AWARENESS, ACTION AND FEEDBACK IN DOMESTIC ENERGY USE

Sarah Darby

Environmental Change Institute, School of Geography and the Environment

Mansfield College

Thesis submitted in accordance with regulations for the degree of Doctor of Philosophy in the University of Oxford, Trinity Term 2003



Acknowledgements

Many people have done their best to help my efforts and guide my thinking; any deficiencies in what follows are there in spite of their assistance.

John Boardman noticed the connections between what Brenda Boardman and I were recognising as effective energy advice and what most educationalists would describe as good teaching practice. I owe him many thanks for pointing to a productive line of enquiry into learning theory.

The data collection was downright enjoyable, thanks to the consideration, hospitality and openness of all my interviewees. Thanks in particular to Andrew Cooper and Angela Walsh at Calderdale District Council; Lisa du Lieu, John Parton and John Turner at the Kirklees Energy Efficiency Advice Centre; Paul Robinson, Emma Thomas and John Green in Oxford; Bob Jackson and Jo Rutterford at the Thames Valley Energy Efficiency Advice Centre; and George Trist, Pam Gifford and Janette Hunter at West Lothian Council Energy Services. Chris Reynolds at Woolwich plc made the survey of Woolwich mortgage-holders possible and Ian Cook of Ekins Surveyors saw the project through. Colin Timmins at the Energy Saving Trust supplied useful information in relation to the EEAC network. In Launton, Pat Mitchell convinced me that the village was well worth studying, while Ed Hamill and the Launton Environment Group went out of their way to help with distribution of the questionnaire survey.

Thanks to David Firth and Kevin Lane for statistical help, and to colleagues at the Environmental Change Institute for their company.

I was extremely fortunate in my supervisors and family. Brenda Boardman and Alistair Rogers were generous with their time, acute in their comments and realistic in their guidance. Their feedback was impeccable. As principal supervisor, Brenda deployed a powerful mix of enthusiasm, rigour and friendship that I cannot begin to measure. Finally, thanks to Jonathan, Anna and Megan, who were never less than encouraging and often more than helpful.

Sarah Darby
Mansfield College
University of Oxford

Thesis submitted for
D.Phil., Trinity term, 2003

ABSTRACT

Awareness, action and feedback in domestic energy use

The nature of gas and electricity and the methods of distribution, billing and payment all contribute to the 'invisibility' of much domestic energy consumption in industrial and post-industrial societies. For the householder, understanding how to invest and behave in ways that will give affordable comfort with minimum environmental impact involves making sense of a hidden set of processes. This poses a major challenge, one that a range of energy advice programmes is attempting to meet. The main focus to date has been on the actions taken as a result of advice, with little attention paid to teaching and learning processes or to context. This thesis explores formal and informal processes by which householders learn about their energy use in order to develop a theoretical framework.

Constructivist learning theory guides the investigation and a variant of the 'conscious competence' model of learning is used as a starting point. The concept of 'tacit knowledge' (foundational knowledge, usually acquired informally) is used in tracing the development of energy literacy. Empirical data come from householder surveys and from interviews of householders and advisers in five contrasting locations in the UK. Interpretation of this material demonstrates the construction of meaning through experience and interaction with others, and the potential role of the energy adviser as a trusted and knowledgeable person.

The building of tacit knowledge is crucial to the development of energy literacy and the householder's ability to absorb and evaluate new information. Energy advisers need to be able to identify and develop existing knowledge, and to form effective networks with social welfare programmes. The need to build awareness by following up advice wherever possible is stressed. There also needs to be a supportive learning infrastructure that includes easily accessible feedback on consumption, and the availability of accurate information for those who are knowledgeable and confident enough to teach themselves.

CONTENTS

TITLE PAGE i

ACKNOWLEDGEMENTS ii

ABSTRACT iii

CONTENTS iv

LIST OF TABLES xi

LIST OF FIGURES xiii

1 ENERGY, ENVIRONMENT AND HOME 1

1.1 Preface 1

1.2 Aim and approaches 3

1.3 Energy as an environmental and political issue 4

1.4 Energy advice 8

1.5 The home as an environment 10

1.5.1 Energy visibility 11

1.5.2 Householder states of mind and thought processes 12

1.6 Definitions 13

1.6.1 Awareness 13

1.6.2 Knowledge 14

1.6.3 Feedback 14

1.6.4 Energy literacy 15

1.7 Summary and thesis structure 16

2 LEARNING ABOUT ENERGY: THEORETICAL CONTEXT 19

2.1 Behaviourist and constructivist views of learning 19

2.2 Interpretations of constructivism 25

2.2.1 Individual constructivism 25

2.2.2 Social constructivism 27

2.2.3 Radical constructivism 28

2.2.4 Experiential learning 30

2.3 Environmental perception and learning 31

2.3.1 Environmental responsibility, lived experience and the home 34

2.4 Tacit and explicit knowledge 37

2.5 Formal education on energy and sustainability 39

2.5.1 Education beyond schools 41

2.5.2 Self-education, monitoring and reflexive learning 42

2.6 A basic model – conscious competence 44

2.6.1 Awareness 48

2.6.2 Action 49

2.6.3 Feedback 50

2.6.4 Sequence in the 'conscious competence' model 53

2.7 Perspectives on learning and choice of research methods 54

2.8 Summary 54

3 REDUCING DOMESTIC ENERGY DEMAND 57

3.1 Demand reduction priorities 57

3.2 Understanding the householder 59

3.2.1 Energy literacy 63

3.3 Antecedent strategies 65

3.3.1 Campaigns and mass media information sources 67

3.3.2 Education 73

3.4 Rewards and penalties 74

3.5 Feedback, a consequent strategy 75

3.5.1 Metering and direct feedback 80

3.5.2 Indirect feedback 82

3.5.3 Audits 84

3.5.4 Feedback in context 86

3.6 Energy advice programmes 87

3.6.1 Fuel poverty-related advice programmes 88

3.6.2 Carbon-focussed advice programmes 90

3.6.3 Evaluation of advice 94

3.7 Summary and research questions 97

4 **METHODOLOGY** **101**

4.1 Choice of scale 101

4.2 Choice of approach 103

4.3 Sequencing of research 105

4.4 Sampling 107

4.5 Choice of questions 112

4.5.1 Exploring householders' learning processes 112

4.5.2 Exploring sequence in the 'conscious competence' model 114

4.6 Analysis 115

4.6.1 Use of terms: awareness, action, feedback and effectiveness 116

4.7 Generalising from findings 118

4.8 Summary 119

5 LAUNTON: RAISING AWARENESS IN A VILLAGE **121**

5.1 The REAP competition: an exercise in awareness-raising 122

5.1.1 Launton village and the organisation of the competition 124

5.1.2 Village response to the 2001 survey - categories for analysis 129

5.2 Awareness 131

5.2.1 Action and awareness 135

5.2.2 Experience and awareness 136

5.2.3 Social learning - discussing fuel use 141

5.2.4 Monitoring as a possible awareness-raiser 143

5.2.5 Awareness of causes of climate change 145

5.3 Action in the home - DIY 146

5.4 The impact of REAP on awareness and action 150

5.4.1 Home alterations undertaken by respondents 150

5.4.2 REAP and indicators of awareness 154

5.3 Action in the home - DIY 147

5.4 The impact of REAP on awareness and action 151

5.4.1 Home alterations undertaken by respondents 151

5.4.2 REAP and indicators of awareness 155

5.5 Learning in sequence 164

5.5.1 Are the categories in the conscious competence model realistic? 166

5.6 Inclusion and engagement 171

5.7 Summary 175

6 WEST LOTHIAN: ADVICE WITH FEEDBACK 181

6.1 West Lothian District 181

6.1.1 Local sources of energy advice 183

6.1.2 Urban regeneration and the West Lothian Energy Advice Project 184

6.1.3 West Lothian Council Energy Services 185

6.2 The interviewees 186

6.3 Awareness 189

6.3.1 Crisis 189

6.3.2 Reasons for asking for help 191

6.3.3 Householder awareness of the advice programme 193

6.4 Advice giving: home visits 194

6.4.1 Observation of home visits 196

6.5 Action taken as a result of advice 199

6.5.1 Improving the energy efficiency of building and appliances 200

6.5.2 Improving timer and thermostat settings 200

6.5.3 Clearing up billing and tariff mistakes 200

6.6 Feedback 202

6.7 Social and psychological factors affecting learning 204

6.7.1 Tenancy 205

6.7.2 Multiple difficulties 207

6.7.3 Social solidarity 208

6.8 Achievements 210

6.9 What was learned by householders? 212

6.9.1 Use of controls 212

6.9.2 Other behavioural change 215

6.9.3 The importance of insulation and draughtproofing 215

6.9.4 How to use readings 216

6.9.5 General ability to cope 216

6.9.6 Spreading awareness of energy advice 218

6.9.7 Limitations to learning 218

6.10 Awareness, action and feedback in West Lothian 221

7 ADVISERS AND INFRASTRUCTURES 226

7.1 The advice programmes: context 226

7.2 Advice-giving 236

7.2.1 Establishing relationships, defining problems, building awareness 236

7.2.2 Action: visible outcomes 243

7.2.3 Feedback and following up advice 245

7.3 The content and processes of advice 247

7.4 Learning from evaluation 250

7.5 Summary 252

8 DISCUSSION, SUMMARY AND CONCLUSIONS 255

8.1 What does energy awareness mean? 256

8.1.1 Raising awareness through advice programmes 257

8.2 What is the significance of informal learning? 262

8.3 Infrastructure and social factors 265

8.4 Awareness, action and feedback: developing the model 267

8.5 Summary and conclusions 274

REFERENCES 282

GLOSSARY OF ABBREVIATIONS, ACRONYMS AND TERMS 321

APPENDIX 1: EEAC HOME ENERGY CHECK, LAUNTON SCORESHEET SUMMARY AND EKINS HOME ENERGY REPORT 323

APPENDIX 2: SURVEY QUESTIONNAIRE AND INTERVIEW PROTOCOL FOR LAUNTON 333

APPENDIX 3: SURVEY QUESTIONNAIRE AND INTERVIEW PROTOCOL FOR WOOLWICH SURVEY 345

APPENDIX 4:	THE USEFULNESS OF ENERGY RATING REPORTS TO EKINS CUSTOMERS	354
APPENDIX 5:	WEST LOTHIAN INTERVIEWS AND HOME VISITS	387
APPENDIX 6:	ADVISER INTERVIEW PROTOCOLS	390
APPENDIX 7:	SAMPLE FILE SHEETS FROM WLCES	391

