

## Improving Energy Performance of Historic Buildings

Jonathan Clarke of Energy Solutions presented a well-attended seminar at Reigate Manor Hotel on 21 January 2010. This is a summary of his presentation by Stuart Page

Following a review of the political and social background to 'sustainable' and 'green' issues including climate change he was able to explain new developments as well as some myths about environmental improvements and energy efficiency.

Although the political agenda has been set by Energy Directive 2009, Energy Performance Certificates and quick fixes such as 'scrappage' for boilers, the reality is that around 80% of UK existing buildings is energy inefficient. Revisions to the Building Regulations will place additional requirements on historic buildings.

What we need as a society - and even more as practitioners - is clear practical guidance on what works, what is efficient and aesthetically acceptable.

Forty per cent of CO<sub>2</sub> emissions in the UK emanate from the housing stock. External weatherboarding, tiling and rendering are efficient and practical ways of concealing externally-fixed insulation. But can rarely be used on listed buildings, in conservation areas or even where such limitations abut a site due for improvement.

### Double glazing

Double glazing, Jonathan explained, is probably the least efficient upgrade of all and results in the destruction of finely-detailed existing buildings, whether listed or not. In the wrong location, double glazing might offer a 98-year payback, whereas higher levels of insulation can be achieved by draught stripping, shutters, blinds and curtains in combination.

Narrow section double glazing has been available for many years - at a price - but with more companies entering the UK market and with long experience in Europe we may see prices becoming more competitive. The possibility of traditional glass as the outer 'leaf' means that most visual objections are overcome. The Pilkington solution using spacers and an evacuation plug in the face felt like a poor solution, reminiscent of the worst products of British Leyland.

The great boiler debate was given an airing and it was refreshing to hear objections to plumbing, high maintenance, short life condensing boilers discussed openly. I wonder if the 'if it ain't broke, don't fix it' axiom has a place here.

Ventilation was also considered and, with heat exchange extractors becoming more readily available, this would be a good 'retrofit' improvement to buildings troubled by condensation.

Sophisticated insulation in materials were also discussed. The limitations of thin laminated foil/quilt/barriers were noted, as were the possible long-term problems with pore closure on vapour permeable membranes.

### Sheepswool

Insulating materials from sheepswool to gels were discussed, including an (expensive) German lime based board that can be stuck to the interior face of walls to provide impressive thermal properties including addition mass.

A Danish formula was offered as a test of performance:

$$\frac{\text{£ saved x years life}}{\text{£ capital cost}} = (\text{should be higher than 1.33})$$

As a long term enthusiast for sheepswool, I was pleased to hear of its benefits but cautious about a 100-year life. Fibreglass and rockwools are modified by debris in voids and poor insulation; both defects that effect sheepswool. However, installation and disposal of sheepswool is much easier and safer than alternative fibre quilts.

## Fuel sources

Fuel sources were also discussed with simple solutions given due prominence. Modern woodstoves are sophisticated combustion chambers, while the basic Rumford fireplace offered 25-30% more efficiency than a simple rectangular fireplace.

Biomass fuels such as wood chip and pellet seem to offer an efficient sustainable source of energy but have to be weighed against the efficiencies of gas and oil, once at the appliance. They also require large fuel stores.

Micro hydro generation is efficient, with a good track record and the benefit of a seasonal fluctuation that matches seasonal energy demands.

Small wind turbines gained no support, and remained 'eco-bling'.

## Simple is best

Although we may not save the planet on our own but architects can make a significant difference to the energy consumption of existing buildings by logical and cost-effective interventions. The simplest solutions appeared to offer the best returns:

- Insulate and improve insulation
- Draught proofing doors and windows
- Sealing open disused flues
- Heat exchange ventilation
- Smart controls on heating systems
- Monitoring energy use.

Jonathan quoted Jevons' Paradox, dating from 1865. This proposes that improvements in efficiency tend to lead to increase in the use of a resource.

Individual consumers and society as a whole therefore have to be aware of their choices; take appropriate action; and be aware of the consequences.

Given the intricate and interwoven nature of the environment and how architects specify materials and installations, this was a useful caution within a stimulating refresher course in what can be done to improve the existing building stock.

Although the performance of buildings can be improved structurally, upgrading services installations is also critical to success.

## The role of M&E Consultants

Given the complexity of modern services there is a real need for appropriate advice from M&E Consultants.

The leaders of the South East Sustainability and Conservation Groups are keen to know about members' experience with M&E Consultants on smaller projects.

Contact Ian McKay, [ian@bbm-architects.co.uk](mailto:ian@bbm-architects.co.uk) or Stuart Page, [stuart@stuartpage.co.uk](mailto:stuart@stuartpage.co.uk) with your experiences. They will collate the information and hope to investigate solutions that will help small practices.