ECSC promoting domestic energy efficiency

by Dyfrig Hughes, managing director

The Energy Conservation and Solar Centre (ECSC) specialises in tackling the problems of cold damp homes and high fuel bills through improved energy efficiency. The company provides local authorities, housing associations, private developers and fuel utilities with a source of independent expertise through a range of consultancy and training services.

Energy audits have played a key role in most countries which have made major strides in improving domestic energy efficiency. An audit is a survey to establish practical ways to improve energy efficiency, and generally includes an estimate of the potential savings on fuel bills and of the approximate capital costs involved.

ECSC was the first organisation to establish a viable self-financing domestic energy auditing service in the UK. It did this targeting the service on groups of public sector dwellings..

The service has been running now for five years, with audits covering over 7000 dwellings having been carried out. Users of the service are authorities planning improvement work to estates and concerned to utilise this opportunity to improve standards or to provide tenants with affordable warmth. The service uses computer software, based upon the Building Research Establishment's BREDEM model, for assessing cost effectiveness and for defining packages of measures which will bring running costs down below a target level.

A low-cost postal audit service has recently been developed for those able to provide architects plans and other details. This is used by small local authorities and housing associations, and by private developers.

Tackling condensation and mould growth problems has a high priority for most local authorities. Some condensation problems have a simple cause such as lack of ventilation in kitchens and bathrooms or excessive production of moisture by occupants. The majority of problems however are due to underheating of dwellings which are poorly insulated. Energy efficiency measures tackle the cause of the problem by providing occupants with affordable warmth.

ECSC carries out surveys of dwellings which suffer from condensation and mould growth, primarily for housing authorities. The cause of the problem is carefully diagnosed and a range of remedial options identified. The effect of the various options on the level of surface and interstitial condensation risk is examined using a computer model, and their cost-effectiveness compared. The cost and effect of humidistat controlled extract fans can for example be compared with that of improved heating. A technique for rapidly measuring air change rates is also used in situations where air change rates are thought likely to be especially low. Recommendations for action are then made.

Working with tenants

WORKING WITH TENANTS

ECSC has for several years been running condensation workshops for housing authorities. Groups of 20-30 staff from various departments are brought together for a one or two day workshop. A systematic approach to the problems is applied to real life case studies, using slides and other visual aids to take participants 'on site'. Participants are encouraged to diagnose the cause of problems and to propose remedies. A strategic approach for the authority is then formulated through interaction with the various departmental representatives present.

Condensation workshops have also been held for the Institute of Housing and for the Institute of Maintenance and Building Management.

ECSC's charitable wing – The Energy Conservation and Solar Centre – has since 1982 operated a free energy advice service for Tenants Associations in London. It is funded by the London Boroughs Grant Scheme and charitable trusts. This has enabled ECSC staff to work closely with tenants and to see the problems and priorities clearly from their point of view. The service assists groups in their discussions and negotiations with their landlord, and generally leads to a more contstructive and productive dialogue.

Typical services provided are:

- value for money assessments for district heating schemes
- condensation surveys
- temperature monitoring
- assessment of council plans for tackling condensation and mould growth
- assessment of refurbishment programmes

There is growing evidence that many people – particularly the elderly – have difficulty in understanding heating controls. This often results in them keeping their homes warmer or colder than desired or, in some cases, not using their central heating at all. Leaflets for users, although essential, are an inadequate response to this problem.

ECSC has been working for the past year with British Gas on developing ways of making individual advice available locally to public sector tenants, after they have had gas central heating installed. Tenants representatives are trained as neighbourhood advisers through a two day training programme covering the details of the individual heating system, how best to use controls, budgeting for fuel bills and condensation control.

In a parallel project a video is being produced for distribution to tenants when systems are installed.

Pressure-Tests are a way of estimating the leakiness characteristics of a dwelling and of measuring air change rates. They are another common feature in countries well down the energy efficiency road. In the UK they have until fairly recently been purely a research tool. In 1985 ECSC established a commercial service, using equipment imported from Canada. The service proved useful to builders of low energy houses at Milton Keynes Energy Park. Local authorities wanting to test the effectiveness of draughtproofing work or to diagnose the causes of condensa-

tion also use the service. Pressure-Tests are now proving useful for testing fire-protected spaces, as an alternative to the relaease of halon gas. This gas damages the ozone layer and contributes to the greenhouse effect.

The ECSC 'Energy in Housing' training programme is now in it's third year. This is a five day programme covering a broad range of energy issues. Day modules include: combatting condensation, energy auditing, energy efficiency techniques, giving energy advice. Other topics covered include: energy software, energy policies, district heating, fuel poverty and environmental concerns. Day modules can be taken individually. Participants on courses include housing managers, architects, surveyors, mechanical engineers, estate officers, tenant liason officers, fuel utility staff and neighbourhood energy action group staff. The courses are designed to be suitable for a mix of participants from different backgrounds. There is great emphasis on group participation and practical case studies.

