

## **THE ENERGY DESIGN ADVICE SCHEME: THE FIRST TWO YEARS**

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### **Abstract**

The aim of the Energy Design Advice Scheme (EDAS) is to improve the energy and environmental performance of the building stock by making low energy building design expertise more accessible; and, by doing so, to increase the expertise of designers (and raise the expectations of their clients). Its success can be gauged by the number of those receiving advice and the fuel saving measures which are identified during consultations and implemented by those who receive the advice. The Scheme is complementary to other initiatives intended to promote energy efficiency in the design, refurbishment and management of buildings. In particular, the Best Practice programme of the Department of Environment's Energy Efficiency Office (EEO) provides much of the background information and technical literature upon which advice is based. The Scheme actively disseminates advice to building design teams via regional centres, one of which acted as a regional pilot scheme for several years. The Scheme is co-ordinated by a central management organisation at the Building Research Establishment (BRE) and publicity is handled by a marketing consultancy. It is being monitored independently and some preliminary conclusions are drawn about the day to day operation and the achievements of the Scheme.

### **1 Description of the Scheme**

The Energy Design Advice Scheme is a Department of Trade and Industry discretionary initiative aimed at improving the energy and environmental performance of the building stock by making low energy design expertise more widely available. At the launch of the South East regional centre on 5 March 1993, Lord Strathclyde, then Minister with responsibility for energy efficiency, stated:

"...The buildings-related research, design and development programmes of the UK government and others have shown that many energy conscious design measures are technically proven and economic now. The application of such measures offers significant scope for improving the energy and environmental performance of the UK building stock. Although results of the research have been available for some time the rate of adoption has been slow, due in part to a lack of expertise among designers in the industry. The scheme is intended to overcome the skills shortage and to accelerate the adoption of proven low energy design measures. This skills shortage must be overcome and the potential energy savings realised. ... The educational content of the advice will enable [designers] to apply their knowledge to future projects producing cumulative benefits. ...The Central Management Organisation for the scheme is located at the Building Research Energy Conservation Support Unit (BRECSU). The scheme is part of the UK Passive Solar Programme managed by the Energy Support Technology Unit on behalf of the DTI."

The technical advice dispensed by the scheme is intended to achieve extra fuel savings in buildings over and above the norms implied by current practice. This *additionality* is to be achieved by using the most up to date design information and design tools, neither of which are routinely applied to building designs.

The scheme is based around regional centres staffed by professionals with expertise in low energy design and acting as information resource centres. They offer those commissioning or executing the design of a new building or refurbishment project an initial consultation lasting up to one day at no charge subject to certain eligibility criteria; the main ones being a minimum planned floor area (currently 500 m<sup>2</sup>) and evidence of intent to build. Agreement is also necessary that the building can be monitored and the effect of the Scheme published if required. Depending on the nature of the design and the opportunity for energy savings, further detailed advice on a project may be available at a proportion of its commercial cost through a full consultation. This advice is provided by consultants registered with each regional centre.

At the time of writing (January 1994) four Regional Centres are in operation – in Scotland, London, Belfast and Sheffield. Eclipse Research Consultants are retained to monitor the operation of the scheme and report to BRECSU. There is also a marketing contractor whose responsibilities are to publicise the scheme nationwide.

## **2 Background: phase 1**

The Energy Design Advice Scheme did not spring into being fully formed, but grew out of a regional advisory service based in Scotland. The Scottish pilot scheme has its roots within the University of Strathclyde's Architecture and Building Aids Computer Unit (ABACUS), which was responsible for much of the early research into computer aided design and the development of programs to analyse the thermal performance of buildings. A joint application from ABACUS and the Royal Incorporation of Architects in Scotland (RIAS) to the Scottish Development Agency (now Scottish Enterprise) and to BRECSU and EEO was successfully made for pump-priming funding to launch an advisory service targeted largely at building professionals in Scotland. The service was operated by the RIAS with technical support from the ABACUS Unit. Between 1987 and 1989 it gave advice to building design teams including, in appropriate cases, details of the predicted expected performance of design projects based on the use of innovative design tools such as the programmes developed at ABACUS.

