

*Environment Group
Building Research Establishment*

*Energy Rating Schemes for
Non-Domestic Buildings*

Workshop summary

Foreward

I have pleasure in presenting this summary of delegates' responses from the energy targeting workshops held at London, Manchester and Edinburgh in March 1996. I am able to report that there was a very positive response at all three workshops to the idea of developing an energy rating scheme for non-domestic buildings, and that delegates delivered a remarkably clear and consistent set of messages about how they want such a scheme to be introduced in the UK.

It is clear that there is strong support for a scheme and that its use would be wide ranging. The influence of possible regulation in maximising business and environmental benefits is clearly seen as an important one by workshop delegates. Similarly, the option to use the scheme to promote voluntary best practice standards is highly desirable.

Further development of the scheme will be carefully focused to ensure that the technical and commercial barriers identified are minimised. In particular, it is clear that the two approaches presented were seen as having particular benefits (and drawbacks) in different applications. Further development, testing and consultation will be required before the effectiveness of either approach can be fully evaluated.

The feedback provided by delegates will be used to inform policy decisions at DoE and its research programme at BRE. In the short term, BRE will begin developing the two calculation methods in earnest, with a view to starting an initial public trial within two years. Additional consultation will be undertaken as part of this process, and this is likely to be predominantly through professional and trade bodies. It is clear that a solid programme of promotion and training will also be essential to the scheme's success.

Finally, I would like to thank you, the industry, for the enthusiasm and stamina with which the workshops were tackled. I look forward to continuing our partnership in this area.



Roger Berry

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Executive Summary

1. This report contains a summary of delegates' responses from three energy targeting workshops held at London, Manchester and Edinburgh in March 1996. The workshops sought to take a broad sounding of UK industry needs in the area of energy rating for non-domestic buildings.

Workshop format

2. The workshops were attended by individuals representing a wide range of commercial organisations, professional institutions, trade and research associations. Delegates were assigned to three broadly defined groups: designers, occupiers and manufacturers. Through a series of individual and group exercises, they were asked to respond to detailed questions about the development and implementation of a rating scheme for non-domestic buildings. This report contains an analysis and summary of their responses to these questions.
3. The workshops were divided into five practical sessions. In each session, delegates were asked to work, either individually or in groups, through a series of exercises. Each exercise required them to address a particular question relating to the development or implementation of a rating scheme. It is delegates' responses to these questions which are analysed and reported here. Each tabulated analysis is followed by a brief interpretation of the main findings from their recorded responses.
4. In practical sessions 1, 2 and 5, all the delegates were asked to address the same questions. Sessions 3 and 4 were run in parallel. Delegates were given a short presentation about two calculation procedures currently under consideration for use in the rating scheme. Then, in session 3, occupiers and manufacturers were asked to address a general set of questions about the application of the method and its impact on these procedures. In session 4, designers were asked specific questions about the practicality and effectiveness of the calculation methods themselves.

Presentation of results

5. Analyses are presented in the order in which delegates undertook the exercises in their workbooks. Not all of those who came had time, or chose, to answer all of the questions they were asked to address. Furthermore, some did so in ways which proved difficult to analyse. In addition, delegates were not chosen to be statistically representative. Nor were they invited to present the view of their professional body or organisation. Hence, straight generalisations about the view of the industry as a whole, based on this report, would be an oversimplification. However, the findings do represent an immensely valuable resource for use in the DoE's research programme.

Perceived benefits of and barriers to a rating scheme

6. Delegates identified a long list of benefits arising from the introduction of an energy rating scheme for non-domestic buildings. The most frequently mentioned of these were environmental, followed by financial and educational.
7. Delegates identified 5 broad methods for exploiting these benefits – promotional, regulatory, financial/fiscal, educational, and technical. Promotional methods were the most frequently cited (as many as the other four categories combined).
8. Delegates also identified a long list of barriers to the widespread take-up of the scheme. The most frequently mentioned barrier was financial. Delegates' methods for overcoming these barriers were less extensive and fell into four broad categories: promotional, regulatory, financial/fiscal, and technical. Again promotional methods were the most frequently cited, although there was a closer balance between promotional and regulatory methods.

Delegates' preferred implementation route

9. There was little support from delegates for a solely voluntary approach to implementing the rating scheme. About 60% of them favoured some phased combination of voluntary and regulatory approaches – typically voluntary in the short term and regulatory in the medium to long term. The need for some form of regulation was supported by 90% of delegates.
10. There was a general feeling that the full environmental and business benefits would not accrue unless the scheme was widely adopted. Some form of regulation or statutory obligation was seen as essential in order to stimulate this widespread take-up. This may explain why business benefits were given such low priority in session 1.

Using the rating scheme throughout a building's lifetime

11. Between them, delegates were able to identify an extensive range of applications for the rating scheme, some of which are specific to particular stages of a building's lifetime. They were also able to identify an extensive list of constraints on using the rating scheme throughout these stages. There was a clear consensus that the two major constraints on the scheme would be the possible additional costs associated with administering it and the availability of the necessary information to carry out the calculations at a particular stage.

Delegates' responses to the two proposed calculation procedures

12. Delegates were asked to look at two approaches to calculating an energy rating; the use of an energy performance index (EPI) based on installed plant capacities, and an annual energy calculation with target energy consumption (T&AEUC).
13. Most occupiers who replied (60%), preferred the Energy Performance Index (EPI), while most manufacturers (70%) preferred the Targets and Annual Energy Use Calculation (T&AEUC). Most designers thought that the information required to do either of the calculations would be fairly easy to

obtain, though slightly more difficult in the case of the T&AEUC. Voting as individuals, designers typically saw the T&AEUC as slightly more practical and effective than the EPI.

14. The workshops did not generate a categorical preference for one or other of the calculation methods. Both approaches were seen as having benefits (and drawbacks) in different applications, such as different types of buildings and at the different stages of design, construction and use. The diverse specialisms represented by delegates, and the varied applications required, had a clear impact on the way delegates responded.

Preferred time scale for implementing the rating scheme

15. All of the groups voted for the rating scheme to be launched in the next 2 - 5 years.
16. In combination, delegates identified a long list of key players whom they thought should be involved in the development of the scheme. Those cited tend to fall into one of three main groups: government bodies; professional institutions and trade bodies; and building procurers and users. Many of these are seen as having multiple roles to play across a broad range of activities. For example, government was seen as providing quality assurance, promotion, and education.
17. The multiplicity of roles identified for all the players reflects industry's strong support for a continued partnership approach to developing the scheme. It is clear that this partnership will be vital to the technical, commercial and environmental success of the programme.

Introduction

This report contains analyses of exercises carried out by delegates at regional workshops held by the BRE to gauge the construction industry's preferences and support for the development of an energy rating scheme for non-domestic buildings.

Three workshops were held – in London, Manchester and Edinburgh. Delegates were invited from a wide range of organisations within the industry, e.g. professional institutions, trade and research associations, and property groups. Those who attended the workshops were assigned to three broadly defined groups: designers, occupiers and manufacturers.

The workshops were divided into five practical sessions. In each session, delegates were asked to work, either individually or in groups, through a series of exercises in their workbook. Each exercise required them to address a particular question relating to the development or implementation of a rating scheme. It is delegates' responses to these questions which are analysed and reported here. Each tabulated analysis is preceded by the question to which delegates were asked to respond and is followed by a brief interpretation of the main findings from their recorded responses.

In practical sessions 1, 2 and 5, all the delegates were asked to address the same questions. Sessions 3 and 4 were run in parallel. Delegates were given a short presentation about two calculation procedures currently under consideration for use in the rating scheme. Then, in session 3, occupiers and manufacturers were asked to address a general set of questions about the application of the method and its impact on these procedures. In session 4, designers were asked specific questions about the practicality and effectiveness of the calculation methods themselves.

Analyses are presented here in the order in which delegates undertook the exercises in their workbooks. The results presented are predominantly quantitative, although extensive qualitative content analyses are also provided. Some of the exercises in the workbooks gave delegates opportunities to make additional personal comments. This rich and diverse source of additional information is not presented here in any detail.

55 designers, 50 occupiers, and 24 manufacturers booked to attend the three workshops. Not all of those who came had time to, or chose not to, answer all of the questions they were asked to address. Furthermore, some did so in ways which were difficult to analyse. Because of this, the number of responses in each table is variable, dependent on how many delegates answered that particular question and whether they did so in a form amenable to analysis.

Caution is required when interpreting feedback from Sessions 3 and 4, as the rating scheme was only discussed in concept and it is clear from delegates' responses that its role could be very wide ranging. In addition, delegates were not chosen to be statistically representative. Nor were they invited to represent their professional body or organisation. This means that straight generalisations from delegates' responses to wider populations or groups would be an oversimplification.

Practical 1 Identifying benefits and barriers

In this session delegates were asked to address four questions.

- What are the main benefits that a non-domestic energy rating scheme would offer them?
- How did they think these benefits can be best exploited?
- What did they see as the main barriers to the widespread take up of such a rating scheme?
- How did they think these barriers could be overcome?

Question 1.1 What do you see as the main benefits of a non-domestic energy rating scheme?

