

Low energy housing blows with the winds of change

Shaun Skyme

RECENT developments in the controversy over the use of nuclear power and the research into alternative forms of energy such as solar and wave power, have increasingly brought the issue of the conservation of our available resources to the public notice. However attempts to cultivate a greater awareness among architects and builders of the potential in the building industry for higher standards of energy efficiency have all too often fallen on deaf ears. Despite ten years of campaigning the Electricity Council still meets with resistance from builders, architects, estate agents and building societies, who prefer to stick to tried and tested methods of construction and marketing despite the fact that energy efficiency requires a minimum of extra investment.

Yet to represent the electricity industry's past efforts as a total failure would be unfair. Over 90,000 dwellings have been committed to the Medallion Award energy efficiency scheme for the private sector, and this in itself represents a considerable improvement on the days of almost complete ignorance of over a decade ago. However it is still apparent that countries such as the USA, Canada and Sweden are considerably more sophisticated in their approach to the problem of energy efficiency.

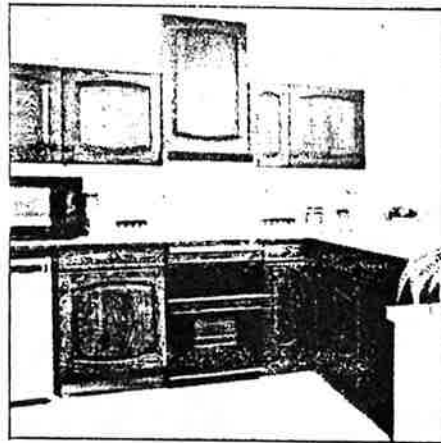
A joint approach to efficiency

Perhaps indicative of a more cooperative relationship between the energy and building industries is the joint project undertaken by Rendell Homes, the Electricity Council and the Southern Electricity Board involving the construction of 26 all-electric bungalows at the Ridings site, in Devizes, Wiltshire. Christened the 'New Day' range, three different models are being built on the site: the two bedroom Allenwood, the three bedroom Villager and the four bedroom Leyton. The designs, which originate in the US where Rendell's sister company, Y.J Lovell developed them, incorporate standards

The four-bedroom Leyton Bungalow, showing the Fläkt Rexonet ventilation system.

of energy efficiency far beyond the Medallion Award standards. So far public reaction has been encouraging; of the twenty six bungalows on the Ridings site one is already occupied and all twenty five other have been sold. All in all over 200 homes are planned for the development.

Pointing to the fact that this project was begun in late 1984 the company denies the accusation that it is jumping on the band wagon in Energy Efficiency Year, yet the significance of these bungalows and the new electricity supply industry's



Cooking up energy savings: the ventilation unit is incorporated into the cooker hood

energy efficient specification cannot be underestimated. Duncan Ross, Chairman of the Southern Electricity Board, has said of the project. "I sincerely believe that not only Rendell Homes, but other

builders as well will see the advantages of building properties to this specification."

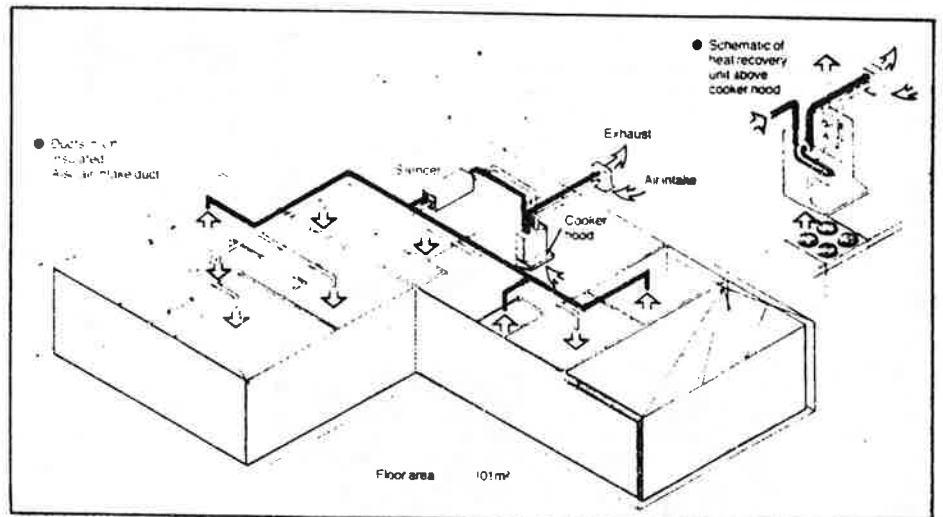
Low-energy specification

Incorporating standards of energy efficiency, previously unattained in private housing developments the new specification evolved from years of research at the Electricity Council Research Centre at Capenhurst, near Chester. It specifies U values of less than 0.4W/m²C for external windows and ground floors, less than 3.0W/m²C for windows and doors and less than 0.25W/m²C for the roof. However the unique aspect of the specification is the inclusion of a matched supply mechanical ventilation system with heat recovery facilities. To satisfy requirements the system must be capable of supplying the equivalent of 0.75 air changes per hour over the house as a whole. Other specifications include the incorporation of speed control on the fans and a minimum heat recovery efficiency of 60%.