LIST OF TABLES

Table 3-1:	Savings demonstrated by feedback studies	78
Table 4-1:	Characteristics of energy advice and audit programmes sampled	108
Table 5-1:	Some characteristics of Launton interviewees	131
Table 5-2:	Indicators used in analysis	132
Table 5-3:	Self-assessment of energy awareness by Launton residents	133
Table 5-4:	Percentages of aware/less-aware householders with indicators of awareness	134
Table 5-5:	Self-assessed awareness, installation of energy efficiency measures and planned efficiency measures	136
Table 5-6:	Percentages of discussers and non-discussers with indicators of awareness	142
Table 5-7:	Percentages of meter readers and others with indicators of awareness	143
Table 5-8:	Percentages of participants and others recognising link between climate change and fossil fuel consumption	145
Table 5-9:	Percentages of DIY practitioners and other householders who show indications of awareness	148
Table 5-10:	Percentages of DIY practitioners and other householders who show indications of action	149
Table 5-11:	Percentage participation in REAP among long-term resident DIY practitioners	149
Table 5-12:	DIY and history of home alterations	150
Table 5-13:	Meter reading and history of home alterations	151
Table 5-14:	Alterations carried out by participants, non-participants and newcomers	152
Table 5-15:	Participants and non-participants acquiring and installing energy efficiency measures	154
Table 5-16:	Self-assessments of energy awareness: participants, non-participants and newcomers	155
Table 5-17:	Participants with different levels of energy awareness and reactions to REAP	157

Table 5-18:	Percentages of participants with different reactions to REAP, with indicators of awareness	159
Table 5-19:	Different reactions to REAP and indicators of action	160
Table 5-20:	Relationship between cumulative knowledge build-up, action and planned action	164
Table 6-1:	Percentage of enquiries to WLCES relating to payment, appliances, building characteristics and other issues (case files raised)	192
Table 6-2:	Fuel consumption data from a case file, West Lothian	204
Table 6-3:	Savings and annual fuel costs for West Lothian householders following advice	211
Table 7-1:	Formal aims of the advice programmes studied	228
Table 8-1:	Recommendations	279

LIST OF FIGURES

Figure 2-1:	A basic conscious competence model: learning to be competent	45
Figure 2-2:	Conscious competence in energy advice	46
Figure 3-1:	Scale and possible interaction of different antecedent approaches	66
Figure 3-2:	Feedback in terms of immediacy and control	77
Figure 3-3:	Diagram of possible stages in fuel poverty-related advice	89
Figure 3-4:	Variant of the conscious competence model used in giving personal advice	90
Figure 3-5:	The most common UK advice process, as carried out by an EEAC or fuel supplier	92
Figure 3-6:	Variant of the conscious competence model used in giving formulaic advice	93
Figure 3-7:	Movement from a behaviourist to a constructivist paradigm	98
Figure 4-1:	Sequence of research activities	107
Figure 5-1:	Communications between EEAC, Village Organiser and householders	125
Figure 5-2:	Learning sequence as described by a Launton householder	165
Figure 5-3:	Participation and energy-consciousness in Launton	172
Figure 8-1:	A 'conscious capability' model	271

1 ENERGY, ENVIRONMENT AND HOME

1.1 Preface

In the early 1990s, two Swedish friends visited us in Oxford. One evening we sat by the (coal) fire, and the talk moved to the subject of acid rain and the damage done to Scandinavian lakes and forests. One of the Swedes commented that he could not understand how the British could still be living in such poorly insulated homes, given the damage caused by fossil fuel combustion and the wasteful use of so much of the energy released. To him the damage was highly visible and distressing, and the connection with our housing stock was clear, but to me it came as a shock to have the connection made so directly. I had a degree in ecological science and was familiar with the arguments for resource conservation and redistribution. I associated the burning of coal in power stations with acid rain, and the burning of fossil fuels in general with accelerated climate change, but had never realised that our home was someone else's problem in quite that way. There is sometimes no substitute for a personal message.

Now, a decade later, the cavity walls in our home have been insulated (though not the solid walls), there is a solar water heater on the roof, we buy 'green' electricity and when we light a fire in the grate we burn wood. A condensing boiler is the next step. This is progress, but it did not happen overnight and it still leaves us consuming some 40,000 kWh worth of gas each year. Apart from the shift from coal to wood, each change towards a lower-carbon way of life involved a series of decisions– decisions that were easily shelved if something more urgent needed attending to.

Many other changes have taken place since that conversation in 1992. Most significantly, I began work at the Environmental Change Institute and started to take a more professional interest in domestic energy use. The interdisciplinary approach of the Energy and Environment research team and their focus on policy-relevant demand-side issues introduced me to many factors that bring about changes in our use of domestic appliances and our homes in general. In particular, I became interested in attempts to change how we think about and use energy. I reviewed the evaluation of energy advice programmes and then the use of feedback on consumption in reducing domestic energy demand. These reviews each contributed strands that are taken up and woven into this thesis. First, that effective advice often involves far more than the simple transmission of information; second, that feedback alone can bring about significant changes in demand in certain circumstances. These two strands differ in kind. One is holistic and assumes that a range of factors must be integrated in order to understand how people change. The second – on feedback – is relatively mechanistic and suggests that there are simple ways of achieving improved energy efficiency and energy conservation. My initial plan was to develop the second idea, and to try to answer the question 'Does consumption feedback work, and how effective is it?' by looking at a range of types and applications of feedback and the circumstances in which they were effective. As will become clear, the inquiry into feedback led to a wider examination of how we learn about energy, so that it is presented here as an inquiry nested within a larger project.

We live in a culture in which even 'environmentally aware' people burn large quantities of fossil fuel as an integral part of their way of life, and in which they are constantly offered opportunities to burn more. At present there are some pointers to how this might be transformed into more sustainable ways of life, but no more.

Hence this exploration of what we learn about energy, how we communicate it to each other and what the consequences can be.

1.2 Aim and approaches

The aim of this thesis is to develop a theoretical framework for understanding how people learn about their domestic energy use. Testing the proposition that learning theory has useful insights to offer, the study concentrates on the experiences of UK householders and domestic energy advisers. In doing so, it broadens out the consideration of a set of problems relating to energy consumption – problems that have most often been approached in the past from a positivist and behaviourist standpoint. The processes by which individuals learn about energy are explored, with householders and energy advisers in the UK as the main sources of empirical data. A simple 'conscious competence' model is used as a starting point for reflection on what happens as individuals learn a specific competence. The empirical evidence of what individual householders and advisers have learned from their experience is analysed with a view to developing this model and casting more light on how people interpret the concept of energy in relation to their everyday lives. It is supplemented by a consideration of the structural factors that influence domestic energy use and advice initiatives.

A recent study of interventions designed to change energy-related behaviour in the EU found that fewer than 20% were designed with any theoretical framework or previous research findings in mind (Greer et al., 2000). A dynamic theory of consumption that considers social and cultural factors along with individual agency is badly needed (Wilhite, 2001). Yet surprisingly little published work exists on what householders *think* about energy usage, either on its own or in relation to other

aspects of their lives. It is as though the household is a black box: inputs and outputs are monitored and reported on from time to time but the processes that take place within the minds of householders are barely speculated upon. This 'black boxing' may be convenient for researchers in the short term, but is not helpful in designing policy that may have long-lasting effects. If the processes that occur between interventions and outputs are airbrushed out of the picture, there is a danger that what remains for the policymaker is the 'bureaucratic processing of ignorance' (Hajer, 1996:272).

The empirical work carried out for this study peers inside the black box in order to understand better what householders and advisers know and how they know it. Energy advice programmes provide the lens through which domestic energy use is viewed, chosen because they interpret to householders the technological and behavioural possibilities open to them. They also link householders, fuel suppliers, installers of energy efficiency equipment, governmental and voluntary agencies.

This is the first study of domestic energy consumption to combine information from householders and advisers on changes in their views, comfort levels, aspirations, and behaviour, in relation to theories of learning. It involves an empirical investigation into how people learn from their experiences and how advisers go about their work.

1.3 Energy as an environmental and political issue

Serious questioning of the environmental impact of modern industrial societies began in the 1960s and gained momentum during the early 70s (e.g. Carson, 1962; Goldsmith et al., 1972). It became clear to some that economic growth as experienced at the time, with its associated energy consumption, was unsustainable

(Meadows et al., 1972) and inequitable (Schumacher, 1973:14). Energy became both an environmental and a political issue when the economics of energy supply were dramatically altered by the demonstration of OPEC power and the oil price rises of 1974 (Leach et al., 1979; Wilhite, 2001). The geographical distribution of finite stocks of fossil fuels, with the associated political issues, became an urgent issue for politicians, corporate planners and academics. Since that time, though, the debate has shifted: the 'energy problem' is not so much impending resource scarcity as an abundance of fossil fuel that will lead to dangerously accelerated climate change if consumed at anything like the current rate (RCEP, 2000; IPCC 2001). In these terms, there is too much rather than too little fossil fuel on the planet, and the central questions hinge around how to reduce consumption in absolute terms and make the transition to safe and affordable sources as rapidly as possible (Cooper, 1994).

Sustainability and equity issues are often brought together in energy debates: an example is 'The Politics of the Real World', produced by a coalition of environmental and anti-poverty groups to address 'how we determine where [environmental] limits lie and what "living within them" in practice involves' (Jacobs, 1996:21). Over time, the 'environmental' element in energy discourses has gradually increased in relative importance. Policy-making, once dominated by considerations of security of supply and then by market liberalisation, is changing to the extent that the recent UK Energy White Paper could state that the first of the government's four goals of energy policy would be

> *... to put ourselves on a path to cut the UK's carbon dioxide emissions – the main contributor to global warming – by some 60% by about 2050, as recommended by the RCEP, with real progress by 2020.*
>
> (DTI, 2003)

The other three goals relate to energy security, the promotion of competitive markets, and affordable warmth in homes.