Table 1 Individual delegates' most frequently perceived benefits of non-domestic energy rating scheme, aggregated for all three workshops

| Ranking | Aggregated responses | Frequency of mention |
|---------|--|----------------------|
| 1 | Reduced energy consumption/CO ₂ emissions/improved environmental impact | 27 |
| 2 | Design/performance/cost comparisons | 25 |
| 3 | Raised public awareness/profile of energy efficiency | 20 |
| 4 | Reduced capital and/ or running costs | 15 |
| 5 | National/common/industry standards | 14 |
| 6 | Bench-marking | 13 |
| 7= | Setting of improvement targets | 12 |
| 7= | Level playing field | 12 |
| 9 | Improved education of clients/business community/tenants | 11 |
| 10 | Marketing edge/industry competitiveness | 9 |
| 11 | Improved education of designers | 8 |
| 11 | Life cycle costing | 8 |

This league table of benefits has been compiled by rank ordering the frequency with which they were mentioned by the delegates at all three workshops.

- Delegates' responses suggest that a rating scheme is credited with being capable of delivering a wide range of benefits.
- Perceived benefits fall into 5 broad categories:
 - environmental
 - financial
 - standards-related
 - business-related, and
 - educational.
- Only one, the most frequently cited benefit, is environmental.
- 30% are financial: cost comparisons/reduced costs/life cycle costing.
- 30% are educational: raised public awareness/better educated clients/better educated designers.
- 30% are standards-related: cost comparisons/industry standards/target setting.
- 20% are business-related: level playing field/market edge.

Question 1.1 What do you see as the main benefits of a non-domestic energy rating scheme?

Table 2 Individual designers', occupiers' and manufacturers' most frequently perceived benefits of non-domestic energy rating scheme, aggregated by group for all three workshops

| Ranking | Designers | Occupiers | Manufacturers |
|---------|--|---|---|
| 1 | Design/performance/ cost comparisons | Bench-marking | Reduced energy consumption/CO2 emissions/improved environmental impact |
| 2 | Reduced energy consumption/CO2 emissions/improved environmental impact | Design/performance/ cost comparisons + Reduced capital and/ or running costs + Reduced energy consumption/CO2 emissions/improved environmental impact | Level playing field |
| 3 | Raised public awareness/profile of energy efficiency | | Encouragement of investment in energy efficiency |
| 4 | Setting of improvement targets | | Market edge/industry competitiveness + improved education of clients/business community/tenants + Reduced capital and/ or running costs |
| 5 | National/common/ industry standards | Raised public awareness/profile of energy efficiency | |
| 6 | Improved education of clients/business community/tenants | National/common/ industry standards + Life cycle costing | |
| 7 | Reduced capital and/ or running costs | | |
| 8 | Level playing field + Healthier internal environment | Marketing edge/industry competitiveness | Improved education of designers + Life cycle costing |
| 9 | | Setting of improvement targets + Level playing field + Improved education of designers | |
| 10 | Bench-marking | | |

This league table of benefits cited by the three types of delegates attending the workshops has been compiled by rank ordering the frequency with which each group mentioned them at all three workshops.

- The predominant benefits perceived by all three groups of delegates fall into the same broad set of categories – environmental, financial, standards-related, business-related, and educational.
- The emphasis put on these predominant benefits varied across the groups.
- Designers stressed: financial, environmental, and educational.
- Occupiers stressed: standards, financial, and environmental.
- Manufacturers stressed: environmental business, and financial.
- Some of these emphases do not necessarily accord with what might have been expected, given each of the groups' prime interests. For example, manufacturers stressed environmental benefits more than either designers or occupiers. Other emphases, such as occupiers' primary stress on standards, do.
- Only designers stressed environmental benefits at both the macro and micro-levels, i.e. reduction of CO₂ emissions and provision of a healthier internal environment.

Only benefits which were cited by at least three delegates per group have been included in the list. Only 8 benefits mentioned by manufacturers met this criterion .

Caution should be used in interpreting these results. There are relatively small numbers of delegates in each of these groups, especially the manufacturers. This limits the extent to which these results can be seen as representative beyond the delegates who attended the workshops. Care should be taken not to generalise beyond these small samples.

Question 1.1 What do you see as the main benefits of a non-domestic energy rating scheme?

Table 3 Delegates' most frequently perceived benefits of non-domestic energy rating scheme, aggregated by workshop

| Ranking | London | Manchester | Edinburgh |
|---------|--|--|--|
| 1 | Reduced energy consumption/CO2 emissions/improved environmental impact | Design/performance/ cost comparisons | Reduced energy consumption/CO2 emissions/improved environmental impact |
| 2 | Design/performance/ cost comparisons | National/common/ industry standards + Raised public awareness/profile of energy efficiency | Design/performance/ cost comparisons + Reduced capital and/ or running costs |
| 3 | Level playing field | | |
| 4 | Raised public awareness/profile of energy efficiency | Setting of improvement targets | Raised public awareness/profile of energy efficiency |
| 5 | Improved education of clients/business community/tenants | Bench-marking + Reduced energy consumption/CO2 emissions/improved environmental impact + Reduced capital and/ or running costs | |
| 6 | Reduced capital and/ or running costs | | |
| 7 | Bench-marking + National/common/ industry standards + Encouragement of investment in energy efficiency | | |
| 8 | | Life cycle costing | |
| 9 | | | |
| 10 | Life cycle costing | | |

This league table of benefits cited by the delegates attending each of the workshops has been compiled by rank ordering the frequency with which they were mentioned, regardless of the group to which delegates were assigned.

- The predominant benefits mentioned at all three workshops fall into the same broad set of categories – environmental, financial, standards-related, business-related, and educational.
- The emphasis put on these varied across the workshops.

- The London workshop stressed: environmental financial/standards and business.
- The Manchester workshop stressed: financial standards, and educational.
- The Edinburgh workshop stressed environmental financial/standards and educational.
- These regional differences are not easily understandable.
- The Manchester workshop gave most prominence to standards.
- Only the London workshop gave strong prominence to business-related opportunities.

Only benefits which were cited by at least three delegates have been included in the list. Few benefits met this criterion at the Edinburgh workshop due, in part, to the smaller number of delegates who attended.

Caution should be used in interpreting these results. There were relatively small numbers of delegates at each of the workshops, especially that held in Edinburgh. This limits the extent to which these results can be seen as representative beyond those who attended. Care should be taken not to generalise beyond these small samples.

Question 1.3 What does your group agree are the most useful methods for exploiting the benefits of a non-domestic energy rating scheme?

Table 4 Group suggested methods for exploiting these benefits, aggregated for all three workshops

| |
|---|
| Policy and statutory methods |
| Introduce building energy MOT |
| Make planning requirement |
| Link to government energy policy (long term programme) |
| Make compulsory/introduce regulations (Building Regulations) |
| Financial and fiscal methods |
| Introduce fiscal methods, e.g. VAT incentives |
| Introduce innovative energy charging schemes |
| Use utility regulators to encourage investment in energy efficiency not generation |
| Provide justification for required capital investment (new-build and refurb) |
| Promotional methods |
| Promote as responsible design through Best Practice |
| Get major players to lead field |
| Promote green image |
| Promote for small buildings |
| Promote as offering market edge |
| Promote as providing added value |
| Promote as decision-making tool for building procurement |
| Promote continuous assessment throughout building life (cost benefit analysis) |
| Promote use for prioritising actions on existing estate |
| Promote to top management and energy managers |
| Encourage innovation |
| Raise profile of energy in business community |
| Reinforce through maintenance standards |
| Link energy efficiency with commercially successful buildings |
| Link to wider environmental auditing |
| Link to staffing/personnel issues |
| Stress comprehensive energy performance comparisons |
| Education and training methods |
| Provide education and training, CPD |
| Provide more support for energy efficient design, e.g. through EDAS |
| Technical methods |
| Establish technical reliability of scheme (credibility crucial) |
| Set standards |
| Learn from NHER experience (plus QA, etc.) |
| Identify criteria for comparison |
| Make visible to user, via a building labelling system, in accordance with EU harmonisation |
| Investigate possibility of different rating levels for different groups, e.g. plan/design/vacant/occupied |
| Establish common language |

This list of measures for exploiting the benefits of a rating scheme has been compiled by collating the suggestions made by each of the groups at the three workshops.

- The groups at the three workshops identified an extremely wide range of methods for exploiting the benefits of a rating scheme.
- These methods fall into 5 broad categories:
 - regulatory
 - financial/fiscal
 - promotional
 - education and training, and
 - technical.
- The majority of methods suggested were promotional (17) – as many as the other four categories combined.
- Some of the methods proposed, e.g. regulatory (4) and financial/fiscal (4), could only be pursued by national government.
- The majority of the methods proposed could operate on a voluntary basis.
- The Manchester workshop gave most prominence to standards.
- The responses emphasise the importance of effective promotion and dissemination.

Caution should be used in interpreting these results. No frequencies of mention have been attached to the list because few of the groups recorded this information. Thus it is impossible to say whether individual methods were endorsed by all members of a group or simply represent the presence of a vocal individual.

Question 1.4 What does you see as the main barriers to the wide spread take-up of a non-domestic energy rating scheme?