Requirements for the heating and hot water systems are designed to take advantage of the electricity board's Economy 7 tariff, which offers electricity at less than half the normal domestic rate for seven hours during the night. Two immersion heaters, each with a separate electrical circuit, are fitted to the water heating storage tank. The upper element is designed to have a 24 hour supply, whilst the lower is timed to operate during the seven hours when cheap electricity is available.

Lifting the condensation curse

Clearly, the main factor in this improvement in energy efficiency is the ability of the heat recovery system to solve condensation and ventilation problems which, up till now, have been inherent in any sealed, highly insulated, houses. Insufficient air change rates lead to an uncomfortable and unhealthy environment; it has also been claimed that breeze and building blocks currently in use have been



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know to give off fumes which can have a harmful effect on the living atmosphere. The only previously available solution was to open the windows which leads to inestimable heat loss which can only be compensated for by turning the thermostat up. The heat recovery system filters out unwanted odours yet will recycle at least 60% of the heat created by people, domestic appliances and solar gain back into the home.

In the construction of the New Day bungalows Rendell Homes have incorporated a Fläkt Rexonet heat recovery system. Discreetly situated beneath its integral cooker hood, the unit is connected to a network of air ducts which run throughout the bungalow above a false ceiling. Heat from the exhaust air is transferred to the incoming supply of fresh air and distributed via ducts into the various rooms through a number of small ceiling units. The average temperature of this air is about 21°C which provides a comfortable living temperature for the whole of the year. Should it prove necessary the air-handling capacity of the cooker hood can be still further increased by setting the fan control to maximum. The overall ventilation of the house can be similarly boosted on a low ventilation rate setting when the house is unoccupied for a length of time.

The Fläkt Rexonet system has been

successfully used in Sweden and consumes no more electricity than the average domestic light bulb. Maintenance requirements are negligible; it being



The lounge is heated by an electric storage heater. Fresh air enters through the ceiling-mounted grille.

advisable to give the supply and exhaust air filters a clean two or three times a year. Its incorporation into a sealed home prevents condensation and solves ventilation problems. The system has allowed Rendell Homes to insulate its bungalows even to the extent of attaching seals to external doors similar to those normally used on freezers.

Weekly running costs

The result of all this is weekly running

cost estimates for space and water heating only of £3.50 for the Allenwood, £4.00 for the Villager and £4.50 for the Leyton. Such figures make it possible to approximate a £10 figure for total weekly running costs, including lighting and cooking, for the four bedroom Leyton.

A change in public perceptions?

Such figures are obviously impressive enough but will the system have the desired impact on the way we think upon domestic energy efficiency? For the moment its immediate influence is limited. Neither the Fläkt Rexonet nor any other heat recovery system can be installed into an existing house, rather needing to be incorporated into the structure during construction. Thus the vast majority of property owners in the UK must continue to cope with energy efficiency rates significantly inferior to those in the US and Canada.

However for the future the Rendell Homes bungalows illustrate two very important points: firstly, that standards of insulation need no longer be restricted by ventilation and condensation problems, and secondly, that the public is fully prepared to respond positively to properties that offer increased energy conservation facilities, as shown by the ease with which all 26 bungalows were sold.

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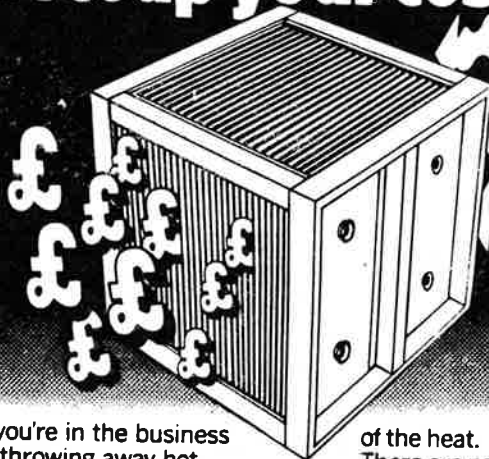
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