The scheme was successful in attracting clients and meeting their expectations for energy design advice, and Professors Tom Maver and Joe Clarke were awarded the Royal Esso Prize for their efforts in promoting technology transfer. However, in practice, technology transfer was limited to customers using ABACUS on a bureau basis – rather than acquiring wider capabilities in-house and applying them as appropriate to design enquiries.

### 3 Background: phase 2

In parallel with this technology transfer initiative ETSU, acting on behalf of the DTI, had been responsible the management of research into renewable energy sources, including the Passive Solar Programme, and for promotion of the results of the programmes. There was a recognition of the benefits of person to person contact as a particularly effective means of disseminating highly specialised project-specific information. ETSU agreed to continue the Scottish service, but reorganised to meet its own objectives and as a pilot which would allow an assessment to be made of the feasibility of a national scheme.

Broadly the service operated much as before, offering up to one day of free advice in an initial consultation and, in appropriate cases, more detailed advice subsidised at not more than 50% of its commercial cost through a full consultation. But the new objective of a pilot study put the service under two pressures – to revise its *modus operandi* to suit the new objectives, and to document the operation in considerable detail so that the feasibility of the national scheme could be accurately assessed. Both added to the burden of meeting the everyday requirements of the service's clients. The Scottish service operated from two bases – the RIAS in Edinburgh co-ordinating publicity and marketing and acting as a focal point, ABACUS in Glasgow being the information resource centre and providing the technical advice. This raised a number of management and communication issues.

Overall the Scottish service met its targets in terms of the number of consultations it carried out. Within some of the initial consultations and most of the full consultations, estimates were made of the amount of fuel which could be saved by the incorporation of various energy efficiency measures, together with their payback periods. Users of the service were also sent questionnaires which asked them about their degree of satisfaction with the advice they had received, and the extent to which they had incorporated the advice into their designs. The fuel savings identified in consultations and the degree of incorporation of the advice into decision making, as reported by the recipients of the advice, were evaluated as part of the feasibility assessment for the nationwide scheme.

Other feasibility studies were undertaken, together with two smaller pilot schemes. The relevant professions were consulted, and a workshop was organised as a means of wider consultation with the construction industry, including potential clients of the scheme, consultants who would give advice and researchers who would provide much of the new information. The national scheme was approved in early 1992. The scheme has been identified as one of the ways by which the UK will limit its carbon dioxide emissions attributable to energy use in buildings.

#### **4 The role of the Central Management Organisation**

The national scheme is co-ordinated by BRECSU which is responsible for the following areas:

- national strategy in liaison with an independent Advisory Panel
- overall management – including the appointment and administration of regional centres, the marketing contractor and the monitoring consultant – and regular progress reviews
- evaluation of cost effectiveness
- technical information flow – identifying information sources
- maintaining liaison with other national and international energy programmes, including the Energy Efficiency Office Best Practice programme.

The Central Management Organisation (CMO) is supported by a marketing contractor and a monitoring consultant. The marketing contractor provides a national promotional campaign. This has involved the establishment of a corporate identity and national strategy for the Scheme, the official launches of the Regional Centres, the design of promotional material, press releases and media relations, exhibitions and conference support, and seminars. A national mailing list was compiled and is used for mailing the national newsletter *Communiqué*, and post card case studies. In addition the marketing contractor liaises with regional centres in the preparation of press articles and places these in appropriate journals. The Scheme has received extensive coverage in the technical press.

The aim of the monitoring is to contribute to the effectiveness of the Scheme in meeting its objectives, by providing feedback on its operation and recommendations to improve its management and working practices. These arise from collecting, collating and analysing data gathered from the CMO, regional centre staff, registered consultants and users. Periodic reviews are conducted of the operation of the Regional Centres.

#### **5 Regional Centres**

Four regional centres are opened, of which two are already in their second year of operation. The centres are sources of information and advice and centres of excellence based in a geographical region of the country. The larger ones are staffed by two professionally qualified and experienced staff, with clerical support. The principal purpose of regional centres is to give technical advice to enquirers through initial consultations and make arrangements for outside consultants, associated with the regional centre, to undertake full consultations. The centres are responsible for documenting the initial and full consultations, which are subsequently analysed.