Table 5 Individual delegates' most frequently perceived barriers to a non-domestic energy rating scheme, aggregated for all three workshops

| Ranking | Aggregated responses | Frequency of mention |
|---------|---|----------------------|
| 1 | Time/costs involved in implementation | 16 |
| 2 | Extra (design/retrofit) costs | 15 |
| 3= | Lack of incentives/apathy/ignorance/mistrust | 14 |
| 3= | Lack of awareness/ education/training/ expertise | 14 |
| 5 | Low/marginal cost of energy/lack of fiscal or financial benefits | 12 |
| 6 | Short term investment practices/focus on capital costs | 9 |
| 7 | Lack of compulsion/ legislation | 7 |
| 8= | Diversity of ownership management, use, construction, location, of property | 6 |
| 8= | Lack of political will/ government lead | 6 |
| 10= | Worries about complexity/bureaucracy | 5 |
| 10= | Limits on design freedom | 5 |

This league table of barriers has been compiled by rank ordering the frequency with which they were mentioned by the delegates at all three workshops.

- Delegates' responses suggest that take-up of the rating scheme could be hindered by wide range of barriers.
- Perceived barriers fall into 5 broad categories:
 - financial
 - motivational
 - educational
 - autonomy-related, and
 - complexity-related.
- The most frequently mentioned barriers were financial (40% and 4 out of the top 6): implementation costs/extra costs/marginal costs; lack of financial benefits/short term investment practices.
- 30% are motivational: lack of incentives/lack of compulsion/lack of political will.
- 20% are complexity-related: diversity of ownership etc./bureaucracy.
- 10% are educational: lack of awareness etc.

Question 1.4 What do you see as the main barriers to the wide spread take-up of a non-domestic energy rating scheme?

Table 6 Individual designers', occupiers' and manufacturers' most frequently perceived barriers to non-domestic energy rating scheme, aggregated by group for all three workshops

| Ranking | Designers | Occupiers | Manufacturers |
|---------|--|---|--|
| 1 | Extra (design/retrofit) costs | Lack of incentives/ apathy/ignorance/ mistrust | Time/costs involved in implementation + Short term investment practices/focus on capital costs |
| 2 | Lack of awareness/ education/training/ expertise | Time/costs involved in implementation | |
| 3 | Low/marginal cost of energy/lack of fiscal or financial benefits | Extra (design/retrofit) costs + Lack of awareness/ education/training/ expertise | |
| 4 | Time/costs involved in implementation + Lack of compulsion/ legislation | | |
| 5 | | Low/marginal cost of energy/lack of fiscal or financial benefits + Lack of political will/ government lead | |
| 6 | Worries about complexity/ bureaucracy + Limits on design freedom | | |
| 7 | | Diversity of ownership, management, use, construction, and locations, of property + Short term investment practices/focus on capital costs | |
| 8 | Lack of incentives/ apathy/ignorance/ mistrust + Short term investment practices/focus on capital costs | | |

This league table of barriers cited by the three types of delegates attending the workshops has been compiled by rank ordering the frequency with which each group mentioned the barriers at all three workshops.

- The predominant barriers perceived by all three groups of delegates fall into the same broad set of categories – financial, motivational, educational, autonomy-related/complexity-related.

Question 1.4 What do you see as the main barriers to the wide spread take-up of a non-domestic energy rating scheme?

Table 7 Delegates' most frequently perceived barriers to a non-domestic energy rating scheme, aggregated by workshop

| Ranking | London | Manchester | Edinburgh |
|---------|---|---|--|
| 1 | Lack of incentives/ apathy/ignorance/ mistrust + Lack of awareness/ education/training/ expertise | Extra (design/retrofit) costs | Lack of awareness/ education/training/ expertise |
| 2 | | Time/costs involved in implementation | Time/costs involved in implementation + Lack of incentives/ apathy/ignorance/ mistrust + Extra (design/retrofit) costs |
| 3 | Time/costs involved in implementation + Low/marginal cost of energy/lack of fiscal or financial benefits | Low/marginal cost of energy/lack of fiscal or financial benefits | |
| 4 | | Lack of incentives/ apathy/ignorance/ mistrust | |
| 5 | | Short term investment practices/focus on capital costs + Lack of awareness/ education/training/ expertise | |
| 6 | | | |
| 7 | | Lack of compulsion/ legislation | |
| 8 | | Worries about complexity/ bureaucracy + Limits on design freedom | |

This league table of barriers cited by the delegates attending each of the workshops has been compiled by rank ordering the frequency with which the barriers were mentioned, regardless of the group to which delegates were assigned.

- The predominant barriers perceived by delegates at all three workshops fall into the same broad set of categories – financial, motivational, educational, autonomy-related/complexity-related.
- The emphasis put on these predominant barriers varied across the workshops

Question 1.6 What does your group agree are the most useful methods for overcoming the barriers to a non-domestic energy rating scheme?

Table 8 Group suggested methods for overcoming these barriers, aggregated for all three workshops

| |
|--|
| Policy and statutory methods |
| Make compulsory/legislation |
| Promote self-assessment |
| Formulate effective national energy policy |
| Avoid duplication, e.g., Best Practice, BREEAM |
| Sponsor research |
| Fiscal and financial methods |
| Offer fiscal or financial incentives/grants/capital allowances/tax breaks or penalties/CO ₂ tax |
| Promotional methods |
| Raise awareness, education and training |
| Publicise – case studies/demonstration projects |
| Promote leadership by professional institutions |
| Offer recognition/award scheme |
| Promote cost benefit analysis/life cycle costing |
| Promote product development |
| Emphasise user power |
| Technical methods |
| “KISS” – develop simple, practical, workable, added-value scheme |
| Set standards |

This list of measures for overcoming the barriers to a rating scheme has been compiled by collating the suggestions made by each of the groups at the three workshops.

- The groups at the three workshops identified a less extensive range of methods for overcoming the barriers than they did for exploiting the benefits of a rating scheme

- These methods fall into 4 broad categories:
 - regulatory
 - financial/fiscal
 - promotional, and
 - technical
- As with methods for exploiting benefits (see Table 4), the majority of methods suggested for overcoming barriers were promotional (7) – almost as many as the other three categories combined
- But there is a closer balance between regulatory (5) and promotional (7) methods than with benefits
- This suggests the need for government intervention at the statutory level for barriers to be removed

Caution should be used in interpreting these results. No frequencies of mention have been attached to the list because few of the groups recorded this information. Thus it is impossible to say whether individual methods were endorsed by all members of a group or simply represent the presence of a vocal individual.

Question 1.1 What do you see as the main benefits of a non-domestic energy rating scheme?

Question 1.4 What do you see as the main barriers to the wide spread take-up of a non-domestic energy rating scheme?

Table 9 Delegates' response rates for perceived benefits and barriers to a non-domestic energy rating scheme, aggregated by workshop

| Workshop venue | Total number of delegates | Perceived benefits | | Perceived barriers | |
|----------------|---------------------------|---------------------|---------------------|---------------------|---------------------|
| | | Number of responses | Responses/ delegate | Number of responses | Responses/ delegate |
| London | 62 | 130 | 2.1 | 31 | 0.5 |
| Manchester | 44 | 67 | 1.5 | 75 | 1.7 |
| Edinburgh | 23 | 28 | 1.2 | 27 | 1.2 |
| Designers | 55 | 101 | 1.8 | 61 | 1.1 |
| Occupiers | 50 | 82 | 1.6 | 60 | 1.2 |
| Manufacturers | 24 | 42 | 1.8 | 12 | 0.5 |
| Totals | 129 | 225 | | 133 | |

The figures in this table have to be treated with extreme caution. They have been calculated by dividing the number of benefits/barriers cited by the number of delegates concerned (i.e. booked to attend per workshop or per group).

- Most perceived benefits per delegate were cited at the London workshop and least at Edinburgh.
- Most perceived barriers per delegate were cited at the Manchester workshop and least at London.
- In this sense, Manchester delegates were least optimistic about the value of the scheme and about its likely take-up.
- Roughly the same number of perceived benefits were cited by designers, occupiers and manufacturers.
- Manufacturers cited roughly half as many barriers per delegate than designers and occupiers.
- In this sense, manufacturers were most optimistic about the rating scheme.

Practical 2 Implementation

In this session delegates were asked to address three questions.

- What implementation strategy would provide UK industry with the greatest competitive advantage?
- What are the key factors instrumental in creating that competitive advantage?
- What is the best approach to introducing a rating scheme?

Question 2.2 Which of the following implementation routes does your group see as providing UK industry with the greatest competitive benefits?

Table 10 Individual designers', occupiers' and manufacturers' preferred approaches to implementing rating scheme, aggregated for all three workshops

| Preferred approach | Designers | Occupiers | Manufacturers | Total |
|--------------------|-----------|-----------|---------------|-------|
| Voluntary | 2 | 4 | 1 | 7 |
| Regulatory | 15 | 10 | 3 | 28 |
| Combination of two | 20 | 17 | 13 | 50 |
| Totals | 37 | 31 | 17 | 85 |

This table has been compiled by counting the frequency with which groups of delegates chose the options offered.

