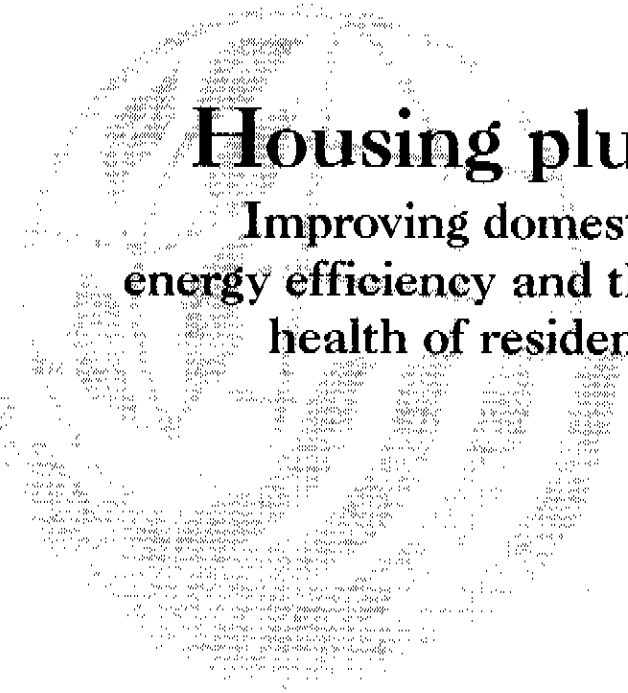




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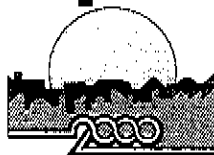
Case studies in
Sustainable Development and Health: 2



Housing plus

Improving domestic
energy efficiency and the
health of residents

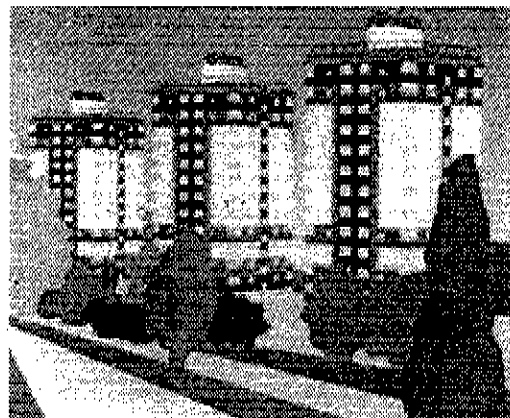
Sheffield
United Kingdom



Healthy Cities Network

Abstract

Between 1993 and 1996 the Municipality of Sheffield invested US \$4 million renovating 7 tower blocks (each with 48 apartments) in a poor inner district of the city. Most of the investment was in energy efficiency measures. The impact was a small reduction in energy consumption, a larger reduction in emission of greenhouse gases, a big improvement in residents' warmth and comfort and an associated improvement in residents' perceived health status.



Keywords

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Housing plus

Improving domestic energy efficiency and the health of residents

Objectives

The original objectives of the Municipality were narrowly defined by the Department of Housing as increasing the market value of the property and reducing rent arrears and vacant property. These limited objectives were not acceptable to the United Kingdom government. Residents and the Municipality then proposed a plan with broader objectives – security, greater resident stability and community cohesion, increased energy efficiency and a reduction in the emission of greenhouse gases, especially CO₂.

Project status

The renovation of the 7 tower blocks was completed in 1996.

Background information

The Municipality built the tower blocks in 1960 as part of a comprehensive redevelopment programme of old slum property located in an inner-city collar around the central business district. By 1990 this solution had become a problem. According to a municipal application for European Union URBAN programme funding, the area was locked into a “vicious circle of unemployment, deprivation, ill health and poor housing”.

Much of the housing stock was built to comply with low insulation standards when energy was cheap. Residents and the Municipality proposed to improve the energy efficiency of the tower blocks. This would reduce the heating costs for residents and contribute to the United Kingdom target of reducing the emission of greenhouse gases. The intervention was more broadly designed to break the vicious circle of economic decline and social exclusion in this area.

Implementation

Strategy

After considering a number of alternatives – demolition, “do nothing”, transfer of ownership and partial improvement – the project team and residents opted for full refurbishment. They decided to encase each tower block in mineral wool insulation material with an outer skin of rainscreen cladding using an aluminium cassette-type system. This would protect the old building structure from the weather and also prevent cold bridging caused by the external exposure of concrete floors. Insulation would be enhanced by enclosing the open balconies with glass. The underfloor electric heating system would be replaced by a small gas-fired district central heating plant with hot water pipes feeding heat to each apartment.