Conveying the concept of climate change to the public is a complex process, dramatised from time to time by events such as extreme weather conditions, major international conferences, or disputes among scientific experts that may add to the confusion. There is plenty of evidence that the general public do not understand the connections between their energy consumption and climate change, and that campaigns based on assumed knowledge of these connections, or assumed support for policy makers' goals and methods, have been unsuccessful (e.g. Hedges, 1991; Lofstedt, 1992, 1993; Hinchliffe, 1996). Public understanding of the links between energy use and wider environmental issues appears to develop slowly and to be insufficient to motivate most people to change their way of life significantly (Morris and Schagen, 1995; Taylor 1997). Yet without understanding and action by individuals, supported as necessary by public resources, the global emissions targets cannot be considered realistic.

Domestic energy consumption accounted for 30% of total primary energy use in the UK in 2002 (DTI, 2003), and demand continues to rise in spite of more energy-efficient buildings and appliances, education and information campaigns. Between 1995 and 2000 there was a 9% increase in domestic electricity consumption (DTI, 2002). This rise is partly due to the increasing number of households, but it is also a function of increased consumption per household by lights and appliances (Boardman and Lane, 2001). The Home Energy Conservation Act of 1995 required all housing authorities to identify measures to improve the energy efficiency of the housing stock by 30% by 2010, while the most recent Energy White Paper aims to

reduce domestic carbon emissions by 5Mt by 2010 and a further 4-6 Mt by 2020[1], with about half these savings to come from increased energy efficiency (DTI, 2003:13, 26, 33).

At present there is a serious gap between aspirations and reality. We are nowhere near achieving the 30% improvement in domestic energy efficiency that is the aim of the Home Energy Conservation Act in the near future. The estimated improvement in efficiency is less than 1% per year in the national housing stock (New Perspectives, pers. comm., 1999). There is also an increasing recognition that efficiency on its own will not be enough. Absolute reductions in emissions are needed, and energy users must be actively involved in making the reductions:

> *The key importance of public engagement with the aim of reducing carbon emissions comes ... clearly into focus. Although improved technology can deliver the first steps towards sustainability, it cannot guarantee sufficient savings on its own.*
>
> (Fawcett et al., 2000)

The challenge of reducing and transforming domestic energy demand from high usage of fossil fuels to low usage of renewables is one that potentially involves everyone who has a roof over their head. It is a question not only of sustainable consumption, but also of sustainable production. For those in fuel poverty, the challenge takes on an added dimension. In England[2],

> *A household is in fuel poverty if, in order to obtain a satisfactory heating regime, it would be required to spend more than 10% of its income (including Housing Benefit or Income Support for Mortgage Interest) on all household fuel use.*
>
> (DTI, 2001b: 107)

---

[1] From a business-as-usual level of 135 MtC, of which roughly a third will be domestic emissions.

[2] Slightly different definitions are used for other parts of the UK.

The term 'fuel poverty' thus relates to both housing conditions and income, and investment in the housing stock is a crucial element of any solution (Wicks, 1978; Boardman, 1991). The number of households experiencing fuel poverty in the UK is still unacceptably high. The official figure stands at 3.7 million or approximately 15% of households. It has fallen dramatically over recent years, more as a consequence of lower fuel prices and higher incomes than of improvements in domestic energy efficiency; the true figure is likely to be much higher (Brenda Boardman, pers. comm.).

Efficiency improvements in the homes of the fuel poor may lead to relatively minor reductions in carbon emissions, because increased efficiency will be taken more in terms of increased comfort than reduced consumption (Milne and Boardman, 1997). However, there is evidence that efficiency improvements can produce substantial reductions in consumption (10% or more), along with improved comfort, if they are combined with effective energy advice. What is more, advice to the fuel poor can lead to significant fuel savings from behavioural change alone (Boardman and Darby, 2000).

1.4 Energy advice

Domestic energy advice is defined for this thesis as

> *Advice specific to householders' circumstances, with one or more of the following aims: achieving affordable warmth, improving energy efficiency, conserving energy and reducing carbon emissions.*

It therefore covers a wide range of issues from fuel supply, through technical issues surrounding appliance design and installation, to individual behaviour and household consumption patterns. The issues facing energy advice programmes are large and sometimes complex. In the long term, the task is to assist in reducing the carbon

consumption of an entire society while maintaining or achieving an acceptable standard of comfort. In the shorter term, there is an urgent need to do away with fuel poverty in the UK. These objectives require careful joint consideration and the development of policy packages rather than single-track policies (Boardman et al., 1999).

It is estimated that 3-4% of UK households[3] receive some form of energy advice each year (Boardman and Darby, 2000:17). This advice comes from a range of sources: Energy Efficiency Advice Centres (EEACs), fuel suppliers, local authority advisers, voluntary organisations, heating installers, friends and neighbours. It may relate to behaviour, buildings or appliances, separately or in combination, and it varies greatly in quantity and quality. Some £350m is available each year for efficiency measures through the Warm Front (government) and Energy Efficiency Commitment (fuel supplier) schemes, and most of this is intended for low-income households (Boardman and Darby, 2000). Spending the money on the most needy in the most appropriate way takes efficient administration and well-developed networks for advice and social welfare, and energy advisers often act as channels for such funding.

While domestic energy advice is supported by public funding and rhetoric as a means of improving the energy efficiency of the housing stock and the understanding of householders, there is little in the way of theory to guide its future development. Research on the effectiveness of energy advice programmes provides some clues to the processes that take place in effective and ineffective advice (e.g. Boardman and

[3] A household is defined as 'a group of people who live permanently together in an interdependent way within the same dwelling (and at the same address)' (Thomas, 1999).

Darby, 2000; Walker and Oseland, 1998). This study builds on those clues, drawing on the experiences of householders and advisers.

1.5 The home as an environment

The term 'environment' is commonly taken to mean the natural environment or biosphere, particularly those parts of it that are not directly controlled by humans (e.g. Goldsmith et al., 1972; Christie and Jarvis, 2001). In this sense, it is argued by some that most people in industrialised societies do not understand the 'environment' well and do not act in ways that will maintain healthy ecosystems (Smyth, 1996). This should not foreclose or even limit debate on what is possible, though. For example, while most UK householders lack formal training in ecology, they may nonetheless have built up a stock of relevant 'environmental' experience that lies unrecognised and unused by policy makers (Irwin et al., 1999). The household is their immediate environment, and it is something that they are able to change to some extent (Lutzenhiser, 1993). It is worth considering whether the state of the household and the directions in which it changes are as faithful indicators of 'environmental awareness' as the state of the householder's knowledge of tropical deforestation:

> *If we want to make environmental policy successful, we need to look not only at the element of understanding and scientific awareness that is discussed in the notion of extending expertise, but also at how people connect their own lives to the environment.'*
>
> (Eden, 1996)

While they may rely on others for information, practical help, funds and inspiration, all householders have in their homes something from which to begin learning more about their environment. The home can be a valuable source of data on how people

relate the immediate to the wider environment, while domestic energy advice can be seen as a form of education in resource management.

1.5.1 Energy visibility

Energy is a largely invisible factor in an industrial/information society, although it is so closely bound up with production, consumption and recreation. Gas and electricity, the commonest domestic fuels in the UK, enter the home unobtrusively and effortlessly from apparently limitless sources. This ease and invisibility have been linked with the rapid growth in demand for both:

> *Like gas, electricity offered effortless, invisible heat ... this effortless invisibility has been a major source of the popularity of electricity as an energy source ... per capita consumption of electricity in the US doubled every ten years for decades. Today, the only visible aspect of energy for most households is the bill.*
>
> (Stern and Aronson, 1984: 35)

Payment for fuel is usually some time in arrears and by direct debit: neither arrangement gives an incentive to think about the links between consumption and household circumstances, or to learn about how to control usage to best effect (Mudyn and Ryzak, 1997). Not only is energy invisible, but saving it may well appear as a negative rather than a positive action:

> *Energy efficiency is boring, invisible and usually not experienced directly. It is not fashionable and not something that people will admire you for having – indeed it is more likely to reduce one's standing.*
>
> (PIU, 2001)

Energy use in the home is often invisible in an immediate way, with respect to where it is consumed, how, and in what quantities. But the linkages between action at home and environmental consequences are also largely invisible. Most people have to depend upon a shifting scientific debate, which they understand partially or not at

all, for their knowledge of these consequences (Eden, 1998). Patchy and incomplete public knowledge about the factors involved in climate change is well documented (e.g. Lofstedt, 1992, 1993; Banks, 1998; Berrang, 2001) and may be a major factor in explaining the lack of action to conserve domestic energy (as concluded by Kempton et al., 1995). An alternative explanation is that complacency, low levels of interest or ignorance of practical solutions are more significant, as suggested by in the evaluations of the work of the UK Energy Efficiency Advice Centres (New Perspectives/BMRB, 1996b). In either event, there appears to be a need to make energy/carbon use more 'visible' and to convey the associated environmental impacts more vividly.

1.5.2 Householder states of mind and thought processes

There have been many attempts to identify and categorise states of mind with respect to the environment, such as awareness, attitudes, beliefs and values (Christie and Jarvis, 2001). This has sometimes been done with a view to segmenting the population in order to find groups likely to be responsive to environmental initiatives (e.g. Wortmann, 1996; Karp, 1996; Banks, 1998). An alternative approach is to concentrate on the *processes* by which thinking and action develop (e.g. Tabara et al., 1999; Lenzen et al., 2001b).

This thesis takes the latter course. It investigates the processes involved in domestic energy advice and audit programmes as a means of integrating and making sense of data on householders, advisers, energy suppliers, government and regulatory bodies. The research mostly focuses on householder accounts of energy use in their homes and what they may have learned on the subject. To complement this, material on context and structures is used – energy advice services, suppliers and regulatory

bodies, for example – in order to make better sense of what happens within the home. The methodology was chosen to demonstrate the interactions involved in energy advice and auditing, as well as the processes that take place in the 'black box' of the household and the views of householders on their homes and energy use. Questionnaire surveys and published information on advice programmes were used to assemble data on the household and on advice received, but they also serve to frame the interview material. The interviews allow for a widening of the scope of the investigation and suggest avenues for further research.

1.6 Definitions

The literature on learning and environmental knowledge is full of contested definitions. In this study, four crucial concepts related to learning require definition and explanation at the outset, and are given below. Others are introduced and discussed later.

1.6.1 Awareness

Awareness is, on many definitions, very close to knowledge in meaning. Yet it is used in contexts where knowledge does not seem appropriate, and the difference seems to relate to a dimension of alertness. Aware, according to the Oxford English Dictionary, means *'watchful ... informed, cognizant, conscious*[4]*, sensible'*. The Merriam-Webster online dictionary defines aware as implying *'vigilance in observing or alertness in drawing inferences from what one experiences'.*

[4] *'conscious'* may involve sharing knowledge with others.