- Little support was offered for a solely voluntary approach to implementing the rating scheme by any of the groups.
- Most delegates (approx. 60%) favoured some (phased) combination of voluntary/regulatory approaches – typically, voluntary in the short term, regulatory in the medium to long term.
- There was most enthusiasm for a voluntary approach from occupiers (>10%) and least from designers (<<1%).
- There was most enthusiasm for a regulatory approach from designers (40%) and least from manufacturers (<20%).
- There was most enthusiasm for a combined approach from manufacturers (>70%) and least from occupiers (50%).
- The support for some form of regulation was supported by 90% of delegates, regardless of the group to which they were assigned.

Question 2.1 Which of the following implementation routes does your group see as providing UK industry with the greatest competitive benefits?

Table 11 Delegates' preferred approaches to implementing rating scheme, aggregated by workshop

| Preferred approach | London | Manchester | Edinburgh | Total |
|--------------------|--------|------------|-----------|-------|
| Voluntary | 4 | 2 | 1 | 7 |
| Regulatory | 15 | 8 | 5 | 28 |
| Combination of two | 24 | 19 | 7 | 50 |
| Totals | 43 | 29 | 13 | 85 |

This table has been compiled by counting the frequency with which delegates chose the options offered at each of the workshops.

- Little support was offered for a solely voluntary approach to implementing the rating scheme at any of the workshops.
- Most delegates (approx. 60%) favoured some (phased) combination of voluntary/regulatory approaches – typically, voluntary in the short term, regulatory in the medium to long term.
- At none of the workshops was enthusiasm for a solely voluntary approach as high as 10% delegates.
- There was most enthusiasm for a regulatory approach in Edinburgh and London (38% and 35%, respectively) and least in Manchester (28%).
- There was most enthusiasm for a combined approach in Manchester (66%) and less in Edinburgh and London (54% and 56%, respectively).
- As noted in Table 10, in aggregation, a regulatory approach was supported by 90% of all delegates, regardless of which workshop they attended.

Question 2.3 **Would you prefer a staged approach as the route to implementing an energy rating scheme?**

Table 12 **Individual designers', occupiers' and manufacturers' preferences about a staged approach to implementing a rating scheme, aggregated for all three workshops**

| Staged approach | Designers | Occupiers | Manufacturers | Total |
|-----------------|-----------|-----------|---------------|-------|
| Yes | 22 | 19 | 12 | 53 |
| No | 8 | 5 | 2 | 15 |
| Totals | 30 | 24 | 14 | 68 |

This table has been compiled by counting the frequency with which groups of delegates chose the options offered.

- The majority of the delegates (>3/4) who answered this question would prefer a staged approach to implementing the rating scheme.
- There was most enthusiasm for a staged approach from manufacturers (90%), closely followed by occupiers (80%) and least from designers (<3/4).

Question 2.3 **Would you prefer a staged approach as the route to implementing an energy rating scheme?**

Table 13 **Delegates' preferences about a staged approach to implementing a rating scheme, aggregated by workshop**

| Staged approach | London | Manchester | Edinburgh | Total |
|-----------------|--------|------------|-----------|-------|
| Yes | 22 | 18 | 13 | 53 |
| No | 7 | 8 | 0 | 15 |
| Totals | 29 | 26 | 13 | 68 |

This table has been compiled by counting the frequency with which delegates chose the options offered at each workshop

- At each workshop delegates who answered this question showed a clear preference for a staged approach to implementing the rating scheme.
- There was most enthusiasm for a staged approach in Edinburgh (100%), followed by London (76%) and least in Manchester (69%).

Question 2.4 Who does your group think is best placed to take a voluntary scheme forward?

Table 14 Group suggestions of those best placed to take a voluntary scheme forward, aggregated responses for all three workshops

| |
|--|
| <p>DoE Government body with no self-interest – BRE? Government lead or recognised scheme</p> <p>Public sector clients Local government through fiscal incentives</p> <p>Combination of government and industry Property interests – British Property Federation Leading clients/developers, e.g. banks Financial backers to look at running costs</p> <p>Link with professional CPD</p> <p>Champions in professions and trade associations</p> <p>Link with BREEAM – most likely users. [Must not be too complex, e.g. BREEAM]</p> |
|--|

This list of whom delegates think is best placed to take a voluntary scheme forward has been compiled by collating the suggestions made by each of the groups at the three workshops.

- If the rating scheme is implemented as a voluntary initiative (at least in the first instance), only a few organisations are seen as being well placed to undertake this
- Delegates' preference is for a government (lead) body acting in collaboration with:
 - public sector clients, and
 - private sector property interests (leading clients and financial backers) with a link to BREEAM
- However, one group dissented from linking the rating scheme with BREEAM, viewing the latter as too complex, (see table statement in italics)

Question 2.4 What does your group see as its areas of common ground and disagreement on the most appropriate implementation route for an energy rating scheme?

Table 15 Group suggestions of areas of common ground on implementing a rating scheme, (aggregated responses for all three workshops)

Regulation most important mechanism, stimulating widest interest

Mandatory rating required acceptable for all buildings

Need for voluntary testing

Patchy up-take if only voluntary

Rolling programme, legal requirement in 5 years

Staged approach with initial voluntary period

Base level scheme required as soon as possible

Tried and tested initially to gain credibility

Well-founded approach supported by research

Apply to new and existing, all types (eventually)

All sizes of buildings to be included

Stages should increase in complexity/compulsion

Staging by sector using broad categories, e.g. schools, offices.

[Staged introduction must not be by sector]

Statutory for new build and major refurbishment

Apply to all new-build and refurbishment requiring planning

Point of sale on new leases

Must have an incentive or payback

Business drivers, i.e. costs, have to be reflected in scheme

Focus on management, operation and maintenance

Must not inhibit design freedom

Must be led by body with no sectoral interest

Government sponsorship, e.g. BREEAM

Education to present long term benefits

Set up training/registration scheme for consultants

Align with European practice

This list of common ground has been compiled by collating the suggestions made by each of the groups at the three workshops.

- **Between them, delegates offer a clear and consistent picture of how a rating scheme should implemented.**
- **Despite originating from various groups at different workshops, almost all of the suggestions made are compatible.**
- **Only two of them are incompatible – whether the scheme should be introduce by sector or not (see table statement in italics).**

Question 2.4 What does your group see as its areas of common ground and disagreement on the most appropriate implementation route for an energy rating scheme?

Table 16 Group suggestions of areas of disagreement on implementing a rating scheme, (aggregated responses for all three workshops)

Details of staging

What the first sector should be – offices, shops?

Whether retrospective statutory rating required?

Levels of compulsion required

Whether scheme should be voluntary or compulsory

Whether voluntary scheme will work

Can scheme be left to the market?

Is regulation divisive but necessary?

Rate of implementation of the scheme

Who should implement – government or industry?

Whether there is a need for regional schemes?

Level of detail required for scheme

Interpretation of rating – if too loose, room for misinterpretation and evasion

This list of areas of disagreement has been compiled by collating the suggestions made by each of the groups at the three workshops.

- Between them, delegates were able to identify a less extensive, but still considerable, list of areas of disagreement that remain to be resolved.
- In the main, these concern:
 - whether the scheme should be voluntary/compulsory, regulation or market driven plus
 - a range of details about quite how the scheme should be implemented.

UK non-domestic energy rating methodologies

Prior to Practical Sessions 3 and 4, a presentation was made to delegates about the two calculation procedures currently being canvassed by the BRE. A one-page summary of this presentation is included below.

"Following a review of UK and international initiatives, the Department of Environment is undertaking a first round of consultation on two approaches identified as suitable to form a UK energy rating scheme for non-domestic buildings. The scheme would probably cover energy used to supply space heating, lighting, air-conditioning and mechanical ventilation.

1 The Energy Performance Index Method

This is an approach developed at BRE in partnership with industry. It was created to address the energy efficiency of air-conditioned and mechanically ventilated buildings but the methodology could be extended. The calculation is based in installed plant capacity (kW/m^2) and credit is given for the range of management and control options provided by means of multiplication factors (weights). The scheme does not require energy use calculations and is flexible in the design options it allows. Relatively low level mathematics are required to calculate the rating. However, a reasonable level of understanding is required to be able to distinguish plant capacity which is stand-by or used for commercial or industrial processes.

2 Target with Annual Energy Use Calculation

A similar procedure is already described in Approved Document L as a way of showing compliance with the Building Regulations. The aim of the BRE programme would be to produce a recommended target consumption coupled to an approved methodology for calculating total annual energy consumption. This approach might be based on a hand calculation but would probably be best as a computerised method. In the latter case, any software used would have to strike a reasonable balance between speed, ease of use, and model accuracy, although the balance between these might be flexible, dependent upon the intended use of the results. As above, this approach is flexible in the design options it allows, provided the software is able to model accurately new systems and designs."

Practical 3 Use of an energy rating scheme

In this session occupiers and manufacturers were asked to address four questions.

- When might a rating scheme be used during the stages in a building's lifetime?
- What might it be used for at each of these stages?
- Of the two approaches to energy rating presented in this session, which did they prefer?
- What is the most advantageous form of presentation for the scheme?

The interpretation of results from Practical 3 should be treated with caution. Individual responses, as well as those from groups, have been analysed. Group responses were recorded after group discussions, and so may contradict delegates' previously cast individual responses.

