AWARD: PRIVATE SECTOR COMMITMENT TO CARBON REDUCTION

Sigrid Stagl and Peter Kaufmann

‘Eco-refurbishment of Victorian house’

The house in its original state

After refurbishment

Insulation: 5cm, or 2.5cm where wall radiant heating

Plastered over insulation, with a mesh under the 2nd layer

Notable Features

Taking an old Victorian house in a densely populated city environment, and reduce its CO_2 emissions from 14 tonnes to 3.81 tonnes per year. This is primarily done by a holistic approach to insulation, combined with wall radiant water heating and solar heating, backed up with gas or alternatively with a 6 kW pellet stove.

Setting the scene

A fifth of the housing stock is pre-WWI and the current rate of new built is low. Hence, it is crucial to use the refurbishment potential as well as the new-built potential for achieving national and regional sustainability goals. This project demonstrates that the 40%-House scenario (Boardman et al, 2006) is achievable and more.

Even Victorian houses can become 30%-Houses – with existing and marketed technology – and provide excellent living conditions. We think that it is important to highlight this potential and to empower people to make their contribution to sustainable devleopment.

Due to the conservation area status, outside insulation was not possible in our project, which is why we adopted inside insulation. This was combined with a wall-radiant heating system that perfectly worked with the wood wool insulation and the solar heating system, backed up with gas. For the heating system, our first choice had been wood pellets combined with solar, but the lack of storage space and with only one supplier in Sussex, it seemed too problematic; the second choice had been a ground source heat pump but our garden is not big enough for the panels (even vertical alignment) and a borehole to tap into the ground water is too expensive (£8k min+heat pump); the third choice would have been an air source heat pump, but this deemed too risky because of possible noise in garden; we are situated in a densely populated city area.

While compromises were necessary, we are very happy with the result. We transformed this house from a typical Victorian house (a 98 year old lady had lived here, thus not much was done on the house for a while) to a modern building with a much lower carbon footprint, but still kept the basic character of the house, and we feel to live now in a very healthy environment by using eco-material and paint, except the insulation under the ground floor where we used polystorol (this was judged to be necessary as natural material could have rotten with time). Also, the heat generated from the wall-radiant heating is so pleasant!

Beating the odds

Because the house is in an Article 4 regulated Conservation Area, this eco-refurbishment posed an additional challenge to the already existing struggle to find contractors who can implement such a project. As the council was initially not positive towards the project, we ended up with having done four planning applications; at the end we got everything we wanted (even the low energy windows in the front bays and the solar panels, which were the cause for the initial problems with the council). In terms of contractors, we employed different contractors for different stages as we could not find one who could do all in one go (let alone to an affordable price). All in all, it was quite an interactive learning process which saw us being on the phone a lot with producers and installers, partly in other countries, who helped us along with some details which enabled local contractors to do their job properly. We hope that our webpage helps potential future projects to be implemented with less effort.

Reaping the benefits

- **Environmental outcomes:**
  Reduced CO_2 emissions by 72% (or 80% if you calculate it per m2), created a very healthy living environment.
- **Social outcomes:**
  Devised a project web-page to facilitate dissemination of the knowledge.
  Presentation to Energy Minister. Sensibilisation and upskilling of local contractors.
  Demonstration that a refurbished Victorian house can provide better living conditions than a standard new built (wall radiant heat feels more pleasant than standard heating).
- **Economic outcomes:**
  Reduced energy bill by at least two thirds. Payback period for solar heating system is roughly 9 years (at current energy prices).

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