Awareness may relate to individual items or processes, but it also has a gestalt quality:

> *As for our awareness, what we are aware of is exactly this one experienced world. Awareness is not a storehouse of representations. It is an orchestration of all our constitutive acts, such as discernment, relating, focusing and so on ...*
>
> (Marton and Booth, 1997:164)

For this study, the working definition will be that awareness is *'a state of being alert and knowledgeable'*.

1.6.2 Knowledge

Definitions vary from the positivist – that knowledge is *'the fact of knowing a thing, state, etc'* (Oxford English Dictionary, 1979) – to the more relational interpretation of Schon (1983): that knowledge is personal and contextual, learned from experience and residing in the person who practices it.

For this study, knowledge is taken to be *familiarity gained by experience* as well as *a state of being aware or informed; the fact, state or condition of understanding* (alternative definitions from the OED, 1979). It therefore comes close to awareness in meaning, but the importance of experience in forming knowledge is stressed.

1.6.3 Feedback

The term came into widespread usage during the development of cybernetics, as a basic characteristic of self-controlling systems (Wiener, 1961). Since that time, it has been adopted in many different human contexts, including management, training and education. However, a definition is adopted here that can be used for both human and engineered 'systems': feedback is

> *Information about the result of a process or action that can be used in modification or control of a process or system ... especially by noting the difference between a desired and an actual result.*
>
> (Oxford English Dictionary online, 2000)

According to this definition, feedback can be a single 'event' or a continuous process.

1.6.4 Energy literacy

The concept of energy literacy was originally introduced as

> *a dimension ... reflecting different patterns of beliefs and knowledge about energy conservation. Those low on the dimension are characterised as having seldom thought about saving energy themselves, believing that individual efforts are of little consequence and if attempted would lead to unacceptable living conditions. In addition, they lack understanding of domestic energy use such that if they were forced to cut back their efforts would be inefficient and ineffective. Such consumers lack the decisional freedom typical of the more energy literate, who through greater knowledge have more options available with which to respond to new situations.*
>
> (Gaskell et al., 1982: 2-3)

Energy literacy, when measured in terms of knowledge, was found to be significantly associated with domestic fuel consumption levels and to be related to factors such as standards of comfort, a sense of personal efficacy and an ability to reflect and learn (ibid.).

An energy literate person is defined here as

> *someone who knows how to direct his/her efforts to save energy to best effect and who also knows something of the wider implications of energy use. S/he not only knows how to go about conserving energy but is motivated to do so.*

Energy literacy is thus a concept that embraces knowledge of things and of processes, reasoned motivation, and quantitative and qualitative judgements about how to act. It is not free from value judgements or a sense of moral prescription as to the best ways of acting: classical ethical and environmental assumptions are

normally embedded in the use of the term. The values are, broadly, those of the environmental movement mainstream: that resources should be used efficiently and sparingly if they cannot be conserved altogether. A social dimension to energy literacy is not always assumed.

1.7 Summary and thesis structure

Efforts to reduce dependence on fossil fuels in an industrial or post-industrial society will require enormous political will, public support and cultural change as well as technical expertise. In a democracy, any serious approach to tackling the problem demands widespread understanding, acceptance and participation and these raise issues of visibility and control. Yet domestic fuel consumption in a 'developed' country typically involves very little in the way of clear information on how, where and when we use energy. This study contributes to the body of knowledge on behavioural factors in domestic energy use and, by considering energy awareness, it explores an area of environmental awareness. It examines relationships between awareness, advice, action and feedback, and the social and institutional factors at work in programmes to bring about change in energy use. The emphasis is on advice programmes, as these embody teaching and learning most clearly, but informal learning pathways are also recognised and discussed.

In the two chapters which follow, there is an assessment of what theories and concepts are appropriate to describe, analyse and evaluate energy advice and audit programmes – two modes of teaching which are primarily aimed at assisting householders to reduce their consumption of fossil fuels while maintaining or increasing comfort levels. Chapter 2 looks at theories of learning, emphasising the

constructivist approach and the role of tacit knowledge. A simple 'conscious competence' model is introduced.

The literature on attempts to modify energy-using behaviour and to reduce domestic demand is reviewed in Chapter 3, which largely reflects a behaviourist and positivist tradition. Research into more cultural understandings of behaviour shows that many people lack the ability to interpret their consumption because of an unhelpful institutional context and a lack of salient information. Little is known about their learning processes. At the close of the chapter, research questions are formulated to guide the empirical part of the study.

The methodology used in the course of the empirical work and its suitability for the purpose are outlined and discussed in Chapter 4. Accounts of householders' learning come from the results of surveys and interviews of residents of an 'energy-conscious village' in Chapter 5. Variables that might affect learning are examined for their significance in relation to learning theory and the hypothetical existence of a sequence of steps as shown in the 'conscious competence' model. Chapter 6 takes a more homogeneous sample of householders and examines their accounts of receiving energy advice. It brings out strongly the social and infrastructural requirements for reducing both fuel poverty and energy demand. Chapter 7 investigates advisers' perceptions of householder learning and of the contexts in which they themselves work.

Chapter 8 discusses the extent to which theory and empirical data answer the research questions set out in chapter 3, and the extent to which householders and advisers involved in the research bear out what learning theory suggests about

advice. In this final chapter, a more rounded model of learning is presented and conclusions are drawn as to the meaning of the research and implications for future work.

2 LEARNING ABOUT ENERGY: THEORETICAL CONTEXT

> *A solo agentive view of mind is wildly off the mark – probably a projection of our Western individualistic ideology. We do not learn a way of life and ways of deploying mind unassisted, unscaffolded, naked before the world.*
>
> *The culture of education* (Bruner, 1996: 93)

In this chapter, two contending schools of thought about learning are outlined and discussed, and a choice of paradigm for the study is made. A basic 'conscious competence' model is set out as a starting point for analysing behaviour change in relation to energy use, and for designing empirical work to shed more light on how people learn about it.

2.1 Behaviourist and constructivist views of learning

The definition of learning has been widely contested and the debate continues. For example, learning may be defined, in rising order of complexity, as searching for more knowledge, memorising and reproducing facts, acquiring and applying procedures, making sense or creating meaning, and undergoing personal change (Watkins and Mortimore, 1999). These definitions can in turn be divided into two groups. The first three definitions assume that knowledge is a collection of facts and practices that are used to internalise and control a given, fixed external reality; and learning is of the type associated with the acquisition of specific skills. In the fourth and fifth definitions, however, reality is not taken as given or absolute: it is *constructed* by each learner as s/he engages in activity and reflection. Such learning involves more than the internalisation of facts or mastering of skills: someone who is creating meaning and undergoing personal change is someone whose view of the world and his/her relationship to it is evolving.

The difference between these two interpretations also indicates the divide between behaviourism and constructivism, the two main schools of thought among educationalists over the past 50 years. For the behaviourist, debate centres around the best methods of teaching and learning, so that the individual will succeed in internalising a body of knowledge or performing procedures that are seen as unproblematic in themselves. For the constructivist, debate focuses more on what knowledge consists of and how it is shaped (Lave, 1993).

Constructivism is discussed under headings such as cognitive, humanistic and situational theory, depending on the particular interpretation and emphasis of the author (for examples see, respectively, Piaget 1972; Maslow 1987; Chaiklin and Lave 1993). Aspects of all these are found in what follows. What they share, though, is the belief that humans construct meaning continually and incrementally, building on what they know already, clarifying their early uncertain understandings before moving on to deepen them (Bennett and Dunne, 1994).

While behaviourists and constructivists agree that behaviour is influenced by the environment (where the term 'environment' applies to everything external to the individual) – that is, that external influences are important determinants of learning – they differ in their assessment of the relative significance of extrinsic and intrinsic processes. The nature of the relationship between individual and environment is central to the argument between behaviourist and constructivist. In its pure form, the behaviourist position stems from the belief that human behaviour is a function of environmental variables. It specifically refutes the idea that patterns of thought or ideas are generated by individuals: 'It may be true that there is no structure without construction, but we must look to the constructing environment, not to a

constructing mind' (Skinner, 1974: 117). This means that the answers to problems concerning human behaviour are to be sought in influences that are external to the individual – in the environment – and that behaviour can be modified by means of external influences such as rewards, punishments and repeated messages. However, this view of learning contains a number of serious weaknesses. First, it appears to conceive of a 'reality' that is constant through time and culture, even though it may be expressed in terms that have only taken root in the dominant strands of western European culture and only date back to the Enlightenment. Second, it assumes a universally 'right' solution to every problem, one that is attainable for everyone given enough time and application[1]. Third, it suggests that the impact of information reaching someone from any external source in a given set of circumstances will be predictable.

Most importantly, the behaviourist view ignores the different meanings that different individuals will ascribe to the information they receive, and educational techniques derived from this view act without reference to the awareness of the person they are designed for (Williams, 1983). These weaknesses matter because behaviourist thinking underlies much research into energy-related behaviour and many initiatives that try to change it. Behaviourists are also accused of assuming that there is an objective (self-free) environment, such that cause and effect can be directly traced between aspects of the environment and aspects of behaviour: behaviourism has focused 'exclusively on environmental stimuli and reinforcement [and] effectively obliterated the concern for thinking' (von Glasersfeld, 1995: 178).

---

[1] This assumption underlies programmed learning techniques. These are able to teach some specific competencies but limited in scope – unlikely to develop capability, reflection or curiosity, and limited by a lack of reference to social context.

BF Skinner (credited as the main proponent of behaviourism, along with JB Watson) repudiated the charge of ignoring consciousness, feelings and states of mind, but he traces all of these to environmental influences in personal history rather than to the activity of the mind itself, a concept he found unnecessary. He was scathing about the curse of 'mentalism' in teaching, which he saw obscuring what ought to be straightforward: the role of the teacher is to arrange 'contingencies under which the student acquires behaviour which will be useful to him under other contingencies later on' (Skinner, op. cit.: 184). The structure of the school system and the relations between teacher and learner, to name only two aspects of the learning context, were dismissed and ignored. Indeed, power structures and relationships generally are ignored throughout the book in which he describes and defends behaviourism.

