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A2-rated retrofit home wins Green Apple award

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Cooney Architects has won the silver medal for Ireland in the Green Apple Awards in 'The Built Environment and Architectural Heritage' category for its retrofit of a 19th century farmhouse in Co. Cavan. The award signifies the possibility of a much higher quality living environment in Ireland, paving the way not only for greener living but also building a potential pathway to meetings Ireland's Kyoto Protocol target through the reduction of energy related carbon emissions in the residential sector, the second largest contributor to emissions in the country after transport.

The house at Moyer, Co. Cavan is nestled in a commercial forest. Through innovative design and construction, the building achieves very high standards of comfort and energy. It is integrated with its natural environment and its contemporary appearance compliments the traditional form and characteristics.

The aim of the project was to conserve and re-use the existing semi-derelict house to achieve both Building Energy Rating (BER) A2 and Passive House design standards. What the project proves is that the processes used at Moyer House for achieving greater biodiversity, very high levels of energy efficiency and very high comfort can be achieved in a cost effective manner.

Examples of energy efficiency and conservation techniques used within the design included 200mm thick external fabric insulation, the use of blower door tests to achieve high air-tightness levels, triple glazed windows, whole house heat recovery ventilation (HRV) system for provision of high levels of air quality, a 14 square metre flat plate solar panel array providing hot water, under-floor heating, recycled rainwater and extensive planting of broadleaf trees on the site.

The performance of the house was monitored during Christmas 2009. The temperature was recorded in each room over a two week period and although external temperatures fell to as low as minus 7°C, the house held its heat very well with the temperature in each room never dropping below 16°C.

Original semi-derelict building

Completed building

The performance of the wood stove, the primary heat generator, was optimised by lighting the stove early morning when the cinders were still warm from the previous day. Morning room temperature was a comfortable 18°C; dried logs were then used to bring the room temperature back to 20-22°C very quickly. The temperature in the buffer tank averaged 35-40°C, sometimes reaching as high as 65°C and it provided a constant supply of hot water.

Although there was very little heat produced from solar over this period, it

did average 6-7^{0}C at midday so it worked extremely well even with snow and very low temperatures.

A little trial and error was required to maximise the efficiency of the under-floor heating; it was found to work most effectively when it was set to come on for a period of two hours, off for two hours throughout the day, then switched off at around 8-9 pm until the following morning. The heat remained in the house overnight and heated up quickly again reaching a cosy 20-24^{0}C within an hour and a half.

While the thermally massive walls (450mm thick) are still drying out, resultant higher levels of condensation are managed by increasing the speed of the HRV (heat recovery ventilation) system.

The building was carefully detailed at design stage to minimise cold bridges. However, continuity of insulation at the junction of the external insulation to the existing wall and under-floor insulation could not be achieved. This detail was analysed using specialist thermal modelling software to identify heat losses and condensation risk. All components are tested to the maximum during the cold period.
The under-floor heating system and HRV installation worked effectively achieving an even distribution of temperature throughout the building. However, we found that due to the slow response time of the under-floor heating system, two rooms in the northern part of the building at first floor level (where the only heat source is the HRV system) are slow to heat up and we may consider installing small radiators in these rooms to achieve a faster heating response time.

Overall the project has been a huge success. It is a cost effective model and sets an example of how a healthier, more energy efficient and economical quality of residential living in older buildings in Ireland is achievable.