They are compiling and maintaining a comprehensive library of technical information, including both reference copies of sources of information and multiple copies of government publications for distribution to enquirers. They also run specialist seminars on the application of practical technologies or within specific market sectors, and contribute to *continuing professional development* events such as workshops and seminars. They supply feature articles and information suitable for press releases.

## **6 Initial consultations**

The main task of the regional centres is to give advice on a project by project basis. They are to seek clients from among the region's building designers and building procurers, and aim to make contact at the earliest stages of design when there is the greatest potential for energy saving. As enquiries are received they are assessed for their eligibility for support. Those which meet the eligibility criteria for the Scheme – of being larger than 500 square metres in floor area and where there is an identifiable intention to build – are classified as *initial consultations*. In these cases up to one day of free advice will be given. This might take the form of a site visit, an inspection of the plans, or a meeting at the Regional Centre with the client and sometimes with others from the design team. Published information sources, such as the Best Practice programme of the Energy Efficiency Office, together with the experience and expertise of the Regional Centre staff, are drawn upon as the basis of the advice. Usually a follow-up letter draws together the advice in a coherent set of recommendations.

Consultations are usually initiated by telephone. Details are logged about the enquirer (profession, how they heard of the Scheme, and so on), the project details (building type, floor area, new build or refurbishment, and so on) and the nature of the advice they are seeking. Details are also logged on how the enquiry was dealt with, what advice was dispensed, and what sources of information were used as the basis of the advice. All this information is stored in a management information system, which can be interrogated by the Regional Centre. It is also passed to the monitoring consultant for various statistical analyses to be undertaken of the Scheme's clients and their projects. Specific targets have been set for the number of consultations each Centre is to achieve. These vary, but typically they are 120 initial consultations per year of which 30 lead to full consultations.

## **7 Full consultations and Associated Consultants**

Where the Centre identifies, during an initial consultation, that further fuel might be saved if more detailed analyses were performed, then the client may be offered a full consultation. Full consultations are not carried out by the Centre. Instead they are undertaken by consultants who are associated with the Scheme.

Regional centres keep a register of suitable consultants for specialist energy and related studies. Consultants must meet certain criteria including professional qualification, professional indemnity insurance and evidence of expertise and experience of low energy advice. Centres are making their own assessments of consultants, and are organising workshops to inform them of the latest proven low energy design techniques.

Typically regional centres classify the skills of consultants by profession, by sector and by technology, and use this classification to identify and nominate a shortlist of one or more consultants for a specific study.

During a full consultation, the consultant is actually engaged by the client, not by the Centre, although consultants are required to pass an estimate of the fuel savings identified in the consultation to the centre for collation, as well as a copy of the report to the client.

## **8 Information dissemination and the use of design tools**

The appointment of BRECSU as the CMO builds upon links between the information arising from the DTI's Passive Solar Programme and that current being promoted through the Best Practice programme, the buildings element of which BRECSU operates on behalf of the Energy Efficiency Office of the Department of Environment. It has been acknowledged that, on a day to day basis, much of the advice will be drawn from these programmes.

Although there is no intention that computer modelling should have any special place within the Scheme, it still plays an important role. Complex models are believed to be generally too time consuming to use during one day of advice-giving. Design tools in the form of look-up tables or nomograms are likely to be more appropriate. In the full consultations, however, it is more likely that computer based tools will be used by the consultants as one input to the advice. Regional centre directors are aware of the uncertainties associated with some of the available simulation models. Clients for whom these models are run are advised to ask consultants to provide evidence of the validity of the model and to check that simpler methods show similar trends.