Activities

Between 1989 and 1993 a team from the municipal Department of Building Services developed the design and specification. An architect coordinated the input of in-house structural and heating engineers, and external consultants were commissioned to develop the rainscreen cladding concept. Resources were finally secured in 1993 to improve 4 of the 7 tower blocks. Henry Boot, a local building firm, won the building contract and began work in 1993 using insulation materials supplied by Sheffield Insulations. Refurbishment was completed in September 1994. A second phase of building improvements to the remaining 3 tower blocks began in November 1994 and was completed in 1996.

Partners

The project was one of many undertaken as part of a wider Estate Action partnership between municipalities and the United Kingdom government. At the city level, the municipal Department of Housing contracted the Department of Building Services to develop the design and specification of the refurbishment. The Department of Building Services team reported progress to the district housing manager and regularly consulted a project group of tenants to ascertain their priorities and concerns. This project group continued in the construction period and liaised with the contractor's site manager.

Financing and resources used

US \$8.4 million was secured to improve the first 4 of the 7 tower blocks at a cost of US \$44 000 for each apartment and covered also the cost of a new district heating system and power plant. A second phase covering the remaining 3 tower blocks cost US \$5.8 million or US \$40 000 per property. Central government approval is simply permission to borrow additional funds: the Municipality funds and recoups them and all capital costs are funded by the municipality and recouped in increased rents. The social security system in the United Kingdom subsidizes the rent charged to low-income residents.

Results and impact

There was no before-and-after evaluation. Nevertheless, the Centre for Regional Economic and Social Research in Sheffield Hallam University compared the lives of residents in the improved property with a matched group of tenants in similar unimproved property. The surveys were undertaken 6 months after the refurbishment and, to ensure that residents were not simply reporting a halo-effect, they were re-surveyed a year later.

The biggest impact is on living conditions. Sixty per cent of residents in the unimproved property could not afford to heat their homes

adequately and nearly 30% had damp homes. In the improved property, even those on the lowest incomes can now afford to heat their apartments, and average indoor winter temperatures are maintained on average 6 °C higher. The results of the re-survey show that improved warmth and comfort and a better standard of living have been maintained over 18 months and are significantly related to better health as measured by the short form of the Health Survey Questionnaire (SF36).

Energy consumption for heating fell by only 5%, but the switch to cheaper and more efficient energy reduced residents annual heating bills by 27% (from US \$480 to US \$351) and their total fuel bills by 18% (from US \$725 to US \$596). Using a method developed by the Friends of the Earth, the annual emission of the greenhouse gas CO₂ is estimated to have fallen by over 50% from 5.37 tonnes to 2.47 tonnes for each apartment.

Rents were raised by 51% (from US \$1531 annually to US \$2404) to pay back the cost of improvements. This does not negatively impact two thirds of resident households whose rent is paid by the state social security system. Nevertheless, one third of the households are financial losers. The wider impact of higher rents is to increase the poverty trap – residents seeking to change their financial status from dependence on social security payments to paid employment must now secure a higher wage (to cover the higher rent) in order to improve their standard of living.

Barriers and conflicts

The leader of the residents' association reports:

“Initially most of the proposals for refurbishment were coming from the Municipality. There seemed to be little, if any consultation and input from local residents who would be affected. We challenged the lack of consultation and presented a list of improvements tenants really wanted. At first the Municipality was very reluctant to accept

because we would be exerting power they did not want us to have. Eventually they said "yes" and came back with a positive response. After a time it was good to see the Municipality fully consulting with tenants and taking on board their ideas and suggestions.

"Now that most of the major problems had been sorted out, it was decided to submit a city challenge bid to central government for matched funding. We were devastated when the answer came back saying "no". The reasons given were that there was too much emphasis on bricks and mortar and not enough on the lives of residents and other people in the district. We addressed these points and were successful in gaining central government funding."

Transferability

Compared with its northern European partners in the European Union, the United Kingdom has a poor record on domestic energy efficiency. This is probably linked to higher excess winter deaths (600 annually in Sheffield compared with 60 in Gothenburg, a city in Sweden with a similar population of 500 000). The position of the United Kingdom may be closer to those of the countries of central and eastern Europe.

Certain of the specific energy efficiency measures applied in the case study – the system of insulation and over cladding – can be applied cost-effectively to the many tower blocks with a concrete frame built across Europe after the Second World War. The gains arising from a switch of energy source – from electricity generated by coal-fired plants some distance from the city to a gas-fired district heating system – can also be replicated if the new energy source is available.

Lessons learned

- Involve residents from the beginning of the design and development process.
- Organize a professional design team.

- Go for the option of full improvement rather than second best.
- Concentrate resources initially on a few tower blocks rather than spread them thinly over many.
- Give others a definite timetable for when their turn will come.
- Specify that the principal building contractor appoint a liaison officer to work with tenants' representatives for the duration of the contract.

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Further information

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