

# A Local Eco House Renovation

*This series of articles follows the renovation of a local house and the renewable technologies used. The house was built in 1850 and is located in the heart of the North York Moors National Park.*

*The house is not a listed building, so only planning consent was required, although many of the renewable energy improvements may now come under 'permitted development'.*

*Future articles will cover the technologies to be used in the house: At the end of the project the house will, over the course of a year, be close to carbon 'zero'*

## PART 1: THE BASICS

When Debbie and Mike bought their 19<sup>th</sup> century house in 2006, they knew it was going to need a lot of renovation work. Although we all know people who have renovated their homes in this area D & M were different in that they were determined to make their house as 'green' as possible. They wanted to see how sustainable they could make a 19<sup>th</sup> century house and the project has been a labour of love for 4 years with completion now finally in sight

Initial work was carried out to make the building structurally sound. The undersides of the roof tiles had been sprayed with foam and this had resulted in the slates delaminating and starting to slip off the roof. So the roof was repaired and re-slatted. The house needed strengthening to support a king post holding the roof purlins. Some internal walls were removed to allow sunlight to flood through the house.



Much of the structural work has been done by engineer Mike himself, approved by the building inspector

Throughout this stage they preserved as much of the remaining legacy of the house as possible. An old range was carefully removed and sent away to Skipton to be renovated. Old shutters were found behind boarded up walls and these were removed for safe keeping.



The old iron weights from the sash boxes were still in place (the original sash windows had already been replaced with plastic frames). Skirting boards and doors were preserved where they were salvageable. All these will be re-fixed during the renovation.

Now having the shell of the building structurally sound made it possible to start the internal work. The first 'technology' is fundamental to any green renovation. All projects to improve sustainability should start with making the home use less energy. Insulation reduces heat loss, so that is where they started.

As the walls are 500 mm thick solid stone, internal treated timber studding was built to hold 100 mm of solid foam insulation. Together with the plasterboard, the heat energy loss through the walls is reduced to less than a quarter of the previous amount. The floors are also being re-laid to include 100 mm insulation and the roof space will receive 150 mm to reduce overall heat losses by over 75%.

However, to get this result, insulation must be fitted in a particular way.

If the insulation is just 'bunged in' there will be gaps between the studding and the insulation. These gaps cause cold air draughts which badly reduces the effect of the insulation. So insulation needs to be carefully cut to fill the studwork and then any and ALL the small gaps are filled with fireproof foam. Yes, it's a labour of love, but it is essential. Why? Half the heat in a house is lost through draughts. Stop these and you stop much of the heat loss. However, rooms do need ventilation, so if you want to have a draught free home, you must have mechanical ventilation system installed (more on this in a future article). The attention to detail in fitting insulation was one of the big learning points when low carbon building projects were started in the UK. Draughty insulation wastes heat and money. The picture (below) shows the timber studding and then later with draught free insulation in place.

Windows can be a major source of heat loss (draughts as well as through the glass). In keeping with the building, new timber sliding sash windows were fitted. However, these use high tech glass which lets solar gain in, but reduces energy out. The windows are designed with draught strips and NO trickle vents (more about this in later article). See the picture showing the draught strips on the windows.



The heat loss through the new windows is less than a third of traditional windows. However, because attics, walls and floors are bigger areas for heat loss, these should be insulated before tackling windows. Draught stripping old windows or good secondary glazing can make a big difference to comfort levels if new windows are not an option.

This insulation has resulted in a building needing less than a quarter of the heating compared with an un-insulated building of its age.

*Next time: Solar PV; generating green electricity*