'Energy in Housing' is run every three months in central London. This year the programme is going on tour for the first time. A programme held in York in March is to be followed up by programmes in Glasgow, Bath and Manchester.

Demonstrating the results of an energy audit to the client.

ECSC also runs customised courses for individual local authorities and for housing associations. These allow more attention to be paid on the course to specific problems and priorities. It also enables ECSC to work closely with the group in developing effective strategies for improving the energy efficiency of their stock and for tackling condensation and mould growth.

Last year the range of ECSC services was extended to include project management. A scheme currently underway is the management of a heating improvment package for the London Borough of Greenwich, on an estate of 200 dwellings. The estate has many elderly tenants living in cold conditions. Heating and insulation packages have been planned which will increase energy efficiency by between 50 and 75 per cent. These consist of gas central heating and hot water systems, draughtproofing, fixed ventilation, cavity wall and roof insulation and secondary glazing in some living rooms. This followed extensive tenant consultation eg on the type of heating, the type and siting of heating controls. Tenants representatives will be trained as neighbourhood heating advisers when the packages are installed this summer, to ensure effective use of heating systems and to minimise the risk of condensation.

There is much to be done to improve heating conditions for the poor, many of whom live in cold and damp homes. Condensation and mould growth has become one of the biggest problems affecting our housing stock. On a global level the greenhouse effect is now acknowledged to be a major threat. Energy efficiency has a central role in tackling all of these problems. ECSC sees its main role over the coming years as a provider of services which encourage and assist those people responsible for our housing stock to implement energy efficiency measures to the highest standards, but in a cost-effective way.

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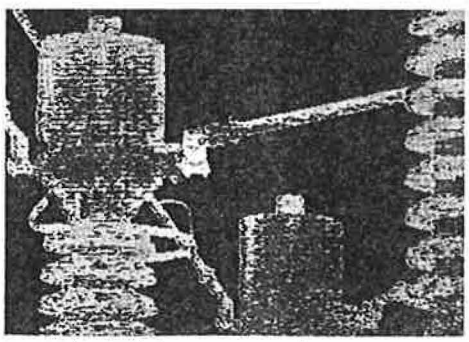
that problems should be dealt with rather than relying on guesswork. An interesting use of the technique is that similar buildings of like use and occupancy in different parts of the country can be compared and the results studied. Differences in building performance will need explanation and, possibly, remedial action.



An infra-red thermogram from a site survey showing overheating component in an electrical sub station.

This mixing and matching of results – known in the trade as multi sampling strategy – is clearly a pretty powerful tool. And not only for the future, but now. Local authorities, with their widely separate buildings with different occupancy times and disparate uses are one obvious beneficiary of this type of technical advance. Even their municipal rubbish tips can be examined for heat build up or loss of methane if they are in the biogas recovery business.

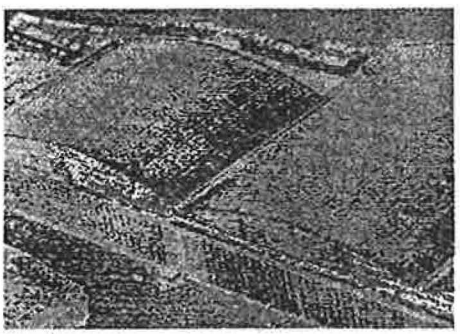
Infra red techniques enable rapid surveys to be made of either single buildings or whole cities. The quality and integrity of insulation has been assessed in huge industrial buildings such as the Brabazon hangar belonging to British Aerospace at Filton. According to PEAL's managing director, Alan Williams, this would have been an enormous task using conventional methods.

HOT BOX

The cameras used by PEAL are expensive – about £90,000 each, not including expensive airborne computer analysis equipment. However, since the actual survey is so quick, less consultancy time is required which makes the whole exercise economically attractive.

Clearly all this is state of the art stuff and yet commonplace in the Pilkington laboratories where it was developed. It is here that another major research facility has been developed to aid building energy efficiency – the 'hot box'. This is a large thermal test facility designed to set up controlled climatic conditions and give accurate measurements of heat flow through carefully constructed sample structures. The device is computer controlled and measures U-valves and heat flows through commercially manufactured building elements such as window systems, floors, walls, roof and ceiling structures.

A practical example of its value was in answering questions about the efficiency of mineral fibre insulation in domestic roofs. It had been suggested that the thermal resistance of insulation was reduced significantly from the published values by air flowing across the surface of the product. Under accurately controlled conditions it was found that in a typical ceiling structure the heat transfer through the insulation only increased significantly at substantially higher rates of flow than are normally expected in loft spaces.



The Brabazon Hangar at BAe Filton showing progressive insulation. The, as yet, uninsulated areas can clearly be

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