Human interactions with the environment – including the social environment – are demonstrably complex, though, and responses will depend on multiple factors. If an individual experiences freezing weather, a failing boiler and an energy efficiency campaign, s/he will respond in any one of a number of ways, depending on how s/he perceives the situation, understands available options, experiences comfort, assesses the resources available to make changes or evaluates the merits of the campaign. But outside observers may only see a response in terms of what happens to the boiler: is it left alone, repaired or replaced? If replaced, is it replaced by the most efficient alternative? They will not discover, unless they set up a productive dialogue with the individual, what processes led to the observed response and how those processes and that response may contribute to future decisions.

Behaviourism focuses on what is observable and measurable. However, it is inadequate for many purposes because it leaves out so much that is necessary for

explanation, understanding and prediction. According to constructivists, a behaviourist approach does not employ the resources to teach effectively because it does not recognise the individual person as an interpreter of what is learned:

> *The proposed mechanism of internalisation which is supposed* [by behaviourists] *to bridge the gap between the inner and the outer cannot give a satisfying account of the individual experience because of its dualism ... Learning takes place, knowledge is born, by a change in something in the world* <u>*as experienced by a person*</u> (emphasis added).
>
> (Marton and Booth, 1997:138-9)

Skinner was aware that dualism posed a theoretical difficulty, but saw it as a problem created unnecessarily when people spoke of the 'mind' as something that processed sensory data and made decisions. He banished dualism by removing the concepts of mind and thought processes from his system of analysis: 'Human thought is human behaviour. The history of human thought is what people have said and done' (Skinner op. cit.: 117). So the problem of dualism is 'solved' by behaviourism through denial of the existence of thought as an entity for analysis. But thought and behaviour can be studied (in constructivism) by the exploration of experience, the concept that links the inner with the outer.

It is reasonable to ask whether rich accounts of experience help in developing theory, or serve to confuse? Do they just create work for researchers without improving the quality and usefulness of the output? How much do we *need* to know before it is possible to formulate policy that is 'good enough' for implementation in a complex world? It may seem perversely complicated to wish to research what energy knowledge consists of and how it is constructed, rather than to search directly for the best methods of teaching and learning (as would be the case if adopting a behaviourist approach). At first consideration, it seems acceptable enough to

propose that we start out in life as essentially ignorant of 'reality' and then learn about it gradually as we internalise facts about its nature. For many items of knowledge, most of the time, there does seem to be a consensus about meaning and practice that is based on an objective reality. We do not normally think long and hard about the meaning of time or heat, or even about the workings of an oven, before setting the timer to cook supper. However, what people have to say about their perceptions and thought processes is as revealing as what can be observed in their lives and actions: both are needed in order describe fully how knowledge and capability are developed. Sometimes there is a mismatch between perceptions and actions, but the mismatch in itself is revealing. So are the connections made by individuals between energy and other issues; and so are the narratives and agents that are selected for inclusion in an individual's constructed 'story' of his/her situation and aspirations.

It *is* complex to think in terms of the construction of meaning that accompanies behaviour, but no more so than it is to go into lengthy regressions of actions, reinforcements, physiology and even genetics – a necessity if we are to follow the behaviourist route back to the sources of behaviour (Skinner, op. cit.). It is because of the gaps left in theory by a behaviourist approach, and the potential for expanding our knowledge of energy and behaviour by looking in those gaps – at the 'black-boxed' issues of how people learn and change – that a constructivist approach is likely to be productive. It is time to look briefly at the sources of constructivism and at some of the ways in which it is understood.

2.2 Interpretations of constructivism

According to constructivist theory, people create meaning for themselves from their experiences of life: they construct knowledge rather than imbibing it ready-made and their knowledge therefore contains a strong subjective element. Their learning is also reflexive: the environment may be shaped by the encounter with the learner, rather than being a fixed entity, and the 'teacher' or adviser may also be changed and may learn as a result of interactions with 'learners'. In this thesis, constructivist learning should be noticeable at a minimum of three levels: the householders, the advisers or others involved in dialogue with them, and the researcher who interacts with both householders and advisers. A constructivist analysis may be expected to show that learning can be a messy experience, involving incomplete processes and unanswered questions. Depending on both individual and social experience, it takes many forms and is interpreted in many ways. The most salient and relevant of constructivist interpretations of learning are outlined below.

2.2.1 Individual constructivism

Jean Piaget, who is generally credited with setting out the elements of constructivism (and who studied biology before moving into the study of child development), saw the constant interplay between an organism and its environment as a fundamental characteristic of learning (von Glasersfeld 1995). He believed that knowledge is not only the means by which we adapt to living in the circumstances we find ourselves in: it is also what we use to change those circumstances. It is certainly not an unmodified function of what exists 'out there' in the environment:

> *All knowledge does not have a sensory origin - such an empiricist interpretation neglects the "activity of the individual"... Scientific knowledge thus reflects human intelligence which, by its operational nature, proceeds*

> *from the whole of action. To attempt to reduce knowledge to the passive role of mere recording, which is all the hypothesis of its sensory origin would allow, is to mutilate the characteristic of infinitely fertile construction presented by such knowledge, intelligence and action.*
>
> (Piaget, 1972: 62)

People therefore understand and adapt to their surroundings through action and experiment, as any organism adapts to its environment. By using feedback from aspects of our environment that we select as salient, we can gradually find better ways of adapting ourselves to it and/or shaping it to adapt to us (Piaget ibid., Wadsworth, 1996). Kolb, who views learning as 'an holistic process of adaptation to the world', identifies three forms of feedback, used to achieve goals (first-order feedback), to change goals and strategies (second-order), and to link goals to life purposes (third-order) (Kolb 1984). This differentiation implies the uses of feedback in relatively 'shallow' and 'deep' ways, according to what is at stake.

The constructivist link between action and reflection is reflected in an emphasis on practical and experiential knowing among theorists of environmental[2] education (e.g. Robottom and Hart, 1993). It is also used in the theory of cognitive dissonance, according to which a change in behaviour can lead to a re-rationalising of choices in order to justify the new behaviour and make it 'fit' with the world-view of the individual (Lindseth, 2003).

Any attempt to alter human behaviour must focus on internal as well as external processes; and evaluation of any intervention should consider how learners are learning, not only in terms of facts memorised but in terms of interpretation of 'how

[2] At this point, the use of the term 'environment' shifts from that recognised by pure learning theorists. Instead of taking in everything external to the individual, the meaning narrows somewhat to signify the natural world, modified by human action.

the world is' and how they should act. Cognition (knowledge, consciousness) is an instrument of adaptation – *'a tool for fitting ourselves into the world of our experience'* (von Glasersfeld, op. cit.: 14).

2.2.2 Social constructivism

Piaget's work was based on detailed and painstaking study of the development of infants and young children, including his own. From this he identified stages in development that are widely recognised and accepted, but his work is essentially limited to the study of the individual. The Russian educationalist Vygotsky, working in the early years of the Soviet Union, produced a theory of learning that has a strong constructivist element but also treats learning as a social phenomenon in which teachers and learners develop meaning in company with each other. He commented that

> *Studying child thought apart from the influence of instruction, as Piaget did, excludes a very important source of change and bars the researcher from posing the question of the interaction of development and instruction peculiar to each age level.*
>
> (Vygotsky, 1962: 117)

In particular, Vygotsky identified a critical role of the teacher in enabling a learner to achieve what s/he cannot do unaided. An effective teacher is able to identify a 'zone of proximal development' for each student, the necessary next step in learning, and to help the student through this zone (Bruner, 1987; Capel et al., 1995)

Two further points are worth making about Vygotsky's contribution to learning theory. First, he demonstrated how the teacher helps the learner to abstract general principles from specific experience. Second, he disputed Piaget's rather rigid scheme of fixed stages of development that had to occur in a given order, and interpreted his

data as showing that different temporal sequences in learning, and different relationships between learning and mental development, were entirely possible for different individuals. Both points are summed up as follows:

> *Once a child has formed a certain structure, or learned a certain operation, he will be able to apply it in other areas ... since instruction given in one area can transform and reorganise other areas of child thought, it may not only follow maturing or keep in step with it but also precede it and further its progress.*
>
> (Vygotsky op. cit.: 95-96).

If both these amendments are valid, it follows that a teacher can set in motion a sequence of events that may have far-reaching and unpredictable outcomes. The learner will learn in a way that depends partly on how and when new information or assistance becomes available, and may apply his or her new knowledge to a wide range of contexts. The teacher is never entirely in control of events.

2.2.3 Radical constructivism

Radical constructivism is associated primarily with the work of Ernst von Glasersfeld, who acknowledges his debt to Piaget and to Vygotsky but goes further than both, holding that

> *Knowledge does not constitute a 'picture' of the world. It does not represent the world at all – it comprises action schemes, concepts and thoughts, and it distinguishes the ones that are considered advantageous from those that are not ... it pertains to the ways and means the cognising subject has conceptually evolved in order to fit into the world as he or she experiences it.*
>
> (von Glasersfeld 1995: 113-114)

This emphasises the judgement of action schemes, concepts and thoughts on the basis of whether they are 'advantageous'. According to this view, we develop our knowledge base by continually *selecting* what fits with those things that we already know and value. Accepted facts are those that are useful to us in pursuit of our

goals; the rest we discard or ignore. Our experience is crucial not only in terms of how we evaluate knowledge, but in terms of what we choose to learn about. Marton and Booth (1997) develop the radical constructivist view, emphasising that experience is the unifying explanatory factor for what we are aware of, what we learn and how we learn it. The role of the teacher, according to this view, is to share awareness of the learner's experience and build 'structures of relevance' for the learner to assist in developing what the learner already knows.

There is no such thing as value-free or objective learning in constructivist theory, and there is no such thing as value-free teaching, either. Education inevitably has political goals, even if these are usually unspoken:

> *On the one hand, students are to be empowered to think for themselves and without contradictions. On the other, the ways of acting and thinking that are at present judged the best, are to be perpetuated...*
>
> (von Glasersfeld, op. cit.: 176)

Bias – or, to put it more neutrally, the situated nature of knowledge – cannot be ignored when considering energy education. Expert assessments of the risks of climate change, the politics of fuel sourcing, and the technological and behavioural options open to the householder all lie behind attempts at advising or educating on energy efficiency, and this happens however liberal the approach to teaching and learning. Some householders may resist these assessments and the implication that the teacher/adviser knows best. They will accept them most readily when their experience and interpretation of their environment supports what they are learning from others (Kearney, 1994; Eden, 1996).

