

# Period Restoration: Channel energy into roof, floors and walls

Part two of this series looks at how to achieve energy efficiency without compromising on the character of your home

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The whole area of energy efficiency in period houses is a touchy subject and the fact period homes are exempt from the Building Energy Rating (BER) certification process confirms period homes and energy efficiency are not natural partners.

However, when the Irish Georgian Society held a series of seminars on energy efficiency five years ago, about 1,000 owners of period properties came for advice on how to heat their homes. The idea of keeping warm by simply putting on another jumper or fleece or wearing your jacket indoors is less popular nowadays than in the past.

What is the best way to make your period home warmer without undermining the character of the building? Carl Raftery, conservation research officer at Dublin City Council, suggests considering the areas of your house with greatest heat loss (eg attics and under floors) before embarking on upgrading single-glazed windows to double-glazed. "The key is to look at what energy upgrades give the best return with minimal impact, so it's best to target the roof, floors and walls," says Raftery.

Doing as much as necessary but as little as possible is the mantra of conservationists keen on energy efficiency.

Attic insulation is the best place to start, according to Raftery. It's a low-cost, low-impact energy-efficient measure with a high return. Twenty-five per cent of heat loss from the average period house is through the roof. Insulation can be carried out under the slates (if the house is being reroofed) or above ceiling level otherwise.

"It's very important to maintain ventilation and air flow. And, because synthetic fibre-glass materials slump and trap moisture over time, the more natural the insulation you can afford, the better," says Raftery.

Draught-proofing original windows with brush seals is another low-impact measure. Adding secondary glazing – which can be removed in the summer months – prevents heat loss while keeping original timber framed windows. Neither of these measures require planning permission in buildings on the Record of Protected Structures.

## **Best practice**

"Putting in suspended floor insulation is another energy-saving measure which can be carried out in line with best conservation practice and doesn't require planning permission," says Raftery.

Fifteen per cent of heat loss occurs through the floor space of period homes. (It's important to number floor boards when lifting them to put in insulation as they will need to be put back down in the correct order.)

If you opt for internal or external wall insulation for a protected structure, you will require planning permission. Problems can arise, particularly with internal insulation on solid masonry walls. "It hides the problem but doesn't address it. Dry lining will push mould a layer behind, where you can't see it, but you will still breathe it in," says Raftery.

Another issue is that many period homes that need energy-efficiency improvements won't meet the minimum requirements for the Sustainable Energy Authority of Ireland (SEAI) grants without risking high levels of moisture building up in the solid walls of their homes. But several types of natural insulation are now on the market which are suitable for historic houses.

### **Secondary glazing**

The replacement of original doors and windows with double-glazed windows and doors will also require planning permission. Raftery is a big fan of secondary glazing, which is still relatively rare in period homes.

"It's good for noise reduction. It can be added to timber- or metal-framed windows and removed in the summer months, while still maintaining the use of shutters. Double glazing has a horrendous material impact, a massive carbon footprint and a limited lifespan," Raftery says. One study found secondary glazing combined with shutters reduces heat loss through windows by 75 per cent.

An extensive study of energy-efficient upgrades to homes built before 1945 is soon to be published. Cofunded by Dublin City Council and the Heritage Council, the Built to Last project looked in detail at 15 homes retrofitted for energy efficiency while maintaining the historic fabric of the buildings as much as possible.

Joseph Little and Fergal McGirl were the lead architects on the project. "One of the problems with energy efficiency in heritage buildings is that people in conservation have shied away from energy efficiency and saw anything beyond the basic maintenance as a negative," says Little.

"The whole debate about the high types and levels of insulation in period homes hasn't bedded down yet.

"Nobody was insulating solid-brick-wall houses or rubble-wall cottages until recently and we haven't yet completely figured out how to join [external insulation] with traditional eaves," says Little, who has recently become assistant head of architecture at the Dublin Institute of Technology.

### **Retrofits**

Fergal McGirl adds, "You have to be very careful altering the conditions of an old building in a retrofit. These buildings have to be able to absorb and release moisture and the retrofit should not inhibit that natural process."

McGirl also says sometimes homeowners expect greater reductions in their bills after a retrofit.

"If a homeowner spends about €35,000 on energy upgrades (attic insulation, an energy efficient boiler, under-floor insulation, wall insulation and double glazing on windows), they expect energy savings on the BER improvements. But what happens in some houses is that people absorb the comfort levels without making a big impact on their fuel bills."

### **Energy upgrades to a Victorian redbrick in Ranelagh: 'We could feel the cold coming up through the floor boards'**

Caitriona Fisher is passionate about energy efficiency. The owner of a Victorian semi-detached redbrick house in Ranelagh, she decided to do energy upgrades after the cold winters of 2009-2010 and 2010-2011.



“There was ice on the inside of the north-facing bay window and we could feel the cold coming up through the floor boards in the dining and sittingrooms,” she says.

“We had brushes put on the windows over 20 years ago, some attic insulation but no insulation under the floors,” says Fisher. The house was given an E1 Building Energy Rating (BER) before works began.

“I had spoken with a neighbour who is an architect, who explained the problems of mould growth when using external insulation on an old house so we opted for a breathable calcium-silicate internal insulation board on the external walls of the rooms on the kitchen and rooms on the first-floor return. We didn’t put internal insulation on the dining and sittingrooms and upstairs bedrooms because of the cornices. I have since learned that you can get graduated insulation board which thins out to meet cornices.”

The next job tackled at Albany Road was extra insulation in the attic.

“We also brought the boiler inside as we were losing heat having it in a shed, and we created an insulated room in the attic for the hot-water tank,” says Fisher. The windows in the house were fitted with thin double-glazed glass panels into the original timber sashes. “The windows were black with water and mould when they were single-glazed,” says Fisher. The single-glazed side lights around the front door and the letter box are cold zones that have yet to be tackled. However, tackling the heat loss through the floor boards has been the most troublesome task of all. Dry rot and cellar rot was discovered under the sittingroom and diningroom floors when the subfloor insulation was being put in place. A dripping downpipe was identified and moved, yet the dry rot continued to develop.

“All the insulation had to be removed from under the floors of these rooms as the dry rot was coming up through the floor boards. It takes up to two years for all the spores of dry rot to go away. Just a few weeks ago, we discovered leakage into the house from a gully near the front door which was causing the problem. It will be at least one year before we can reinsulate at the subfloor level,” says Fisher.

In spite of this sharp learning curve, she remains optimistic about the energy upgrades to her home.

“Hopefully, when we face another really cold winter, the house will be more bearable without having to spend a lot on heating.”

The Irish Georgian Society publication *Energy Efficiency in Historic Homes* (2013) is available on [igs.ie](http://igs.ie). The Department of Arts, Heritage and the Gaeltacht publication on *Energy Efficiency in Traditional Buildings* is available on [ahg.gov.ie](http://ahg.gov.ie). See also [historic-scotland.gov.uk](http://historic-scotland.gov.uk) (technical papers 19 and 20 on energy efficiency).

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