

PROJECT



TYRONE BUILDERS SET ENERGY PERFORMANCE STANDARDS IN MONAGHAN

Currently under construction, the Coill Darach housing development in Castleblayney, Co Monaghan is one of the first in the country to seriously address energy performance issues.

The controversial Building Energy Rating (BER) - part of the EU Directive on the Energy Performance of Buildings - comes on stream on 1 January 2007 for new residential buildings, with ratings for all dwellings when offered for sale or letting/re-letting mandatory after 1 January 2009. This initiative, if successful, should go a long way towards improving the energy performance of new houses built from next year onwards and perhaps improve actual building quality standards. Not everyone, however, is waiting for next January. John Corless reports.



An external shot of one of the houses in the 106-unit development by Geda Construction

One company with a keen focus on energy performance is Tyrone-based Geda Construction. Their Coill Darach housing development in Castleblayney, Co Monaghan is one of the first in the country to seriously address energy performance issues. The development, consisting of 106 homes, is supported by Sustainable Energy Ireland's House of Tomorrow grants scheme and features a number of initiatives aimed at reducing the heating costs and fuel bills for the residents. Four house types are offered in the development and energy saving features include heat recovery ventilation systems coupled with an airtight structure, the use of solar energy and high performance boilers.

Introducing a range of environmental features into their residential developments was something of a natural progression for Geda. 'We had just done our own head office in Coalisland, Co Tyrone and we put a lot of energy saving technology into it - solar panels and a heat recovery system and we insulated the building highly,' says Damian Murray, Geda's contracts director - building. 'It seemed like the right thing to do to put the same features into the houses we were building. We went to Kingspan Century Homes for advice. They had tested out all the technology in their Formula One house project a few years previously and they were able to advise on which products and processes to use. In addition, we wanted to use Kingspan insulation and they had just bought Century Homes so the new company was

ideally placed for our needs. We had worked in Carrickmacross before and demand at that time wasn't spectacular. When we returned to the town we were surprised that people were actually waiting for this development and that the reputation earned in our earlier work there made it very easy to go back.'

Damian says that it can be a struggle to educate the public in terms of the extras that a builder has to put in to achieve the performance levels reached by the Coill Darach project. 'Even though you put in all of these high specification features, it can be difficult to get the premium price back out of a house,' he says. 'The grants that we're getting from Sustainable Energy Ireland are a great help but certainly wouldn't cover our additional costs in getting the houses up to the higher performance specification. Our houses are not that much dearer than houses which are not up to House of Tomorrow standards that are being provided by other developers in the locality.'

Four house types are offered in Coill Darach and are competitively priced, ranging from €193,000 to €280,000. The mix comprises three bedroom town houses (1,043 square feet) and three bed semi-detached units (1,175 square feet). Four bed semi-detached and detached houses are also offered. These are 1,650 square feet in size, which includes a garage. Pairs of four bed semis are neatly conjoined at the garages giving the maximum spacing between living quarters.

PROJECT



With fossil fuel prices rising and uncertainty in the market, especially regarding future oil supplies, it makes sense to minimise the amount of heating required for any property. If energy performance is to be improved in buildings, one of the critical design issues that has to be addressed is that of air movement throughout the house. The air tightness performance of a house can play a huge part in reducing heating requirements. The term itself - air tightness - is a somewhat confusing one. Perhaps air control is more accurate. Images of suffocation or the breathing in of stale air come to mind when

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we think of air tightness. But air tightness isn't about that at all.

Air tightness is essentially about the elimination of draughts. In other words, when we want fresh air, we open a window or slide the cover of a vent across. An electronically controlled valve does a similar job for us and we have the fresh air that we want. Draughty houses provide fresh air whether we want it or not. In winter, when ambient external temperatures may be only three or four degrees and we like to relax in our homes in temperatures around twenty degrees, we end up footing the bill for warming up all the incoming air by the required amount. The less cold air that we have to heat the better - so air tightness, or air control - saves money. Airtight houses offer another economic benefit - they don't let much warm air escape either.