2.2.4 Experiential learning

Experiential learning theory is associated with the humanistic (personal development) school of thought. Seeing learning as a social and historical process, it emphasises participation, connectedness and the translation of experience into 'theories-in-action'. In the best-known model of experiential learning, the learner progresses through a cycle or spiral with four stages: experience, observation and reflection, the formation of abstract concepts, and testing the concepts in new situations (Kolb, 1984). The cycle may be entered at more than one point.

Failure to modify ideas and habits in the light of experience, by sticking with 'theories-in-use', can obstruct the ability to develop theories-in-action that would serve an individual better (ibid.: 28). This is a familiar scenario and one that frustrates many initiatives designed to change people's energy-using habits. For example, if someone has a firm belief that it is healthy for a house to be able to 'breathe', validated for them by their experience of a healthy life in that house, it is likely to be difficult to persuade them to close windows at night, insulate their walls or even draught-proof their windows. The challenge for a teacher or adviser, according to Kolb or to Marton and Booth, would be to find ways of entering into their experience and finding structures of relevance through which to communicate what they wish to see adopted. Vygotsky would interpret the challenge in terms of finding and moving through a zone of proximal development. As learning is a process of constant evolution, even among those who apparently learn very little and learn it very slowly, bringing about change requires attention to be paid to processes as much as outcomes.

2.3 Environmental perception and learning

Use of the term 'environment' immediately begs all sorts of questions about meaning and usage, and it is not possible to do more than touch on the issues here. The literature on environmental knowledge and perception is relatively recent, although environmental knowledge itself – in the sense of knowledge about what surrounds us – is nothing new. However, it is only in recent times that a critical mass of people living in highly urbanised societies have come to believe that environmental degradation threatens the whole biosphere[3] and have established a public debate on the issues. In July 1969, the Apollo 11 space mission supplied the powerful symbol of the finite, solitary blue planet spinning in space, veiled in wisps of cloud. Not long afterwards, policymakers from around the world attended the groundbreaking 1972 United Nations Conference on the Human Environment in Stockholm. The price for industrial and agricultural modernisation had become too high, and the human population was rising exponentially at the expense of other living things.

'Environmental awareness' in its most widely-debated modern forms has been brought about more through the impact of dramatic examples of pollution and misdirected technology than through appreciation of the complexity and beauty of natural processes. As a consequence, the term 'environment' tends to carry with it overtones of intractable problems, invisible threats and losses, and hopes for some sort of expert-led advancement that will free us from the need to worry about it. In the UK, it has been shown to have very negative associations for some marginalized groups, who tend to see environmental concern as the preserve of the comfortable middle classes (Macgnachten and Jacobs, 1997). Environmental knowledge can be claimed for use in local contexts by non-specialist groups with little formal education

---

[3] More radically, some hold that the concept of a 'natural environment' is now obsolete, as a consequence of the global impact of human activity (McKibben, 1990).

(Irwin et al., 1999), but environmental policymaking remains largely the province of experts (Eden, 1996).

Most people appear to understand little of the science of climate change, arguably the most all-embracing environmental question, in spite of concerted efforts to educate them in recent times and in spite of high levels of expressed concern (Lofstedt 1993; MORI, 2002; 4CE project, 2003). If they are also alienated in some way from the dominant construction of the term 'environment', then this is hardly surprising. Communicating the science of climate change to the public may have had such limited success because the material is rarely structured to take advantage of the way in which people process information; in constructivist terms, there may be little to build on[4]. There is some evidence that 'stories' containing concrete, vivid material that is integrated with common experience are the most powerful and effective means of conveying messages about how to live in more environmentally-friendly ways in an industrial or post-industrial society (Kearney, 1994; Lindseth, 2003). This fits with the recognition that affective (emotional and relational) aspects of acquiring knowledge are inseparable from cognitive (critical/analytical) aspects (Wadsworth, 1996). Arguing along these lines, environmental science could be made more approachable and comprehensible by linking it to everyday indicators of welfare and health (Spaargaren, 1999) or to everyday experiences (Gurewitz, 2000); while debate might be more fruitful if it explicitly linked environmental with social concern and a sense of collective identity (Witherspoon, 1994). In pragmatic terms, belief in the efficacy of personal action is vital for the development of

[4] It is hard to be certain about this, though. The campaign 'Helping the Earth beings at Home', for example, included messages about connections between everyday behaviour and global changes.

environmentally-sound behaviour: more vital than environmental concern or a sense of moral obligation (Wilhite and Ling, 1992; Eden, 1993).

The effectiveness of an environmental message – as with any other 'taught' message – depends heavily on social and cultural factors, including trust in the authority of whatever body is sending out the message (Brookfield, 1990; Stern, 1992; Burgess et al., 1998). A lack of trust in government and business may produce sluggish responses to environmental campaigns and appeals (Christie and Jarvis, 2001). Moreover, trust and a sense of agency are not distributed evenly among the population. Levels of trust in others, participation in social initiatives and a perception of being able to act effectively tend to increase along with education and socio-economic status (Bynner and Parsons, 1997; Macgnachten and Jacobs, 1997; Johnston and Jowell, 2001). A picture emerges from the literature of a layer of society that is relatively aware of global environmental issues, formally-educated, trusting of authority and/or confident of influencing it. There is also a layer of people who are relatively unaware of such issues[5], less educated, doubtful of their ability to act or without the resources to do so, and mistrustful of authority. In between lie some who show characteristics of both groups.

Segmentation of the population according to levels of concern and action has been tried, and this sheds some light on why certain people act or do not act in certain ways and on what is likely to interest different groupings (e.g. New Perspectives/ BMRB, 1996b; Banks, 1998; Wortmann and Schuster, 1999). However, segmentation is not an aim of this study, for two main reasons. First, segmentation lends itself

[5] Though there may be fierce concern and considerable knowledge at the local level (Irwin et al., 1999; Eden, 1998).

most readily to a marketing rather than a teaching paradigm, and is used in that way in the references cited above. Second, I was keen to minimise any tendency to prejudge individuals by assigning them to categories on the basis of a limited number of characteristics. Instead, the idea was to look at the data as the teacher of a mixed-ability class might look at students: recognising that each individual is learning something, but they are not all learning the same thing and they are learning at different speeds. What is more, all are constructing meanings as they learn and those meanings are heavily influenced by life experiences.

2.3.1 Environmental responsibility, lived experience and the home

Public environmental education is an unwieldy project, given the different scales and intensities of environmental issues and the differing life experiences of individuals. These pose challenges to anyone trying to generate public participation in policymaking or in activities to promote a healthier environment:

> *Environmental education may not lead to public participation because people make the links between their actions and the environment in other ways besides accepted rational and scientific ones. It is not solely through 'top-down' information that people act, but according to a panoply of cultural resonances and perceptions of their own environmental responsibilities.*
>
> (Eden, 1996: 197)

Few would question that homeowners are responsible for the condition of their homes, in a way that tenants cannot be. Ownership implies responsibility (Black et al., 1985). But it is one thing to feel responsibility as an individual and another to adopt someone else's conception of your responsibility and duty. Eden (1993) contrasts the sense of environmental responsibility apparently felt by members of the UK public – sometimes ambivalent or hesitant – with the strong, clear messages on responsibility put out by government campaigns.

There is some evidence that a sense of global environmental responsibility is linked to a sense of attachment to a locality: what people are willing to do to change life in the immediate environment of their homes is significant not only in its own right but as an indicator of what they might be willing to do in the wider environment (Strang, 1996). It is doubtful how much this applies to 'strugglers' on low incomes, though (Macgnachten and Jacobs, 1997; Banks, 1998). While a high income does not in any way guarantee consciously 'pro-environmental' behaviour, a low income may prevent it (Eden, 1993). This is truer for some aspects of behaviour than others: for example, someone with a low income may have a well-kept organic garden but be unable to invest in efficient electrical appliances unless s/he is able to access grants.

Visibility and scale are both issues in environmental perception: how is it possible to feel responsible for the state of the something as vast as the earth's atmosphere, or for the welfare of the world's wetlands, when living in an urban apartment? Perception of energy is a particularly interesting instance, because of the 'invisibility' of energy and because it is understood in so many ways, for example in terms of services provided, money or thermal comfort. People may notice the water vapour from cooling towers, or even the effects of acid rain downwind of a power station, but they cannot see the carbon dioxide emissions resulting from their electricity or fossil fuel use. Even if they are aware of the emissions and their significance, they will combine that knowledge with the realisation that their contribution is a tiny fraction of the whole. It is easy to conclude that it is therefore not worth bothering about (Hinchliffe, 1996).

Overcoming such obstacles is difficult but not impossible. For example, there is evidence that the visibility of kerbside recycling programmes encourages

participation: people can see their neighbours acting and make their own contribution in order to make a significant combined effort (Schultz, 2002). The visibility of double glazing seems to contribute to its popularity in spite of long payback periods for the energy savings achieved. What is there that can persuade an individual that his or her contribution to invisible carbon conservation will be worthwhile?

There is no straightforward answer to this question, but the most attractive single concept is that of feedback. Feedback on consumption can create a new kind of energy knowledge, helping to bring the invisible into view. It revises the *meaning* of energy, adding to the concepts with which it is associated such as comfort, security, novelty and convenience; and it also increases the possibility and significance of control (Shove, 1997). Householders with more knowledge of how much energy they consume and of what the end uses and environmental consequences of that consumption are, are in a position to control it better and to evaluate the options for changed behaviour and investment. If feedback shows the impact of any changes that they have made, it will increase the sense of efficacy identified as crucial in bringing about environmentally-sensitive behaviour (Eden, 1993).

When a personal greenhouse gas calculator was used to raise awareness of climate change and global equity issues among university students and schoolteachers, it triggered feelings ranging from surprise and motivation to guilt, denial, cynicism, anger and frustration; but most of the students involved accepted some responsibility for their own embodied emissions and the implication is that the feedback from the calculator achieved this (Lenzen et al., 2001). A further study of the use of such a calculator in the professional development of school teachers

concluded that it was crucial to engage the emotions as well as the intellect in order to equip students to face such a major issue in a constructive way (Lenzen and Murray, 2001). People make affective as well as more purely intellectual connections between action and impact: 'green political activism is ... much more likely to be found among people who have a coherent ideology linking social and environmental problems and solutions' (Witherspoon, 1994: 128). Feedback information is usable in private actions but also socially, in public debate: it puts the holder in possession of facts that will help them to connect what they do in their lives to the environment in which they live (Eden, 1993).

