

An Irish architect is creating a home that will virtually heat itself, writes Niall Toner

Frank Cooney is what you might call passive-aggressive. The architect is a long-time and vocal proponent of eco-architecture and the idea of sustainable low-energy buildings.

Cooney has an impressive CV when it comes to eco-building. He worked on the Green Building in Temple Bar in conjunction with Murray O'Laoire Architects back in the early 1990s.

Now he is about to put his lifestyle on the line by creating his own super-green home, dubbed a "passive" house. He and his wife Trish McCaffrey will move into a refurbished 18th-century farmhouse on the Cavan-Meath border in March and, if all goes to plan, they won't have to warm their hands on a mug of tea while they wait for the central heating to kick in.

Even in the depths of an average Irish winter, the temperature inside their new home should never drop below 14C-15C, without the need to burn an ounce of fuel. The house will rely largely on "passive" energy for its heating and hot water, which means all but a fraction of its energy will come directly from Mother Nature herself.

It won't be the first "passive" house in Ireland. There are already a number of new-builds, including the Wicklow home of fellow architect Tomas O'Leary, but Cooney reckons his will be the first retro-fitted home capable of achieving the coveted Passivhaus standard, as well as an A2 Building Energy Rating (BER), when the ratings become compulsory on January 1.

Passivhaus is a rigorous international standard for super-efficient, sustainable homes, developed for dwellings that use a minimal amount of energy for space heating or cooling. It was developed by academics in Sweden in the 1980s.

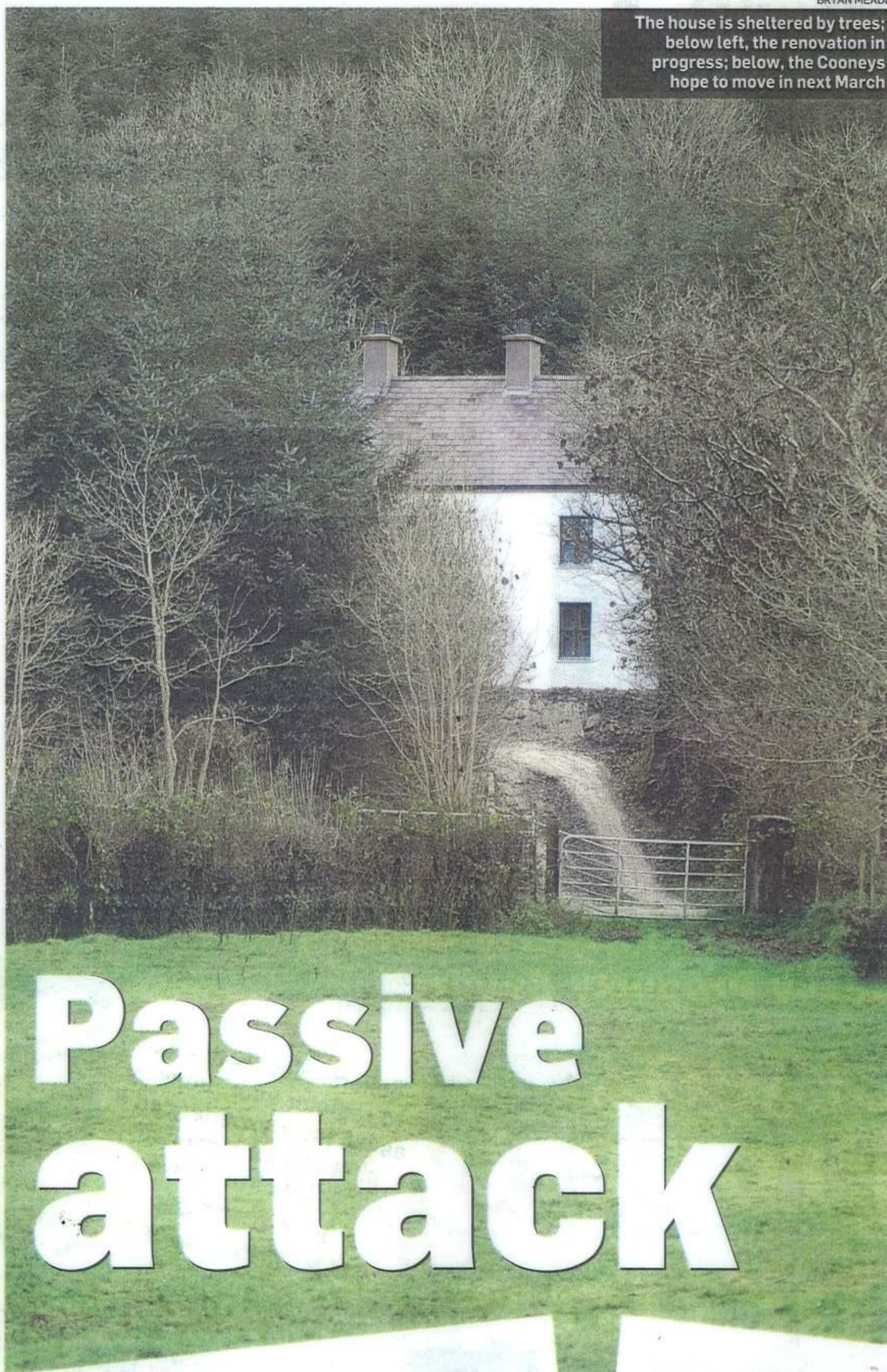
What it means is that 80% is chopped off your energy requirements. In cash terms, that could be a saving of €1,600 on a €2,000 annual heating bill.

