

Sheltering from the Storm

The Search for Sustainable Housing.

By Andy Wilson (October 2007)

The term 'sustainable housing' is one which has no clear definition or agreed set of indicators. Typically, criteria of sustainability have tended to focus on the embodied energy of the building and on the energy the building uses during its lifetime. While these are indeed measures of sustainability, equally important are the other environmental impacts associated with the building, its relationship with transport, and crucially, its affordability.

Affordability

As pointed out elsewhere in the magazine, home ownership in Ireland has never been so unaffordable. The average house price is now more than ten times the average annual industrial income.

Even outside Dublin, site prices alone often exceed three times the average wage. In order to buy property, people are literally signing their life away to the mortgage providers. Their security of tenure hinges on their ability to remain in well-paid employment for the rest of their lives. Any considerations about living lightly on the planet will inevitably be sacrificed in the interests of keeping up mortgage repayments.

Because of the interest owed on monies borrowed, debt ties a society into the necessity of continual economic growth, of more consumerism, more material goods and more resource depletion.

In 2006, only 0.6 percent of houses purchased cost less than half the average price of €306,000. If however house prices had risen at the same rate as income since 1994, the average price of property today would be around €120,000, with the bottom end of the conventional market at about €60,000.

Perhaps surprisingly, it is still possible

to build a small house or renovate an old cottage for under this figure, if one does most of the work oneself and a tight rein is kept on material costs. Individual expectations however have been fuelled by a perceived need to have expensive fitted kitchens, en suite bathrooms for every bedroom, sophisticated heating systems and a plethora of unnecessary and environmentally costly extras.

Low Cost Self-Build

The previous issue of Sustainability documented two self-build projects which have total budgets of under €40,000. One of these is now nearing completion.¹

The project referred to is a re-build of a traditional cottage which had been stripped down to 4 walls. The finished building is generously insulated, contains high spec double and triple glazing, has a flat plate solar collector fitted into the roof, and will easily be heated from a modest wood burning stove with back boiler. Re-building has taken under 18 months.

Much of the work was carried out by a small team of inexperienced young people aged 18-27 who learnt on the job and were supervised where necessary. They were paid an hourly rate a little over the minimum wage.

High standards were set at every stage of the job, and time was always allowed to demonstrate how to do things right, and safely. The same work formula could easily be applied to other projects. Several people were involved in the job right from the start and have become competent at a diverse range of building skills.

Elsewhere in Ireland, radical architect Peter Cowman, who runs the Living Architecture Centre (see below) has been developing a concept called the 'EconoSpace', an ultra low cost self-build dwelling unit of 25m² floor area. This simple design is particularly aimed

at young people with limited financial resources. Previous construction experience is not a prerequisite. The total cost is unlikely to exceed €15,000, and could be considerably less depending on the materials used.

Peter believes passionately that people need to regain responsibility for their living spaces. He also runs various courses to help people develop their spatial awareness and design skills. The EconoSpace fits in well with the ancient Irish concept of the meithall, in which labour and skills are freely exchanged for the common good of the community.²

There is a very strong case for different planning rules to be drawn up, so that new houses no longer have to match the so-called vernacular, particularly



Cottage rebuilt for under €40,000

if all that is meant by vernacular is soulless post-seventies architecture. The evolving situation in West Wales, where planners are looking at special exemptions for dwellings classed as 'low environmental impact', is one which Ireland could learn from.¹

“Property soon will be very cheap. It will be particularly cheap in unfinished housing estates, hotels and apartment complexes on which banks have foreclosed and on which there is the smell of failure. Many of these will have excellent potential for sustainable communities”.

Michael Layden. Sustainability Strategist.

Community Ownership

There is much to be said for community ownership. At the *Lammas* project (also in West Wales) a group of people purchase land on a cooperative basis and then leased parcels of the land back to stakeholders who wished to build their own dwelling on it. Because the leases are very long term, ownership isn't an issue.¹

It also allows for the possibility for the initial purchase to be partly financed by individuals and organisations who wish to support the project for other reasons than wanting to live there. Such reasons could include protection of the environment, employment, development of community based infrastructure and educational opportunities. Without enlightened planning regulations however, such projects will be hard to get started.