In this study, the salient facts are connected to the phenomenon of domestic energy use, and the site for learning is the immediate environment of the home. Theory proposes that processes can be set in motion that alter the relationship between home and householder in such a way that quantitative changes (in energy use and indicators of comfort) are accompanied by qualitative changes (in understanding, confidence, and ability to control) (Marton and Booth, ibid.). These processes involve two types of knowledge which are considered below.

2.4 Tacit and explicit knowledge

The idea that there are different types of knowledge and ability is very relevant to the argument about environmental responsibility and lived experience, and is not new. For example, people are routinely described as academic, good with their hands, or streetwise. Different types of knowledge are also acquired in different ways. Discrete pieces of information may be absorbed and memorised in seconds, while some skills take many years to master and some social acquaintances may last

a long time before the parties believe that they 'know' one another. For the purposes of this argument two types of knowledge are distinguished: tacit and explicit knowledge. Explicit knowledge is knowledge of facts, things or states and is relatively easy to communicate in words and to test. Tacit knowledge is 'foundational' and harder to pin down. Crucially, the concept does not enter into behaviourist interpretations of the world. Michael Polanyi, who first formulated the concept, sees tacit knowledge as a sort of glue that holds together our thinking. It is 'the fundamental power of the mind, which creates explicit knowing, lends meaning to it and controls its uses' (Polanyi 1969: 156). According to him, all our knowing is either tacit in itself or built upon tacit knowledge. The concept explains how it is that *'we know more than we can tell'* (ibid.): the skills that enable us to select the information we want from all that is available, to evaluate facts and theories, to recognise faces and to carry out actions such as the use of a hammer or the performance of a piano sonata. All these are skills that we rarely stop to think about while practising them – and if we did, it would spoil our performance of them. Yet they are crucial to the way in which we function and make judgements.

Tacit knowledge is more succinctly defined as 'the knowledge gained from everyday experience that has an implicit, unarticulated quality ... generally acquired by an individual on their own – with minimal environmental support' (Sternberg et al., 2000: 104, 107). In both definitions (at risk of confusing the reader), tacit knowing has something in common with awareness, although it lacks the element of watchfulness and includes an element of procedure and skill. Most importantly, both tacit knowledge and awareness have a foundational quality to them. Without the tacit knowledge of scientific method, a biologist is unable to decide what new research pathways to follow. Without awareness of the possibility of more

comfortable and affordable housing, a householder will not attempt to find out how s/he can improve his or her own home.

It is possible to identify tacit knowledge, elusive though it is, through the use of 'learning histories' (Swart and Pye, 2002). The theory proposes that a learner will find it impossible to absorb and make sense of explicit knowledge without tacit knowledge. Applying this insight to what is known about energy education, it seems at least possible that the state of tacit knowledge may be affecting the pace and quality of learning and the ability to reason and reach rational decisions on day-to-day energy use. The development of these abilities – if dependent on tacit knowledge and on the sharing of information – will be social as well as individual, exogenous as well as endogenous.

2.5 Formal education on energy and sustainability

In signing Agenda 21 of the 1992 UNCED conference in Rio, the government of the UK accepted that 'education is critical for promoting sustainable development and improving the capacity of the people to address sustainable development issues'. In terms of policy development for education in schools, the main input to the national curriculum review on sustainable development came in 1998, from the Panel for Education for Sustainable Development (PESD) of the Council for Environmental Education. The panel point out that, while the broad principles of sustainable development are widely accepted and endorsed, practical 'learning outcomes' are less familiar. The Panel's overall stated aim is couched partly in practical terms: equipping individuals, communities, groups, businesses and government to live and act sustainably, as well as giving them an understanding of the environmental, social and economic issues involved' (PESD, 1998 p.3).

However, the curriculum is marked by a movement from the specific to the general - away from practical outcomes. Thus children at Key Stage 1 (aged 4-7) are expected to 'know how to care for themselves and others and how to care for their home, school and local environments' and to 'recognise their own basic needs including shelter, warmth and food; also to 'be able to discuss the way they live and products and services they use.' By the end of Key Stage 2 (aged 11) they should 'appreciate that they have choices in the way that they use products and services and that difference choices can affect others and the environment differently' and to 'have begun to be able to distinguish between actions and products which are wasteful or more sustainable.' By the end of Key Stage 3, aged 14, they should 'be able to assess the sustainability of their own lifestyle.' Yet by the age of 16, while one of the Panel's aims is for the students to 'be able to analyse the impact of their actions and lifestyle on the environment and society and able to take informed decisions', there seems to be no ambition to provide them with the specific abilities to implement decisions for a more sustainable way of life (PESD, op. cit.). More is needed at this stage if young people are not to leave school equipped with little more than theory. The teaching of sustainability *skills* is highly desirable as a way of promoting an understanding of how ecosystems work (Smyth, 1996; Palmberg and Kuru, 2000). Yet adults without these skills – who may never have learned them beyond the level appropriate for a young child, or who were at school long before 'environmental education' was introduced – will usually only be able to acquire them outside formal education. Without them, their tacit knowledge will be deficient.

2.5.1 Education beyond schools

While educational theory is for the most part concerned with how children learn, much is applicable to adults (Ireson et al., 1998). When judging unfamiliar concepts, though, adults will tend to be influenced by their experiences of life[6] in a different way from children, having had longer lives in which to interpret those experiences and, often, to form a relatively rigid view of how the world works (Hodgson and Kambouri, 1999). Their tacit knowledge is a hugely significant influence on their learning, affecting what they wish to know and how they will go about learning it.

Adults also have more power to make changes than children, and a variety of social and political networks through which they can bring about change. However, peer pressure does not end with childhood and adolescence but takes more complicated and subtle forms that may be unnoticed until they are challenged by events or individuals. Adults are limited by expectations that they should behave and consume in certain ways in order to be functioning members of their social networks (Wilhite and Lutzenhiser, 1997). They typically learn in a way that stems from their *'practical consciousness ... which is learned, not systematically but through pragmatic living in the social reality'* (Eden, 1993: 1747). Adults will refer to this pragmatic experience to build on what they know already about an environmental issue such as climate change or energy use, or they will find a way of demolishing an old theory in order to replace it with one closer to their experience and present needs. Energy may, at different times and with different people, be primarily linked with cost, convenience and service levels, resource depletion or security of supply. Such experience will

---

[6] From either a behaviourist or a constructivist standpoint, these experiences will affect their responses and decisions when faced with new situations or new information: either they form part of their history of stimuli and 'reinforcements', or they have been incorporated into the tacit knowledge used to select and interpret information.

affect what are the main motivators of action and what is seen as salient (Berk and Shulman, 1995), who is seen as authoritative and trustworthy to advise and help (Craig and McCann, 1978) and which possible policy solutions are preferable (Farhar, 1992).

2.5.2 Self-education, monitoring and reflexive learning

Any learning can be thought of as self-directed and active to some extent, in the sense that the individual chooses to take note of information, or to find out about a new procedure, or to make inquiries about a certain topic (Hase and Kenyon, 2000). However, it is useful to distinguish self-directed learning (or heutagogy) from formal education, in that it continues beyond the span of any formal teaching and is therefore the main form of learning in adults. It may involve learning basic skills in order to participate in civil society (Basic Skills Agency, 2000); a more developed and reflective level is emphasised by authorities on humanistic psychology and professional development (Schon, 1983; Kirkpatrick, 1985; Maslow, 1993). Yet the most common form of self-directed learning, and the most often taken for granted, is the sporadic, unstructured learning from everyday experience referred to by Eden (1993). How does this relate to what is known about environmental awareness and action?

The literature on 'green' attitudes and behaviour draws attention to various personal characteristics of green activists and green consumers (e.g. Witherspoon, 1994). They are described in terms of socioeconomic status, educational level, home ownership and what they are willing to give up in terms of consumption and way of life (Gigliotti, 1992), what new practices they are willing to adopt, such as

vegetarianism and the use of renewable energy (Leonard-Barton, 1981), what their recycling habits are (Pedersen, 1999) and what they say that they are concerned about (Taylor, 1997). There is less information on the social dimensions of green behaviour than on individual characteristics, and surprisingly little on the extent to which people monitor everyday habits and learn from them. There remains a need to combine the understanding of what individuals think and do in unusual circumstances with an understanding of how they think and behave in relatively normal circumstances.

The Global Action Plan (GAP) projects give some indication of the potential of monitoring normal daily life. In the Netherlands, thousands of householders belong to GAP groups serviced by 'EcoTeams', where they report their monitoring of energy, waste, water, transport and shopping at regular intervals over a period of several months. An evaluation of Dutch householders showed that 46 out of 93 household behaviours had changed in a more 'green' direction during participation in GAP, and also that the changes endured for at least three years afterwards. 53% of participants had become more environmentally active outside the home as a result of participating (Staats and Harland, 1995; GAP, 2003). GAP in the UK has been largely concerned with individuals rather than groups and has mostly shown more modest results, although 85 households in recently-established EcoTeams in Nottingham have achieved reductions of 50%, 10%, 17% and 22% in waste, electricity, gas and water respectively (Stephenson, 1996; GAP, 1998; GAP, 2003).

These results support the view that the use of feedback through monitoring can be a powerful teacher, and also that a social element strengthens the impact and the measurable outcome of whatever learning takes place. All the evidence cited above

implies that learning anything at all complex implies reflexivity and change, but it also suggests that it may be possible to identify distinct and necessary stages in learning. The next section sets out a tentative basis for this.

2.6 A basic model – conscious competence

The varieties of constructivist learning theory, described above, suggest models of learning and teaching even if they are not directly related to a model such as Kolb's model of experiential learning. It may seem unnecessary at this point to introduce a new model for consideration. The 'conscious competence' model is introduced here not because it is comprehensive – far from it – but because it has two useful qualities for the purposes of this thesis. First, it is most commonly used in relation to the acquisition of skills as well as knowledge, which implies the integration of action with cognition in a way that is not necessarily the case with the other constructivist theories discussed. As energy literacy is under discussion, a concept described in Chapter 1 as involving 'knowledge of things *and of processes*, reasoned motivation, and quantitative and qualitative judgements about *how to act*', this is highly relevant. Second, the first stage of the conscious competence model, in which an individual is unaware of what s/he does not know, is well adapted to particular arguments about modern energy use, many aspects of which go largely unnoticed.

