

OLD BUILDINGS CAN'T BE ENERGY EFFICIENT, RIGHT?

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A mid-19th century lodge, outside Holyrood Park, Edinburgh

Over 20% of Scotland's houses are traditional buildings (built before 1919). That means one in five of us live in a traditional home!

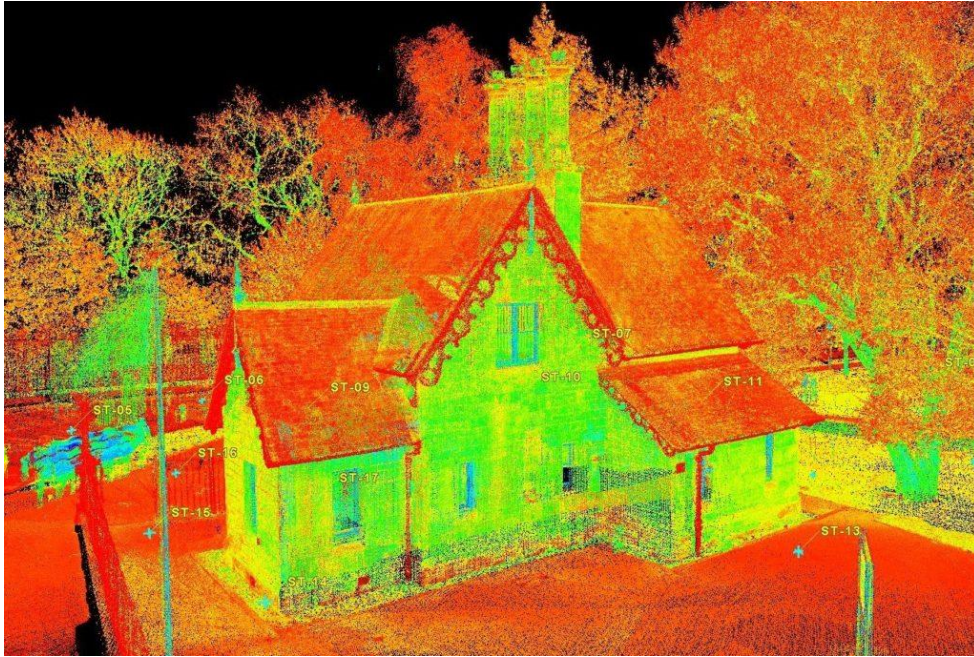
Some think these older buildings can't be energy efficient, and that *old* means *cold*. Others try to improve the energy efficiency in a building using the wrong skills and materials, making things worse.

But new national energy saving targets came into force in 2019 and we need to improve energy efficiency in our homes. Old buildings must play their part.

Since 2008, Historic Environment Scotland has taken the lead in trialling and demonstrating improvements to historic and traditional buildings through [over 30 refurbishment case studies](#).

In this blog, Senior Technical Officer, Lila, explores one of these projects. Discover how they've improved the energy efficiency in older buildings, while preserving their special architectural interest or historic character.

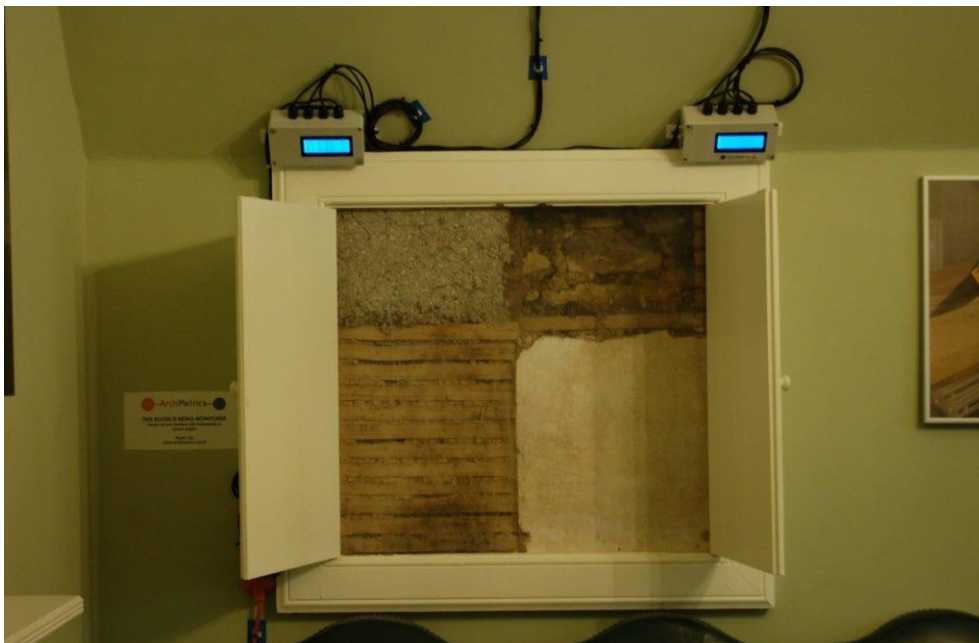
The mid-19th century lodge: Holyrood Park



A laser scan of the lodge before works started.

Holyrood Park Lodge is a Category B-listed, mid-19th century lodge at the entrance to Holyrood Park in Edinburgh. It's overlooked by the Palace of Holyroodhouse on one side and the Scottish Parliament building on the other.

We retrofitted the lodge to show best practice in energy-efficiency retrofit for traditional buildings, while fitting out the lodge as a shop and interpretation centre. As part of the training and development programme here at the Engine Shed, we're also using this as an exemplar property for demonstration and teaching.



A 'viewing panel' for training and demonstration, enabling visitors to see the four layers of the internal wall construction: (from top left clockwise) blown cellulose insulation; masonry; plaster finish; lath.

We carefully chose the most technically appropriate and natural materials, so that they preserved the character and appearance of the listed building. One of our goals was to retain or reinstate original architectural features and traditional finishes which had been lost in previous refurbishments.

We removed 1980s alterations and decoration, reinstated lost fireplaces to the original designs and even used period-style electrical fittings.



New floorboards being re-laid after wood-fibre board insulation was fitted between the joists on the ground floor of the Lodge.

To improve energy efficiency, we insulated the building with breathable and natural insulation materials. Wood-fibre insulation was laid underneath the existing timber suspended floors; blown cellulose insulation was installed behind the existing lath and plaster and plasterboard finishes; and wood-fibre board insulation was installed within the roof space and the cooms (sloping ceilings). Existing timber window casements were retrofitted with doubled glazed units and the windows were draught-proofed.



New double-glazed units standing next to the existing single-glazed timber windows before being retrofitted.

Part of the research work at the Lodge involved long-term monitoring, which examined internal and external conditions of the building, before and after the works. This included temperature, humidity, heat transfer and air-tightness testing, to assess the improvement to the building, in addition to the conservation gain.

We carried out a building energy assessment (EPC) before and after the works. This showed that the works improved the building's energy performance by 83% (taking it from Band F to upper Band D), without any loss of the building's historic character!

Explore the full works in [Refurbishment Case Study 37](#).

Retrofit advice and support

To read about two other examples of retrofit of traditional buildings, visit the [full Engine Shed blog post](#) about this subject. Our case studies show that we can retrofit listed buildings to meet new energy standards. And what's more, that we can do this in a sensitive and proportionate way. The cultural significance and fabric of the building doesn't need to be negatively impacted!

If you are looking for support and advice on retrofitting traditional buildings:

- explore our [free case studies](#)
- read the [independent review of our projects](#)
- contact us using TechnicalResearch@hes.scot