Question 3.1 What does your group see as the role of the energy rating scheme at each stage in a building's lifetime?

Table 17 Occupiers' and manufacturers' group suggestions (aggregated by workshop)

| | | |
|------------------------|------------|---|
| Early design | London | Integrating fabric and services Bench-marking Designer/client dialogue |
| | Manchester | Setting standards Choosing design team members Selecting building orientation/shape/fabric/ |
| | Edinburgh | Setting standards |
| Detailed design | London | Making lighting/air-conditioning/plant choices Fine tuning systems Evaluating options Designer/building control dialogue Providing compliance information |
| | Manchester | Evaluating options Assessing impact |
| | Edinburgh | Decision-making tool |
| Completion and fit out | London | Commissioning (2) Making lighting/air-conditioning/plant choices Cost benefit analysis |
| | Manchester | Not appropriate |
| | Edinburgh | – |
| Vacant buildings | London | Reducing annual energy consumption Evaluating cost-effectiveness Rating performance |
| | Manchester | Marketing tool (2) |
| | Edinburgh | Marketing tool |
| Buildings in use | London | Conducting health checks Monitoring (2) External verification of performance Identifying priorities for improvements |
| | Manchester | Monitoring (2) Bench-marking |
| | Edinburgh | Monitoring Identifying priorities for improvements |
| Refurbishment | London | Evaluating planned improvements Designer/client dialogue |
| | Manchester | Providing improvement incentive Evaluating planned improvements Impact assessment |
| | Edinburgh | Designer/client dialogue Setting standards |
| Other | London | Weighting by fuel type Evaluating planned improvements Providing green image |
| | Manchester | – |
| | Edinburgh | – |

In this table, the suggestions made by individual groups have been collated into a single list for each workshop.

Where more than one group at a single workshop suggested the same role for the rating scheme, at the same stage in a building's lifetime, this is recorded by the figure in brackets.

- Between them, occupiers and manufacturers were able to identify an extensive range of roles for the energy rating scheme throughout the lifetime of a building.
- Certain key roles were identified for the scheme at individual stages in this lifetime:

| | |
|------------------------|---|
| early design | setting standards |
| detailed design | evaluating options |
| completion and fit out | commissioning |
| vacant buildings | marketing |
| buildings in use | monitoring |
| | identifying priorities for improvements |
| refurbishment | evaluating planned improvements |
| | designer/client dialogue. |
- Some of the suggested roles were identified as being relevant at more than one stage:

| | |
|--------------------------|---|
| Designer/client dialogue | early design/refurbishment |
| Bench-marking | early design/buildings in use |
| Making plant choices | detailed design/completion and fit out. |
- Within individual workshops, there was little consensus about what is the appropriate role for the scheme at a particular stage in a building's lifetime.
- Across workshops, there was more consensus about this.

Question 3.2 What practical constraints does your group think are placed on the scheme's calculation procedure, given the role you have assigned to it at each stage of a building's lifetime?

Table 18 Occupiers' and manufacturers' group suggestions (aggregated by workshop)

| | | |
|------------------------|------------|--|
| Early design | London | Lack of information (2) Lack of motivation Lack of time Lack of fee Predicting use/occupancy |
| | Manchester | Need for rapid iterative theoretical calculation Simplicity Limited ability to change Prone to exaggeration |
| | Edinburgh | Open specification Costs Lack of information |
| Detailed design | London | Lack of information Lack of motivation Lack of time Lack of fee Costs Predicting use/occupancy Necessitates software |
| | Manchester | Need for rapid iterative theoretical calculation Comprehensive assessment required Predicting use/occupancy |
| | Edinburgh | Costs |
| Completion and fit out | London | Too late Lack of information Quality of monitoring at hand-over |
| | Manchester | Not appropriate Dependent on commissioning Designer may not have control |
| | Edinburgh | Costs |
| Vacant buildings | London | Too late Not appropriate |
| | Manchester | Calculation must be seen as reliable |
| | Edinburgh | Costs |
| Buildings in use | London | Too late User needs/wishes Metering Costs |
| | Manchester | Vast range of potential uses People and flexibility |
| | Edinburgh | Costs Information overload Building management |

| | | |
|---------------|------------|---|
| Refurbishment | London | Limited options Costs Type of refurb required (full or partial) |
| | Manchester | Acquiring data Planning constraints |
| | Edinburgh | Costs |
| Other | London | Planning constraints |
| | Manchester | - |
| | Edinburgh | - |

In this table, the suggestions made by individual groups have been collated into a single list for each workshop.

Where more than one group at a single workshop suggested the same role for the rating scheme, at the same stage in a building's lifetime, this is recorded by the figure in brackets.

- Between them, occupiers and manufacturers were able to identify an extensive list of possible constraints on the energy rating scheme throughout the lifetime of a building.
- Some of the suggested constraints were identified as being relevant at more than one stage: e.g.,

| | |
|--------------------------|--------------------------------------|
| Costs | Every stage |
| Lack of information | early and detailed design/completion |
| Lack of fee | early and detailed design |
| Predicting use/occupancy | early and detailed design |
| Too late | Completion/vacant/in use. |
- Key constraints were identified for the scheme at individual stages in a building's lifetime: the more significant of these are:

| | |
|------------------------|----------------------------|
| early design | open specification |
| detailed design | necessitates software |
| completion and fit out | dependent on commissioning |
| vacant buildings | - |
| buildings in use | information overload |
| | building management |
| refurbishment | limited options |
| | planning constraints. |
- There was clear consensus at the workshops that costs and problems due to (too little or too much) information are major constraints on the scheme regardless of the stages of a building's lifetime.

Question 3.3 Which of the two calculation procedures described earlier – the Energy Performance Index and the Targets and Annual Energy Use Calculation – do you prefer?

Table 19 Individual occupiers' and manufacturers' preferred calculation method, (aggregated responses for all three workshops)

| Preferred calculation method | Occupiers | Manufacturers | Total |
|--|-----------|---------------|-----------|
| Energy Performance Index | 13 | 3 | 16 |
| Targets & Annual Energy Use Calculations | 7 | 7 | 14 |
| Totals | 20 | 10 | 30 |

- Only 40% of the delegates asked to do so chose to record an individual response.
- Of those that did, a majority (60%) of the occupiers preferred the EPI while a majority of the manufacturers (70%) preferred the T&AEUC

These responses need to be treated with caution because so few delegates recorded their individual responses. These cannot be taken to be representative of the delegates who attended the workshops.

Question 3.3 Which of the two calculation procedures described earlier – the Energy Performance Index and the Targets and Annual Energy Use Calculation – do you prefer?

Table 20 Individual occupiers' and manufacturers' preferred calculation method, (responses aggregated by workshop)

| Preferred calculation method | London | Manchester | Edinburgh | Total |
|--|--------|------------|-----------|-------|
| Energy Performance Index | 8 | 5 | 3 | 16 |
| Targets & Annual Energy Use Calculations | 4 | 4 | 6 | 14 |
| Totals | 12 | 9 | 9 | 30 |

- Again, it has to be remembered that only 40% of the delegates asked to do so chose to answer this question
- Amongst those that did, there was no general agreement across the workshops about which calculation procedure was preferred
- Delegates at the London workshop preferred the EPI by a ratio of 2:1
- Delegates at the Edinburgh workshop voted in the opposite direction, preferring the T&AEUC also by a ratio of 2:1
- Delegates at the Manchester workshop were evenly balanced between the two procedures (5:4)

Again, these responses need to be treated with caution because so few delegates recorded their individual responses. These cannot be taken to be representative of the delegates who attended the workshops.

Question 3.4 Which of the two calculation procedures described earlier does your group prefer?

Table 21 Group occupiers' and manufacturers' preferred calculation method, (aggregated responses for all three workshops)

| Preferred calculation method | Occupiers | Manufacturers | Total |
|--|-----------|---------------|-------|
| Energy Performance Index | 16 | 7 | 23 |
| Targets & Annual Energy Use Calculations | 20 | 6 | 26 |
| Totals | 36 | 13 | 49 |

- Answering in groups, just over half of the occupiers (56% preferred the T&AEUC.
- Answering in groups, just over half of the manufacturers (54% also preferred the T&AEUC.

These responses need to be treated with caution. They differ from the individual results recorded in Table 19 because they show fewer manufacturers preferring the T&AEUC.

Given the way in which some groups recorded their responses, it is impossible to tell how well group responses reflect the balance of individual views within a group.

In some cases, groups failed to reach a consensus and yet did not necessarily put individual scores against minority voting. In addition, group voting followed a period of discussion which may have led some delegates to alter their previously cast individual votes.

The above table records individual votes within groups following group discussion.

Question 3.4 Which of the two calculation procedures described earlier does your group prefer?

Table 22 Group occupiers' and manufacturers' preferred calculation method, (aggregated by workshop)

| Preferred calculation method | London | Manchester | Edinburgh | Total |
|--|--------|------------|-----------|-------|
| Energy Performance Index | 12 | 8 | 3 | 23 |
| Targets & Annual Energy Use Calculations | 13 | 7 | 6 | 26 |
| Totals | 25 | 15 | 9 | 49 |

- Answering in groups, delegates at the London and Manchester workshops were evenly split between the two calculation methods.
- delegates at the Edinburgh workshop voted 2:1 for the T&AEUC.