Another obstacle to low cost housing is the enormously inflated price of building land in Ireland, which in some cases is a hundred times the agricultural value of the land. Interestingly, when the property bubble burst in Japan in 1990-91, development land prices fell by up to 99%.

A more conventional variation of the Lammas concept is the Village project in Cloughjordan Co. Tipperary, where a site of 26 hectares was bought collectively, and then individual sites were sold to stakeholders. However, the site prices reflect recent market values and also the high initial purchase price of what was previously agricultural land. The average site price is €86,000 and prices range from about €41,000 for an apartment site to €144,000 for the largest house site. This makes acquiring a home in Cloughjordan an unattainable proposition for someone on a low to medium income, even if they built the house themselves at low cost.

These criticisms aside, the social and environmental model offered by Cloughjordan is a good one. The Village project has its own community and environmental charter and also includes office space and community buildings. One wonders what could be done on a similar sized piece of land acquired cheaply or on a very long term lease arrangement.

Renting and Social Housing

The potential for good quality rented accommodation is frequently under-

estimated in Ireland. This may be a consequence of Ireland's colonial past, but is also due to the gombeen landlord syndrome. Every large town in Ireland has its 'student' or more recently 'immigrant' quarter, where unhealthy and possibly unsafe apartments, bedsits and nineteenth century terraced houses are let out at grossly inflated prices. With proper regulations however, the rented sector need not be like this.

European Examples

Occupancy patterns in other European countries make for an interesting comparison. In the EU as a whole, about 40 percent of all dwellings are rented. In France, the Netherlands and Germany the figures are 45, 50 and 62 percent respectively, with much higher percentages in many towns and cities. In Ireland the figure is 20 percent, the lowest of the former EU15. In countries where there is a large rented sector, the standard of rented accommodation is generally much higher than in Ireland, with greater security for tenants and more regulation over rents.

In Ireland, the bursting of the property bubble will result in a lot of property becoming available for rent. There is a strong case for local authorities buying up bankrupt stock from developers and then making these houses available to tenants with an option to buy at affordable prices over a period of years if they so wish.

What should not happen, however, is that the local authorities step in now to bale out developers and speculators who recklessly gambled borrowed money to throw up poor quality houses with the aim of making a quick profit.

Public money should be used judiciously. Allowing for monies which will be needed to either to finish uncompleted properties or to make existing ones more energy efficient and fully compliant with Building Regulations, local authorities should aim to pay no more than 25 percent of the original asking price.

Employment, Local Economies and Transport

These are factors often overlooked in the more conventional definition of sustainable housing. The lowest embodied energy construction however, will fail to meet any broader definition of being sustainable if the occupants are obliged to travel big distances by

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private car to access schools, shops, essential services and employment.

One of the biggest problems Ireland will inherit from the many bad planning decisions of the last two decades is that many houses have been built without any consideration of any of the above factors. The eastern counties which surround Dublin have become one massive commuter belt with very few local employment opportunities and massive dependency on the private car for transportation. Equally, the recent fashion of building one-off housing in rural areas does not bode well for the future.

Currently, one third of Ireland's primary energy requirements go on transport. Essentially, this is used for moving people or goods from the place where they are situated, to the place where they need to go, and back again if necessary, irrespective of the distances involved. Any strategy aimed at making housing more sustainable must address these issues. In truth, Ireland has had no spatial strategy up till now.

Energy Efficiency and Use of Resources

Energy efficiency is clearly a mis-used term when it can be applied to 3 litre hybrid engine saloons of the type enjoyed by government ministers. This is equally true of houses. The rating system used to measure the energy performance of buildings both in Ireland and the UK is based on the heat losses per square meter of floor area, not the overall heat losses.

This might sound reasonable enough, but consider two houses, one an average sized house of 150m² and one which is twice the size. Lets assume the larger house, which took almost twice as many materials and resources to build, has an energy requirement (for heating, ventilation and lighting) of 145 kWh/m²/yr (kilowatt-hours of energy per square meter of floor area per annum), while the second has a requirement of 205 kWh/m²/yr.

Multiplying the requirement by the floor area, we find the larger house has an annual energy requirement of 145 kWh x 300 = 43,500 per annum, while the smaller one requires 205kWh x 150 = 30,750 kWh per annum.