"In the future, we will all have to change our lifestyles, but we hope to prove you don't have to compromise so much," says Cooney. "Sustainable architecture is not about just throwing on wind turbines and solar panels. That is only part of it."

The entire project will end up costing about €300,000 when it is finished, about 20% to 25% more than the standard cost of refurbishing a three-bed house.

With a strict budget, the couple started by considering what they already had. He says: "We looked at the house as it stood and its position in the landscape. For starters, it was in a wood, which gave it some shelter."

On the downside, it faces east-west, which is the wrong way from the point of view of maximis-



Passive attack

BRYAN MEADE
The house is sheltered by trees; below left, the renovation in progress; below, the Cooneys hope to move in next March

"SUSTAINABLE ARCHITECTURE IS NOT JUST ABOUT THROWING ON WIND TURBINES AND SOLAR PANELS. THAT IS ONLY PART OF IT"

ing solar gain. To counter this, they put a large window in the gable wall.

They created a sophisticated computer model of the house in its setting to calculate what the weather and light conditions might be on each day of the year. They found that while it performed fairly well, it still wouldn't meet 2007 building regulations.

The next step was to look at ways of saving the energy from any passive gain. This was done by insulating the walls externally. "We put 400mm-600mm of insulation on the outside, and then we insulated the floor and the roof in order to keep any energy gained from the sun," says Cooney.

They next identified the windows as one of the weak points where energy might be lost and opted for triple-glazed timber windows, with five times the energy efficiency of normal windows.

Cooney says: "We also looked at the materials used to build the house in the first place and tried to salvage as much as possible. We took down the slates and re-used what we could."

Because of the external insulation, Cooney says the stone walls are "thermally massive", acting like a storage heater that radiates out when the air inside cools. "It works the opposite way in the summer, staying cooler than the inside and radiating cool air."

Controlling air intake and exhaustion was another important factor and they opted for a heat exchanger, a mechanical system of pumping out hot, contaminated air and taking cool, clean air in.

Hot water will be provided by 150 sq ft of flat plate solar panels. These are connected to a 1,000 litre buffer tank and heat exchanger to provide instant hot water. The tank is linked to pipes embedded in the ground floor, which provide underfloor heating.

The computer model also showed that supplementary heating and power would be required at certain times of the year, with a maximum level of just 6kW in January.

Cooney says: "Given the small amount of additional heating required in winter, we installed a small multi-fuel stove with a back boiler that would provide space heating and extra hot water."

Since the days of the Green Building, Cooney says he has seen a shift in attitudes to greener homes.

"Back then, when the notion of using recycled aggregates in the building process came up, people looked at us as though we had two heads. Now they are used all the time, because they are cost-effective."