These responses need to be treated with caution for the same reasons as those in the previous table. The results for the London workshop differ from the individual preferences expressed in Table 20, for example, showing a greater preference for the T&AEUC.

Question 3.4 Which of the two calculation procedures described earlier does your group prefer?

Table 23 Group occupiers' and manufacturers' reasons for and against the calculation procedures, (aggregated by workshop)

| | | |
|---------------------|------------|---|
| Reasons for EPI | London | Simplicity (2) Easy to understand/transparency (2) Easy to use Robust Available early in process |
| | Manchester | Simplicity (2) Easy to use (2) Easy to check Low cost |
| | Edinburgh | Simplicity Flexibility No software necessary Could force more energy efficient 'kit' |
| Reasons against EPI | London | Not easy to relate to consumption in use Does not measure performance Building performance not related to installed load Lack of precision No controls at early stage |
| | Manchester | Check list approach. "What can I get away with?" Means nothing Fabric? |
| | Edinburgh | Theoretical Need for technical know-how Won't know proper answer until detailed design Too product orientated |
| Reasons for T&AEUC | London | More precise/reliable (2) Building in use comparison Needed for regulation (but based on prediction) |
| | Manchester | Added value – place in business energy management Whole building/addresses fabric and plant Meaningful value May already have started |
| | Edinburgh | Related to actual performance Whole building/addresses fabric and plant Should have target to aim for Easier to market (bench marking) More accessible/understandable |

| | | |
|-----------------------------------|-------------------|--|
| Reasons against T&AEUC | London | Complexity Data not available at early stage Reliance on computer model/software dependent Expertise/training required for use Verification will take long time Too many approaches |
| | Manchester | Complexity Additional cost/cost of process Burden on organisation Reliance on computer model/software dependent Accurate prediction |
| | Edinburgh | Complexity Theoretical Reliance on computer model/software dependent Expertise/training required for use May have to pay consultant Too simplistic/insufficiently detailed |

In this table, the reasons given by individual groups have been collated into a single list for each workshop. Where more than one group at a workshop suggested the same reason, this is recorded by the figure in brackets.

- Across the workshops, groups of delegates were able to suggest extensive reasons for and against the two proposed calculation procedures.
- The number of reasons cited for and against each procedure were roughly equal in both cases.

Question 3.5 What reasons does your group have for preferring specific presentation formats for the energy rating scheme?

Table 24 Group suggestions of Occupiers' and Manufacturers' reasons for (and against) preferring specific presentational formats, (aggregated responses for all three workshops)

| Presentation formats | Reasons cited |
|---|--|
| Energy use (e.g. kWh/m ² , W/m ²) | <ul style="list-style-type: none"> • Useful • Readily understandable • Easily comparable • For use by energy managers • Bench mark for engineers* • Relates directly to costs |
| Environmental (e.g. CO ₂ /m ²) | <ul style="list-style-type: none"> • 'Green' image • PR • Useful and understandable • Focus on what matters • Need to allow for different levels of awareness • Could be available for specialist interests • Government/regulation • May come later with wider commitment (• Reason against - units cause confusion) |
| Financial | <ul style="list-style-type: none"> • Easy to relate to • Most likely to create attention or interest (• Reason against - not time proof) (• Reason against - too changeable) (• Reason against - too many variables) |
| Dimensionless scale (e.g. 5 stars) | <ul style="list-style-type: none"> • Simple to communicate • For accountants and managers • As a comparator • Broad range • Could overlie more complex rating (• Reason against -too vague) |
| Other (please specify) | <ul style="list-style-type: none"> • Combination of energy use and environmental required for various consumers of information |
| | |

* More than one scale required, e.g. air-conditioned and naturally ventilated.

This list of reasons for preferring specific presentation formats has been compiled by collating the suggestions made at the three workshops.

- Between them, occupiers and manufacturers were able to identify a wide range of positive reasons for using each of the presentation formats specified.

- All the proposed formats were seen as having positive attributes for particular purposes or intended audiences.
- There was only specified format which did not draw direct criticism, namely 'energy use'.
- The 'environmental' format, while seen as addressing present and pressing concerns, was criticised as being too specialist or open to confusion.
- The least favourably received format was 'financial': this was seen as too variable over time (because of changes in the price of fuels) – yet it was also judged by some groups as the format which was most likely to generate interest.

Practical 4 Calculation & application procedures

In this session designers were asked to address four questions.

- How practical did they think the Energy Performance Index is?
- How practical did they think the Targets and Annual Energy Use Calculation method is?
- Which approach did they prefer?
- How easy is it to obtain the information necessary to support these approaches to energy rating?

The interpretation of results from Practical 4 should be treated with caution. Individual responses, as well as those from groups, have been analysed. Group responses were recorded after group discussions, and so may contradict delegates' previously cast individual responses.

Question 4.1. For the Energy Performance Index, information is required about floor area and installed plant capacity and controls. How easy do you think it is to obtain this information accurately at the following stages in a building's lifetime?

Table 25 Summary of individual designers' views on the degree of difficulty in obtaining the information required to calculate the EPI, (aggregated responses for all three workshops)

| Stage in building's lifetime | Degree of difficulty in obtaining information | | | |
|------------------------------|---|-------------|-----------|------------|
| | Aggregated responses | | | |
| | Easy | Fairly easy | Difficult | Don't know |
| Early design | 3 | 9 | 11 | 1 |
| Detailed design | 13 | 15 | 1 | - |
| Completion and fit out | 9 | 11 | 1 | - |
| Vacant buildings | 8 | 8 | 5 | - |
| Buildings-in- use | 2 | 10 | 8 | - |
| Refurbishment | 2 | 11 | 6 | - |
| (Recycling) | - | - | 1 | - |
| Totals | 37 | 64 | 33 | 1 |

- Less than half of the designers at the workshops answered this question.
- Of those that did answer it, most thought that the information required for calculating the EPI would be fairly easy or easy to obtain.
- Early design, buildings in use, and refurbishment were seen as the three stages in a building's lifetime when it would be most difficult to acquire this information.
- Detailed design, completion and fit out, and vacant were seen as the three stages when it would be easiest.

Question 4.4 For the Targets and Annual Energy Use Calculation, information is required about internal gains, design temperatures, occupancy hours, installed plant and controls. How easy do you think it is to obtain this information accurately at the following stages in a building's lifetime?

Table 26 Summary of individual designers' views on the degree of difficulty in obtaining the information required to calculate the T&AEUC, (aggregated responses for all three workshops)

| Stage in building's lifetime | Degree of difficulty in obtaining information | | | |
|------------------------------|---|-------------|-----------|------------|
| | Aggregated workshops | | | |
| | Easy | Fairly easy | Difficult | Don't know |
| Early design | 2 | 4 | 7 | 1 |
| Detailed design | 1 | 8 | 7 | - |
| Completion and fit out | 2 | 9 | 4 | - |
| Vacant buildings | 1 | 2 | 10 | 1 |
| Buildings-in- use | 2 | 13 | 1 | - |
| Refurbishment | - | 8 | 9 | - |
| (Recycling) | - | - | - | - |
| Totals | 8 | 44 | 38 | 2 |

- Less than a third of the designers at the workshops answered this question.
- Of those who did, nearly 60% thought that the information required to calculate the T&AEUC would be fairly easy to obtain, 40% thought it would not.
- Vacant and refurbishment were seen as the two stages in a building's lifetime when it would be most difficult to obtain this information.
- Completion and fit out, and buildings in use were seen as the two stages when it would be easiest.
- There were no very significant variations in the responses given by designers at different workshops.

Question 4.2 How practical do you think the Energy Performance Index is as a basis for calculating the energy rating of non-domestic buildings?

Question 4.5 How practical do you think the Target and Annual Energy Use Calculation is as a basis for calculating the energy rating of non-domestic buildings?

Table 27 Individual designers' assessments of the two calculation methods, (aggregated responses for all three workshops)

| Energy Performance Index | | Targets & Annual Energy Use Calculation | | |
|--------------------------|------------------------|---|------------------------|-----------------------|
| Practical ¹ | Effective ² | Practical ¹ | Effective ² | |
| 25 | 20 | 18 | 18 | Number of respondents |
| 2.4 | 1.6 | 2.6 | 3.1 | Average assessment |

¹ Scale: 1 = Very impractical, 4 = very practical

² Scale: 1 = Very ineffective, 4 = very effective

- Few designers recorded their responses to these two questions.
- Neither calculation method was given wholehearted approval by those who did record them.
- Of those who did respond, on average, they saw the EPI as slightly less practical and effective than the T&AEUC.

Question 4.2 How practical do you think the Energy Performance Index is as a basis for calculating the energy rating of non-domestic buildings?

Question 4.5 How practical do you think the Target and Annual Energy Use Calculation is as a basis for calculating the energy rating of non-domestic buildings?