Assuming the same type of heating system in each house, the annual carbon emissions will be roughly proportional

to the total energy used by each house. Yet under the Building Energy Rating (BER) system adopted by Ireland, the smaller house would only be given a D1 rating while the bigger house would qualify for a B3 rating, four bands higher, in spite of using 40 percent more energy.

This shows the nonsensical rationale behind the concept of energy efficiency when it is taken in isolation and not linked to total energy usage. Perhaps not surprisingly, the rating system has been enthusiastically endorsed by many companies selling 'energy efficient' houses, because it allows for the possibility of houses the size of Elizabethan manors, fully equipped with the latest micro-chip controlled heating and ventilation systems, being marketed as 'environmentally friendly'.

In energy terms, the easiest way for a house to meet sustainability criteria is for it to be modest in size. Not only will the annual energy requirements be less, but less raw materials and energy will be required to build the house in the first place. Obviously the house should also be reasonably air tight, have a generous level of insulation and be fitted with good quality windows; this is only common sense. Also, it is often more sustainable to work with what buildings we have already, and upgrade them if necessary, than to build from scratch.

Poor Workmanship

A word needs to be added about workmanship. Theoretical building energy ratings based on the specifications in the plans or on information provided by the developer are worthless. In every single house I have inspected in my capacity as a domestic energy consultant, the loft insulation was non-compliant with building regulations. In a depressingly large number of new houses (houses less than 5 years old) loft insulation is installed so badly as to be useless, is of inadequate depth or is absent completely from large areas.

The standard of cavity insulation is often little better. Although there is no mystery about what constitutes good installation practice, it appears builders are still in the dark.

Rigid cavity insulation should be butted tightly against the inner block work, so that no air can circulate between the blocks and insulation

This is only possible if the inner block work is done in a tidy fashion and there are no bits of mortar protruding from between the blocks into the cavity. Studies have shown that even small air gaps between the inner blockwork and cavity insulation can double or even triple heat losses through the wall.

The much hyped Building Energy Rating (BER) introduced into Ireland in 2007 will assess the energy performance of a building according to the information contained in the drawings and plans. This system of assessment is worse than useless. Without detailed inspections, no accurate picture of the energy performance of a building is possible.

Nasty Materials

No definition of what constitutes sustainable housing would be complete without some mention of nasty materials. Unfortunately, modern buildings tend to be very environmentally *unfriendly*. It is possible however to make informed choices and to avoid the worst products and materials. Second hand or recycled materials typically have the lowest environmental impact of all, closely followed by natural materials from local sources.

Many imported natural materials, notably tropical hardwoods carry a very high environmental cost and are often linked to rainforest destruction. Certification by the Forestry Stewardship Council, once the hallmark of sustainable forestry practice, has been severely discredited in recent years. The full story of how commercial and political interests deliberately sabotaged attempts to sustainably manage the tropical rainforests of Brazil, Thailand, Malaysia and Indonesia is told by the Rainforest Foundation.³

Other products which carry a very high environmental cost include PVC (used widely in modern buildings), plywood and most synthetic wood preservatives. Many of these products carry high health risks to workers and to

people living near to factories and processing plants. Some of them may even pose health risks to the occupants of the building: this condition is known as 'sick building syndrome'.⁴

Conclusion

*T*he principle factors which determine the sustainability of housing are its affordability, whether it already exists or still needs to be built, its location in relation to employment and essential services, the energy required to build the house or make it habitable, and its size. Thus, a 100 year old terraced house in an inner city will score much more highly than a 300m² self proclaimed 'eco-house' built miles from anywhere. Energy efficiency taken in isolation is not much of an indicator, and may even be misleading.

Further reading and references:

¹ Sustainability Issue 1 Spring 2007

² www.livingarchitecturecentre.com

³ Trading in Credibility: The Myth and Reality of the Forestry Stewardship Council, the Rainforest Foundation 2003. This report is also extremely critical of State forestry management practices in Ireland, and the process by which Ireland managed to acquire its own FSC label.

⁴ The Whole House Book, Borer and Harris, CAT Publications 2005, p76-77 (Sick Building Syndrome)