

# Tighter controls on the energy efficiency of buildings will impact on the stone industry if it cannot provide easy answers

Revisions to Part L of the Building Regulations, requiring buildings to be even more energy efficient, come into force this month (April). And this is just a stepping stone on the way to zero carbon standards due to come into force in 2016.



Dr Tim Yates (left) and Alexander MacKay, B Arch, RIBA, a Principal Consultant at BRE, presenting their report on the effects Part L will have on the stone industry at the first of the Stone Federation seminars on the subject at BRE in Watford.

The revisions to Approved Document Part L of the Building Regulations – which regulates the energy efficiency of buildings – were to have been implemented first in April last year, then in October. This month (April) they finally came into force. The Government is circumspect about the specific causes of the delays but they are believed to relate to the cost of making buildings greener, who will meet those costs and how.

One issue was the requirement on property owners who wanted to make repairs or alterations to a building to have to

improve the energy efficiency of the whole property, using the Green Deal as a way of paying for it over an extended period. Take up of the Green Deal has so far fallen short of expectations, although the changes to Part L might change that.

The Government says the new Part L regulations as they now apply will cut £200 from the fuel bills of a typical new semi-detached house and more than £60,000 from the fuel bills of large businesses, compared with build standards before 2010, which have applied until now.

The new measures coming into force mean

new homes and non domestic buildings will have to include energy saving features such as better insulation and more efficient heating and lighting. They require a 6% cut in carbon emissions for new build homes and a 9% cut for non-domestic buildings.

What that means for housing is this: To achieve compliance, both the fabric energy efficiency and CO<sub>2</sub> emissions must be below those of a notional dwelling. This notional dwelling has been redefined such that an emissions reduction of 6% is achieved, compared with dwellings that meet 2010 standards. ■■■➔

## Part L

Calculating the fabric energy efficiency is new and is in addition to calculating CO<sub>2</sub> emissions, which has been a requirement since 2006.

Fabric energy efficiency is measured in kWh per square metre of floor area, and takes into account the heating and cooling demands of the space. The CO<sub>2</sub> emissions, on the other hand, are measured in kg of CO<sub>2</sub> per square metre of floor area. To achieve compliance, both the fabric energy efficiency and CO<sub>2</sub> emissions must be below those of the notional dwelling.

The methods of compliance for new non-dwellings have not changed much, but require a greater reduction (9%). This means more energy efficiency measures will need to be incorporated.

The Government says it is sticking to its 2016 zero carbon target for homes (2019 for non-domestic buildings), although exactly what zero carbon will mean at that time might be a little different to what it means now as the goalposts have moved from time to time. Whether whatever it means can be achieved by 2016, many in the industry now doubt because of the delay in implementing the 2013 changes to Part L (which are still called 2013 changes even though it has taken until now to implement them).

How the latest and future changes to Part L will impact on the indigenous Stone Industry concerned Stone Federation Great Britain on behalf of its members and it secured Growth Fund backing from CITB to pay for BRE to carry out research into the impact on the stone industry in the UK (the Building Regulations apply to England only, but there are similar changes taking place to the devolved regulations in Wales, Scotland and Northern Ireland).

As a result, BRE has published training and guidance notes for the stone industry that it has been presenting to Stone Federation Members at seminars in the past two months. Copies are available from Stone Federation and you can find contact details for the Federation on page 43 of this magazine. It is intended that the document should evolve along with solutions to the requirements of Part L – because the Government's Department for Communities & Local Government is concerned that product suppliers should present architects and clients with solutions to achieving the levels of thermal efficiency required in the revised Part L. In fact, any product that does not offer a solution is likely to be substituted for one that does, which is the real challenge to the stone industry, as Dr Tim Yates has been telling Stone Federation Members at the seminars.

Traditional solid stone construction of architectural features such as windows, doors and parapets will not produce the answers because they will create thermal bridges

between interiors and exteriors. Where solid stone windows have been installed with highly insulated walls, they have resulted in a severe condensation problem.

Even stone cladding presents a problem because the stainless steel fixings that tie the stone back to the building through insulation create a thermal bridge.

Architects quite like to use stone floors to blur the boundaries between interiors and exteriors. But there will have to be a boundary in future to stop heat being conducted between the two environments.

Yet isolating the interior and exterior environments of a building might also have an impact on stone because BRE suggests heat transfer through walls might have protected stone from the harshest weather and facilitated the migration of moisture. If the exterior of a building is completely isolated from the interior the stone could face greater variations in conditions than it has traditionally encountered.

It is not all bad news for stone, though. In this country there is a tendency to think of energy being wasted when heat escapes from the interior of a building to the exterior, but cooling buildings already adds as much CO<sub>2</sub> to the atmosphere as does heating them – some say even more. If global warming continues, cooling buildings could become even more of an issue than heating them. That might give stone a distinct advantage if its thermal mass is employed to keep interiors cool.

As TV architecture critic Charlie Luxon said when he presented the 2012 Natural Stone Awards, improving energy efficiency of buildings could have more to do with issues such as thermal mass and longevity (and, again, stone has an obvious plus in the longevity stakes) than with technological

## Natural Stone

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The BRE Innovation Park at Watford is home to some of the world's most sustainable buildings, with hundreds of innovative low carbon materials and technologies on show – including stone.

solutions such as heat pumps. “Stone, well detailed and well used, has a real role,” he said.

Of course, creating thick walls reduces useable interior space on a given footprint, which is not popular with clients. However, even as cladding, stone’s properties can be used to contribute to a building with a low carbon footprint, as is demonstrated by the Train Drivers Facility Building built for Iarnród Éireann (Irish Rail) at Portlaoise, County Laois, Ireland, the first certified commercial ‘Passivhaus’ for the state sector in Ireland and the first ‘Passivhaus’ for any railway company in the world. It is an example of a performance-driven approach, with high levels of insulation (0.07W/m<sup>2</sup>K) and the latest thinking in building physics, specifically hygrothermal analysis.

A case study of the project was presented at Marmomacc stone exhibition, Verona, last year by architect David Hughes, who designed the building.

He said: “Personally, I always struggled with the use of stone cladding (vener) in modern buildings. Often stone is fixed to a substrate that is load bearing, weather tight and basically sound...

“Dealing specifically with

the use of stone in this building, the question is whether the use of stone is purely aesthetic or whether it has a more active role to play in the performance of the wall and the building generally... I believe that, in modern construction build-up, we will be able to square the circle and find a common or converging approach to using stone technically and aesthetically, making its use ‘honest’ once again.” (A PDF of his presentation can be downloaded from [bit.ly/Passivhaus-Ireland](http://bit.ly/Passivhaus-Ireland)).

While governments all over the world might currently be more concerned with creating conditions for economic growth than tackling global warming, you can be sure the issue will not go away while thousands of houses in a large area of Somerset are being flooded and people are choking to death in the smogs of Beijing.

And it is not just about global warming. Fossil fuels are becoming harder to find and are getting more expensive while renewables are not yet in a position to take over all energy needs. Reducing energy consumption is also about energy security.

With about half CO<sub>2</sub> emissions accounted for by domestic use of energy, it is not surprising a big focus is on reaching the zero carbon target for housing and (later) non-domestic buildings. That will have an increasing impact on the suppliers of all building materials.

More changes to Part L are due to be introduced in 2016 to achieve the zero carbon target. Whether they are introduced in 2016 or a little later will not make much difference. Whenever they are introduced, any industry that cannot offer solutions to meeting the targets is going to find it difficult to survive under the new regime. That is the challenge facing the stone industry.