Table 28 Individual designers' assessments of the two calculation methods, (responses aggregated by workshop)

| Energy Performance Index | | Targets & Annual Energy Use Calculation | | |
|--------------------------|------------------------|---|------------------------|-----------------------|
| London | | | | |
| Practical ¹ | Effective ² | Practical ¹ | Effective ² | |
| 14 | 10 | 11 | 11 | Number of respondents |
| 2.1 | 1.5 | 2.8 | 3.1 | Average assessment |
| Manchester | | | | |
| Practical ¹ | Effective ² | Practical ¹ | Effective ² | |
| 10 | 9 | 5 | 5 | Number of respondents |
| 2.8 | 1.7 | 2.3 | 3.1 | Average assessment |
| Edinburgh | | | | |
| Practical ¹ | Effective ² | Practical ¹ | Effective ² | |
| 2 | 2 | 2 | 2 | Number of respondents |
| 3 | 2 | 2.5 | 3 | Average assessment |

¹ Scale: 1 = Very impractical, 4 = very practical

² Scale: 1 = Very ineffective, 4 = very effective

- Designers attending different workshops had broadly the same response to the two approaches.

Question 4.3. How practical and effective does your group think the EPI is as a basis for calculating the energy rating of non-domestic buildings?

Table 29 Group designers' scores, (aggregated by workshop)

| | Practicality of EPI | | | |
|---------------------------|-----------------------|---|-----|---------------------|
| | Very impractical 1 | 2 | 3 | Very practical 4 |
| London | 2 | 7 | 5 | 1 |
| Manchester | | | 18* | |
| Edinburgh | | | 4 | |
| Total number of delegates | 2 | 7 | 27 | 1 |

| | Effectiveness of EPI | | | |
|---------------------------|-----------------------|----|---|---------------------|
| | Very ineffective 1 | 2 | 3 | Very effective 4 |
| London | 10 | 2 | 4 | |
| Manchester | 9* | 9* | | |
| Edinburgh | | 4 | | |
| Total number of delegates | 19 | 15 | 4 | - |

* Based on potential number of delegates in group: only whole group vote recorded, not actual votes of individual members

This table has been compiled by aggregating the scores of groups (normally recorded as individuals but see note above) for all three workshops.

- Overall, nearly three quarters of the designers (27/37) were recorded as seeing the EPI as practical.
- Overall, half of them (19/38) were recorded as seeing it as very ineffective.
- Nearly 9/10 of them were recorded as seeing it as ineffective/very ineffective.
- Those attending the London workshop saw the EPI as least practical (9/15).
- Those attending the Manchester workshop saw it as least effective (18/18).

Note: these results were recorded following group discussion and contradict those in Table 26 for individual designer's assessments, suggesting greater support for the practicality of the EPI.

Question 4.6. How practical and effective does your group think the T&AEUC is as a basis for calculating the energy rating of non-domestic buildings?

Table 30 Group designers' scores, (aggregated by workshop)

| | Practicality of T&AEUC | | | |
|---------------------------|------------------------|----|----|---------------------|
| | Very impractical 1 | 2 | 3 | Very practical 4 |
| London | | 9 | 12 | 1 |
| Manchester | | 9* | 9* | |
| Edinburgh | | 4 | | |
| Total number of delegates | | 22 | 21 | 2 |

| | Effectiveness of T&AEUC | | | |
|---------------------------|-------------------------|---|----|---------------------|
| | Very ineffective 1 | 2 | 3 | Very effective 4 |
| London | | | 20 | 3 |
| Manchester | | | 13 | 5 |
| Edinburgh | 1 | | 3 | |
| Total number of delegates | 1 | - | 36 | 8 |

* Based on potential number of delegates in group: only whole group vote recorded, not actual votes of individual members

This table has been compiled by aggregating the scores of groups (normally recorded as individuals but see note above) for all three workshops.

- From their group recorded scores, designers were divided about how practical the T&AEUC was.
- From their group recorded scores, designers were more united about how effective the T&AEUC was.
- More than three quarters of them (26/35) saw it effective and almost all the rest saw it as very effective.
- There was no significant variation between workshops in these responses.

These results are broadly in line with those contained in Table 26 for individual designer's assessments.

Question 4.7 Which of the two calculation procedures described earlier does your group prefer?

Table 31 Group designers' reasons for and against the calculation procedures, (aggregated by workshop)

| | | |
|---------------------|------------|--|
| Reasons for EPI | London | Simplicity (2) Easy to use Easy to enforce Drives against over capacity |
| | Manchester | Simplicity Practical Logical Reflects installed load and other design factors |
| | Edinburgh | Simplicity Limited data input Appeals to more people Complexity in setting up scheme not in use |
| Reasons against EPI | London | Crude Open to abuse No test certificate Doesn't address building explicitly Doesn't address occupancy type/effects No control beyond construction stage |
| | Manchester | Doesn't reflect operating loads System performance difficult to rate Not enough emphasis on design |
| | Edinburgh | Abstract Discourages in depth design analysis Levels down to mediocrity Difficult to reflect regional climate differences |
| Reasons for T&AEUC | London | Understandable Clear outputs Maximum flexibility Comparable over time and between buildings Reasonable global performance indicator |
| | Manchester | More realistic These calculations have to be done Active part of design process Active part of management process |
| | Edinburgh | More accurate Easy to apply to existing buildings Related to actual consumption |

| | | |
|------------------------|------------|--|
| Reasons against T&AEUC | London | Complexity Accuracy Doesn't address post-occupancy |
| | Manchester | Complexity Risk |
| | Edinburgh | Complexity |

In this table, the reasons given by individual groups have been collated into a single list for each workshop.

- Across the workshops, groups of delegates were able to suggest extensive reasons for the two proposed calculation procedures, lots of reasons against the EPI but comparatively few against the T&AEUC.
- The primary assets of the EPI were seen as clustering around its simplicity, ease of use, ease of enforcement, its practical and logical nature, and its limited data input.
- The primary assets of the T&AEUC were seen as clustering around its increased accuracy¹, its understandable outputs, its strengths for making comparisons, and the possibility of using it actively within the design and management processes.

¹ It should be noted that the benefits identified for the T&AEUC are strongly dependent on the sophistication of the software used, the expertise of the user and the assumptions inherent in the data supplied to the model.

Practical 5 The way forward

In this session delegates were asked to address three questions.

- Over what time scale should the energy rating scheme be introduced?
- Who are the key players who should be involved in its development?
- What could they do to help this development?

All the responses recorded in Practical Session 5 resulted from group discussions.

Question 5.1 Over what time scale does your group agree a non-domestic energy rating scheme should be launched ?

Table 32 Summary¹ of groups' preferred time scale for implementing a rating scheme, (aggregated responses for all three workshops)

| Preferred time scales | Designers | Occupiers | Manufacturers | Total |
|-----------------------------|-----------|-----------|---------------|-------|
| Short term (< 2 years) | 38 | 15 | - | 53 |
| Medium term (2-5 years) | 9 | 33 | 20 | 62 |
| Long term (> 5 years) | - | - | - | - |
| Totals | 55 | 50 | 24 | 129 |

¹ Approximated responses only, based on number of delegates in each group reporting particular preference in plenary sessions.

The figures in this table have to be treated with extreme caution. They have been constructed by calculating the number of expected delegates in each group at each workshop (i.e. booked to attend). This has been done because few groups recorded precisely how many members of their groups voted for the specific options on offer. Hence the table is based on broad and potentially inaccurate approximations.

- Despite this shortcoming, the trends underlying the groups' voting is clear.
- Most groups voted for the rating scheme to be launched in the short to medium term, i.e. around the next 2 years.
- A short term launch was most popular with designers.
- A medium term launch was most popular with manufacturers.
- Occupiers voted 2:1 for the medium as opposed to short term.
- None of the groups voted for the launch to be delayed until the long term.

Question 5.2 Who does your group agree are the key industry players who should be involved in the development of a non-domestic?

Question 5.3 energy rating scheme? And what role does your group agree these key industry players should have in the development of a non-domestic energy rating scheme?

Table 33 Groups' suggestions of preferred key players and roles

| Key players | Suggested roles |
|--|---|
| UK Government | |
| DoE BRE BRECSU DTI | Initiation and co-ordination. Collaborate with industry. Provide (financial) incentives. Set attainable targets. Pilot schemes. BRE - recognised body. Implementation. Training. Publicity - Award Scheme. Motivation. Funding. Best Practice. Marketing. Independent monitoring. Quality Assurance. Ensure technically sound. Introduce sound, workable legislation. |
| EU | Endorsement. Harmonisation. |
| Professional Institutions: | |
| CIBSE CIOB RIBA RICS | Endorsement. Lead dissemination. CPD/Education. Accreditation. Registration of assessors. Software development. Technical guidance. Standardisation. |
| Construction Industry Associations/Organisations | |
| BSRIA HVCA HEVAC Research Organisations | Provide expertise. Directives. Education. Marketing. Encouragement. Market feedback. Promotion. Dissemination. Provide validation |
| Building Procurers/Users | |
| Developers/BPF/BCO Funding agents Letting agents Owners/Occupiers/Tenants BIFM/Local Authorities/ACC | Create demand. Provide impetus. Consultation on market place issues. Funding. Sponsorship. Publicity. Motivation. Set viable standards. Check usability. Ensure practicability. Data gathering. Monitoring and targeting. Feedback. |
| Manufacturers/Component Suppliers | Product development. Product standards. Provide input data on plant. Market development. Training. |
| CBI | |
| Energy Suppliers/Regulators | Advice. Data provider. Control growth in power demand. |
| Energy consultants | |
| Trade/Professional Press | |
| Higher Education | Data. Software tools. Monitoring. CPD. |
| BEPAC | Provide modelling expertise. Advice and quality control. |
| EDAS | |

This list of key players who should be involved in the development of the rating scheme, and their roles, has been compiled from the suggestions made by the groups at all three workshops. Given the manner in which groups completed their exercise sheets, it is not possible to determine how many delegates voted for the involvement of the players put forward.