Delivering air tightness to the customer demands tight supervision on site. Timber frame houses use a membrane underneath the plaster slabs known as a vapour check to prevent moisture from entering the living space. This can easily be upgraded to an air tightness membrane standard by the use of sealing tapes and mastics etc, which are readily available. However, site supervisors must ensure that proper sealing grommets are used around cables and pipes, where they penetrate the membrane, and that any accidental tears are resealed properly.

Geda Construction sought advice from Kingspan Century Homes on how best to achieve the demands of the House of Tomorrow specification. That specification includes a requirement that houses have to be at least 40% more energy efficient than an equivalent building built to comply with the building regulations. 'Geda are using two Sunwarm solar panels with six square metres gross area of collector on each house in the Coill Darach scheme,' says Bill Quigley, director of Nutec Consultants who advised on the project. 'Each house



also uses a Mitsubishi Lossnay Heat Recovery Ventilation unit as part of the air solar heating, ventilation and hot water system. The HRV unit will have a seasonal efficiency in excess of 80%. The air solar heating and ventilating system is fully automatic and computer controlled. The concept of these houses is broadly the Century Homes 'Formula 1 House' system. Because they're factory built timber frame houses, they can be accurately constructed with high levels of insulation in all of the fabric elements. The walls and roofs have high levels of insulation, the floors have 200mm of high density

land,' says Gerry. 'The kit was more or less the same as our other timber frame kits but the house was obviously specified higher.' The Geda Construction project was the first House of Tomorrow scheme for Kingspan Century Homes. The company is now offering a House of Tomorrow package to other developers. The amount of grant available to builders/developers under House of Tomorrow is €8,000 for a €16,000 spend. Kingspan Century claims the package they offer to the market delivers the required performance within that budget.

Kingspan Century Homes Formula One prototype project was set up to develop a zero energy house - a passive house. However, they discovered along the way that zero energy consumption is virtually impossible, even with passive house technology. They set about developing the zero CO₂ house, which they found is largely achievable. In the process the company developed technologies which involved airtight construction, low U-Values and the development of the mechanical systems that go with that. Other considerations for Kingspan Century are combustion appliances and bringing in air for these appliances. A partnership with Mitsubishi Electric was established to supply the heat recovery ventilation units and systems were also developed with Nutec Consultants integrating air solar panels with the HRV units. The end product is air solar panels which contribute to the HRV system, even in winter, when there's very little solar gain.

The condensing boilers are supplied to Coill Darach by Warmflow Engineering of Lisburn. 'These are Rielo condensing boilers made in Italy,' says Oliver Cormican, sales and marketing manager with the company. 'The primary heat exchanger is made from mild steel and the secondary exchanger is made from stainless steel.' The boilers are 70,000 BTU in output and have balanced flues.

So what about sales of the Coill Darach houses?



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polystyrene and the windows have a U-value of less than 1.5 W/m².K. Factory build also means that there is reduced thermal bridging in the fabric elements. The house has a designed level of air tightness of less than 0.1 air changes per hour - that's 10% of a typical standard house. The houses are Blower Door tested by us to ensure the designed level of air tightness is achieved.'

According to Gerry Hogan, area sales manager with Kingspan Century, the Coill Darach estate is 'at the forefront of house building' in that heat recovery ventilation and airtightness are used in the houses along with high efficiency boilers and highly insulated windows. 'We set up all the contacts and processed the grant through Sustainable Energy Ire-

'House sales have been strong for us so far, maybe it's too early to tell, but it seems to be going well so far,' says Damian Murray. 'Word of mouth is a great advertising medium and we find people turning up to see if they really can get all these added features for the prices we're quoting. We got grant approval from SEI for one hundred of the one hundred and six houses but we're putting it into all of them. The whole area of renewable energy, sustainability and energy efficiency is playing a major role in the construction industry both in commercial projects and increasingly in residential developments. We recognised this emerging trend over a year ago when Coill Darach was at planning stage and it has proved highly successful.'