## **9 Estimating energy savings**

It is an important in assessing the cost effectiveness of the scheme that estimates are prepared of energy savings identified during consultations. In the past there has been some reluctance to make these estimates. Partly this is because of the assumptions that have to be made about occupancy, weather, and the efficiency of plant and equipment in practice. If assumptions are incorrect, predictions may not match actual consumptions in the eventual building, with the risk of dissatisfaction from clients. Unless clients are committed to saving energy at any cost, realistic estimates of the potential energy savings that arise through the recommended energy conscious design measures are an essential part of advice-giving. Only in this way are clients put in a position where they can weigh up the benefits and compare them with the capital costs of the recommended measures. Making robust and reliable estimates is an obligation on both the centres and their associated consultants.

## **10 Conclusions on the UK scheme, and recommendations for other national schemes**

The first 18 months review has shown that the Scheme has got off to a good start. The Scottish Centre, having been operational in various guises since 1987, has consistently met its targets for the numbers of consultations it handles, and has established a good reputation with building design professionals in Scotland. The South East Centre, based in London, has established itself, and met its targets for initial consultations.

Experience of operating the scheme has raised a number of issues which possible national schemes elsewhere, if organised on similar lines, would need to address. Some key ones include the following:

### *Infrastructure and reporting systems*

Regional centre reporting procedures need to be clearly established at the start of the scheme. They need to have the tools required to fulfil those duties (such as a database or management information system for recording projects) sufficiently early to avoid the risk of a back-log of undigested data having to be revisited by the centres once the systems are in place.

### *Dual responsibilities within centres*

Regional Centres can find themselves with two responsibilities – on the one hand meeting the needs of their clients for information and advice, and on the other the contractual requirements to provide financial and statistical information to the funding organisation about their achievements. Often these are in balance, but if the demands from their clients rises they typically give precedence to advice-giving. Centres may need help in establishing appropriate priorities among competing demands on their staff time.

### *Autonomy versus control*

Regional centres have been given sufficient autonomy to define their own operation within the requirements of the specification of the national scheme. This gives them flexibility to manage their own affairs according to their individual circumstances. At the same time, means need to be devised to avoid each centre having to invent for itself its own operating practices and procedures. Collaboration and communication between the Centres is encouraged by BRECSU to enable them to pool information and resources. Consistency in the policies governing the appointment of associated consultants is also desirable.

### *Consistency in technical advice across the centres*

A client approaching one centre should receive broadly similar advice to that which he would receive at another. Although the staff at the centres will have different expertise and experience, each centre should have access to appropriate systems (such as bibliographic databases and technical publications) which will ensure the same information is available at each centre. Established procedures for dealing with consultations, such as those found in quality management systems, would help to ensure this consistency.

### *The commitment of associated consultants*

Associated consultants who are registered are expected to maintain a commitment to the centre by attending workshops and seminars. Consultants are, to some extent, self-selecting, and only those fully committed will continue their association. It is important that consultants who are the leaders in low energy expertise maintain a link with the Scheme and add to the reputation of the Scheme as a whole. A delicate balance has to be found between registering a sufficiently large number of consultants to provide a broad range of skills and to ensure that the aims of disseminating information to as wide a pool as possible is maintained while at the same time not raising expectations for commissions that might not materialise. At the same time limiting numbers of associated consultants could be interpreted as giving them an unfair commercial advantage, and would contradict the aim of information dissemination.

### *Skills, training and assessment*

Although professional qualifications exist in architectural design and building services design, there are currently no recognised professional qualifications in energy efficient design. What skills are required from associated consultants to achieve not just good practice but *additionality* - that extra saving derived from the application of knowledge and understanding of R&D results and sophisticated analysis tools? Who has these skills and how should they be measured? Schemes such as the Building Research Establishment Environmental Assessment Method and National Home Energy Rating have introduced their own training and examination procedures before assessors can act on their behalf. Are similar procedures required for energy design advice?

Questions such as these may not be wholly answerable in the current Energy Design Advice Scheme. What they demonstrate is that such a scheme raises a number of complex issues about the relationship between research results and design practice, and between expertise in a new subject area and its professional accreditation, in a field where there are as yet few precedents which can be drawn upon. EDAS is being well documented, and the identification of these issues and their resolution within the present scheme will be available as a contribution to equivalent initiatives elsewhere.