to download the Code for Sustainable Homes, see

www. Communities.gov.uk

and follow links from the Planning, Building and the Environment button.

If you missed the CPD seminar on **The New Code for Sustainable Homes**, 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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