- **In combination, the groups identified an extremely long list of those whom they saw as key players in the development of the scheme.**
- **The majority of these players, especially UK government agencies and property-related bodies, were presented as having many roles to play in this process.**
- **Many of the roles ascribed by delegates to key players overlap or are duplicated.**

SUMMARY OF CONCLUSIONS

The perceived benefits of a rating scheme

Delegates identified a long list of benefits arising from an energy rating scheme for non-domestic buildings. The most frequently mentioned of these were:

- environmental
- financial
- educational
- standards-related, and
- business-related.

The first of these was the most frequently cited, the last the least.

Different types of delegates placed different emphases on these benefits. Designers placed most stress on financial, environmental and educational benefits. Occupiers stressed standards, then financial and environmental benefits. Manufacturers most frequently mentioned environmental and then business and financial benefits. Similarly, delegates at different workshops also stressed different benefits. Only the London workshop gave prominence to business-related ones.

Delegates identified 5 broad categories of methods for exploiting these benefits:

- promotional
- regulatory
- financial/fiscal
- educational and training, and
- technical.

The first of these was the most frequently cited (as many as the other four categories combined). The next most frequent – regulatory and financial/fiscal – could only be pursued by national government. However, most of the methods proposed could operate on a voluntary rather than mandatory basis.

The perceived barriers to a rating scheme

Delegates identified a long list of barriers to the widespread take-up of the energy rating scheme. The most frequently mentioned of these were:

- financial
- motivational
- educational
- autonomy-related, and
- complexity-related.

The first of these barriers was the most frequently cited, the last two the least. (However, fear of complexity was a recurrent issue throughout the workshops, see below.)

There was strong uniformity in the stress which different types of delegates put on these barriers. Designers, occupiers and manufacturers all emphasised financial barriers most. Occupiers gave more prominence to motivational issues than the other two groups. Likewise, there was similar uniformity in the barriers stressed at the different workshops. Again financial barriers predominated. Delegates in London gave more prominence to motivational issues than those at the other two workshops.

The delegates identified a less extensive list of methods for overcoming barriers than for exploiting benefits. These fell into four broad categories:

- promotional
- regulatory
- financial/fiscal, and
- technical.

The first of these was the most frequently cited (almost as many as the other three categories combined). There was a closer balance between promotional and regulatory methods.

Manufacturers cited as many benefits but only about half as many barriers per delegate as designers and occupiers. In this sense, they presented themselves as most optimistic about the potential success of a rating scheme. Measured in this way, delegates to the Manchester workshop were least optimistic about the value of the scheme and its likely take-up.

Delegates' preferred implementation route

There was little support from delegates for a solely voluntary approach to implementing the rating scheme. About 60% of them favoured some phased combination of voluntary and regulatory approaches – typically voluntary in the short term and regulatory in the medium to long. There was most enthusiasm for a regulatory approach from designers (40%) and least from manufacturers (20%). There was most enthusiasm for a combined approach from manufacturers (>70%) and least from occupiers (50%). A regulatory approach – or a joint voluntary and regulatory approach – was supported by 90% delegates, regardless of which workshop they attended.

However, if a voluntary approach to implementing the scheme is adopted, delegates' preference is that this should be a government lead initiative, in collaboration with public sector clients and private sector property interests (leading clients and financial backers).

A majority of the delegates (>75%) would also prefer a staged approach to be adopted for implementing the scheme. There was most enthusiasm for this from manufacturers (90%), closely followed by occupiers (80%), and least from designers (<75%). Likewise, at all three workshops, delegates showed a clear preference for a staged approach.

Only limited areas of disagreement between delegates were identified – mainly concerned with whether the scheme should be mandatory or driven by market forces,

and also about the specific details of implementation.

Using the rating scheme throughout a building's lifetime

Between them, delegates were able to identify an extensive range of roles for the rating scheme which were often specific to particular stages:

- early design - setting standards and showing compliance with the Building Regulations
- detailed design - evaluating options
- completion and fit out - commissioning
- vacant buildings - marketing
- buildings in use - monitoring and identifying opportunities for improvement
- refurbishment - evaluating planned improvements and promoting designer/client dialogue.

Between them, they were also able to identify an extensive list of constraints on using the rating scheme throughout a building's lifetime. Some of these were specific to particular stages:

- early design - open specification
- detailed design - software dependence
- completion and fit out - dependent on commissioning
- vacant buildings -
- buildings in use - information overload and building management
- refurbishment - limited options and planning constraints.

Others were seen as being relevant at more than one stage:

- costs - every stage
- lack of information - early & detailed design/completion
- lack of fee - early & detailed design
- predicting use and occupancy - early & detailed design
- too late - completion/vacant/building in use.

There was a clear consensus at the workshops that costs and the needs and availability of (too little or too much) information are major constraints on the scheme, regardless of the stage of a building's lifetime.

Occupiers' and manufacturers' responses to the two proposed calculation procedures

This part of the analyses has to be treated with some caution. Many of the delegates as individuals either abstained from answering the questions asked on this topic (sometimes because they felt unable to judge on the basis of the information provided or simply did not have time) or answered them in groups in ways which make analysing the results less reliable. Furthermore, the two approaches and their potential

application were discussed in very general terms. Hence individual delegates may have had different specific issues which they would like the scheme to address and these are likely to have coloured their responses.

The workshops did not provide a categorical answer to which calculation method occupiers and manufacturers preferred. For example, when answering as individuals, most occupiers (6/10) who replied preferred the Energy Performance Index (EPI) while most manufacturers (7/10) preferred the Targets and Annual Energy Use Calculation (T&AEUC). Likewise, occupiers and manufacturers at the London workshop preferred the EPI by 2:1, those in Edinburgh voted 2:1 for the T&AEUC, while those in Manchester were evenly balanced.

Occupiers and manufacturers saw the primary assets of the EPI as its simplicity, ease of use, robustness, low cost and independence from software. Those of the T&AEUC were its increased precision, reliability, stronger relationship to actual performance of buildings in use, and its added value as tool for building management².

Between them, occupiers and manufacturers were able to identify a wide range of positive reasons for using each of the presentation formats suggested for the output from the calculation methods. However, the only format which did not draw direct criticism was 'energy use' (e.g. kWh/m²). The 'environmental' format (e.g. CO₂/m²), while seen as addressing pressing concerns, was criticised as being too specialist or open to confusion. The 'financial' format was the least favourably received, criticised as too variable over time (because of changes in fuel prices).

Designers' responses to the two proposed calculation procedures

This part of the analyses also has to be treated with caution. Many designers as individuals either abstained from answering the questions asked on this topic or answered them in groups in ways which make analysing the results less reliable.

Neither calculation procedure was given a whole-hearted endorsement. Most designers thought that the information required for calculating the EPI would be fairly easy to obtain. Early design, buildings in use, and refurbishment were seen as the three stages in a building's lifetime when this would be most difficult; detailed design, completion and vacant as the easiest.

About half of the designers thought it would also be fairly easy to obtain the information required for calculating the T&AEUC but more thought this would be more difficult than for the EPI. Vacant buildings and refurbishment were seen as the two stages in a building's lifetime when this would be most difficult, completion and buildings in use as the easiest.

Voting as individuals, designers characterised the T&AEUC as slightly more practical and effective than the EPI. However, these results are contradicted by the group votes cast by the designers which record the EPI as being seen as more practical than these individual scores suggest. This change may be partly explained by the fact that the

² It should be noted that the benefits identified for the T&AEUC are strongly dependent on the sophistication of the software used, the expertise of the user and the assumptions inherent in the data supplied to the model.

group votes were cast after there had been more opportunity for discussion of the issues.

Like the occupiers and manufacturers, designers saw the primary assets of the EPI as its simplicity and ease of use: they also noted its ease of enforcement, logical nature and limited data input. They saw the primary assets of the T&AEUC as its increased accuracy, its clear, understandable outputs, its strengths for making comparisons, and the possibility of using it actively within design and management processes.

Delegates' preferred time scale for implementing the rating scheme

All of the delegates voted for the rating scheme to be launched in the short to medium term (i.e. within 2 - 5 years). The short term was most popular with designers, the medium term with manufacturers.

In combination, delegates identified a long list of key players whom they thought should be involved in the development of the scheme. Those cited tend to fall into one of three main groups:

- government bodies
- professional institutions and trade bodies
- building procurers and users.

Most of these players are seen as having multiple roles across a very broad range of activities – for example, from creating demand to quality assurance. Many of these roles overlap, endorsing the view that an integrated, co-operative approach will maximise the likelihood of successful development and implementation of the scheme.