A web search based on 'conscious competence' throws up hundreds of examples of what is recognisably the same model, widely used in training for vocational skills or sporting competencies as well as for more complex abilities such as adjusting to life in a new culture. A number of authors have been credited with devising it, including the humanistic psychologist Abraham Maslow and two management theorists, DL

Kirkpatrick and P Dubin, but a search of the texts in which they were reported to have introduced the model was fruitless[7]. The most likely candidate is WS Howell (1982), whose book 'The Empathic Communicator' describes the model without citing anyone else. A schematic version of his description of the different levels in the model is given in Figure 2-1.

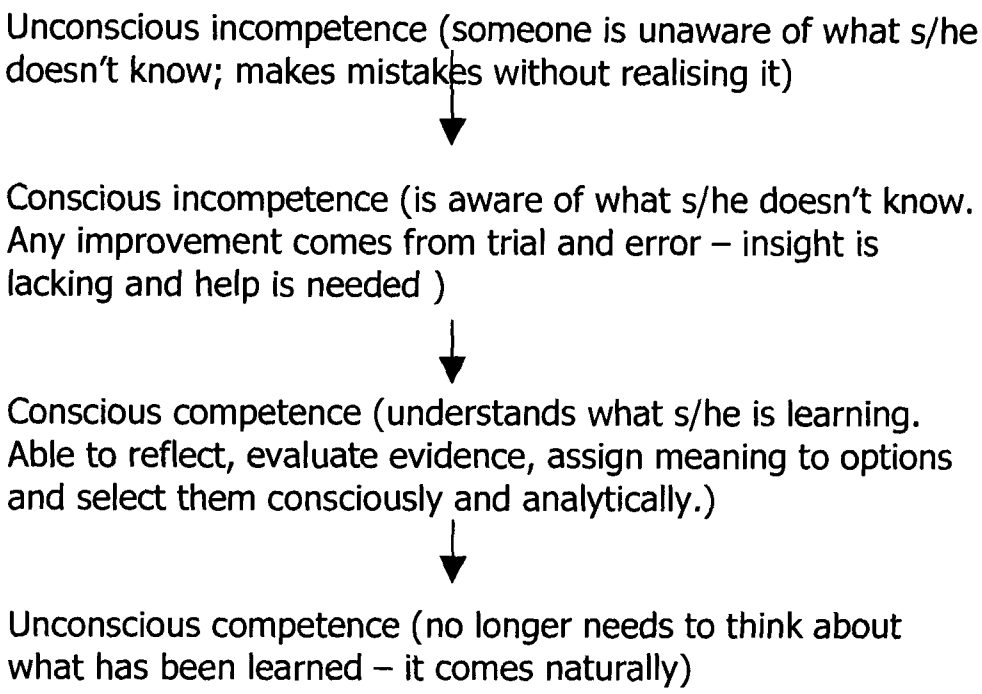


Figure 2-1: A basic conscious competence model: learning to be competent

Source: Howell (1982: 29-32)[8]

The Howell model is a 'vertical' and linear one, describing the gaining of competence in a particular facet of life. It does not address the possibility of transferring competence from one area to another, as Vygotsky believed was possible – for example, being able to communicate in Italian from a knowledge of Latin and French, or being able to design a well-ventilated home using knowledge of what is needed for animal health on a farm.

---

[7] The web searches also produced a lengthy and unresolved discussion about the origins of the model among learning theorists – see http://www.learning-org.com/98.10/0076.html.

The model was adopted in this simple linear form as a starting-point for the reasons given above, and also because a modified version of it had already proved useful in an attempt to summarise what happens in effective advice, as described by experienced energy advisers (Boardman and Darby, 2000). The modified version traces the same progression from unconscious incompetence (or ignorance) to conscious or unconscious competence, but it includes three processes that intervene between the four stages. These are awareness-raising, the giving of advice and taking of action, and the giving of feedback on consumption. The adapted version of the model is shown in Figure 2-2.

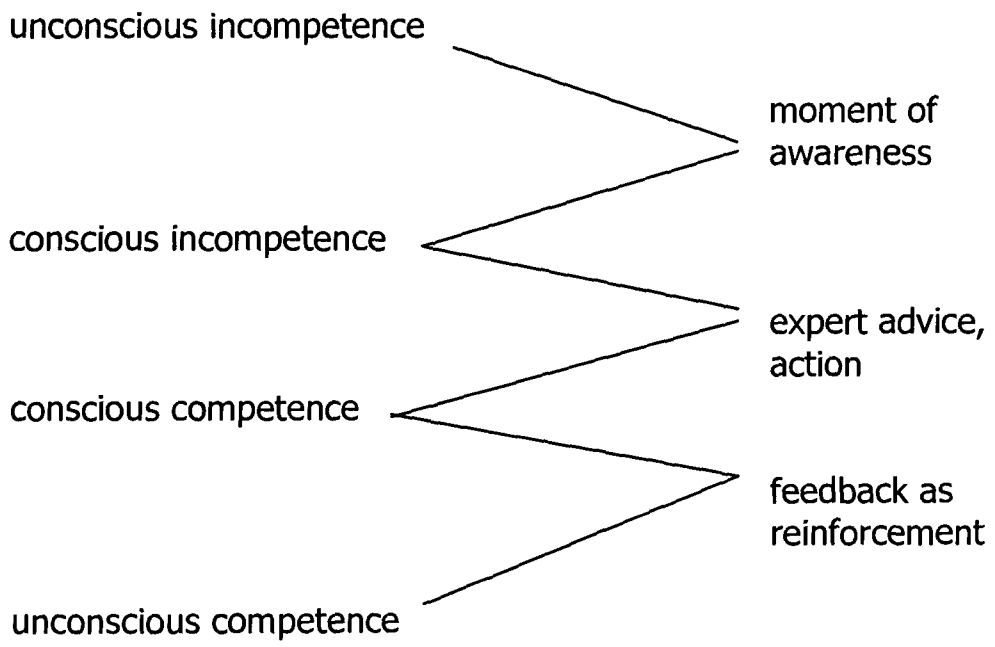


Figure 2-2: Conscious competence in energy advice

(Source: Boardman and Darby, 2000: 7)

In this adaptation, some message or intervention is needed to raise the householder's awareness to the point at which s/he takes the initiative in seeking advice and/or carrying out some action and/or changing behaviour. If feedback on the consequences of the action or changed behaviour is available, the householder can use it in order to improve his/her competence and understanding. The adviser's

---

[8] Howell adds a fifth stage, 'unconscious supercompetence', to describe peak performance, but it is irrelevant to this discussion.

role is to give advice, promote action and (if necessary) arrange for the feedback that can help adviser and advisee in evaluating how useful the action was. The initial awareness, though, is not necessarily generated by the adviser but may come from a wide range of sources such as a chance conversation, a TV programme or a newspaper article.

There was some uncertainty as to how relevant the 'unconscious competence' stage was, but it was included to describe the adoption of automatic behaviour, such as switching off equipment when not in use or using a thermostat routinely and effectively.

This modified model was presented to a large number of energy advisers at various conferences and meetings, where it was well-received, reinforcing the belief that it was worth developing[9]. A comparable learning sequence was being adopted at the same time by Greer et al. (2000) in their review of attempts to change energy-related behaviour in the European Union. However they used different terms, referring to predisposing, enabling and reinforcing factors in place of awareness-raising, action and feedback. Greer et al. insist on the necessity of passing through all stages and not (as so often happens) concentrating all efforts on the predisposing factors. Their model represents progress in the sense that it introduces an element of theory into a highly pragmatic and outcome-oriented area of research and encourages reflection on processes. There is a difference between their approach and the one adopted here, though: Greer et al. work *backwards* from the solutions

[9] The process of adopting this model was similar to the adoption of many mental models of processes: an idea was introduced and then modified, tested, and modified further until it seemed to give a viable account of lived experience to the author and those with personal knowledge of the subject matter.

desired by policymakers, through factors that may influence progress, to the agencies and householders who are intended to implement the programme design. By contrast, the aim here is to understand learning processes by starting at the beginning, seeing how the construction of knowledge takes place. How do the different components of the conscious competence model translate into terms used in learning theory?

2.6.1 Awareness

As defined in Chapter 1, awareness is functionally equivalent to consciousness, and implies alertness and a state of being informed. It may relate to a single item of knowledge or to the connectedness that people recognise (to a greater or lesser extent) between the various aspects of their way of life. It is indispensable as a concept but elusive. There is no apparent consensus on measurement of awareness: not even a debate (British Social Attitudes survey, pers. comm.). In learning theory, though, the nature of awareness has been debated exhaustively over the centuries. One of the earliest references to it comes in the paradox that Meno presented to Socrates:

> *How can you search for something when you do not know what it is? You do not know what to look for and if you were to come across it you would not recognise it as what you are looking for.*
>
> (quoted in Marton and Booth, ibid.: 2)

Learning is only possible because everyone knows 'something' initially: unfamiliar concepts can only be introduced successfully in terms of what the learner already knows about. This reliance on the 'something', on which subsequent learning is

founded, the experience of the learner, runs through constructivist learning theory[10] (e.g. Schon, 1983; Wertsch 1985) and also through the theory of environmental education (Walmsley and Lewis, 1993; Gurevitz, 2000).

While awareness may begin at birth, it develops throughout life as a consequence of external as well as internal effort. Our awareness as adults is a complex product of our own interpretive efforts, applied to what we learn from our experiences, and attempts made by others to educate and inform us. In the field of environmental education, too much effort may have been expended in making learners aware of environmental problems – often distant and intractable – rather than building on their experience and knowledge of the environment they encounter in everyday life (Morris and Schagen, 1995). As Salmon (2000) points out, students usually lack environmental literacy – understanding, specific motivation to act and an ability to adapt to circumstances – more than they lack generalised concern. Longitudinal studies in the US have tracked a growth in generalised environmental concern over many years, even in the face of increasingly deregulated industrial activity, but a shortfall in harnessing this concern that is partly due to a failure to link specific actions and processes with their impacts (Kempton, 1993).

2.6.2 Action

A constructivist interpretation of learning is consistent with the proposition that awareness is a precursor to action but does not guarantee it: for example, it is possible to know about heat loss through the walls of a building before doing

---

[10] It is acknowledged in behaviourist theory also, but not in terms of awareness. Instead, the foundations of knowledge are seen in terms of genetic endowment and personal history. The environment – everything external to the individual – conditions all behaviour.

anything about it. That awareness must be processed – acted on mentally, or interpreted – before it is converted into any form of behaviour (Walmsley and Lewis, 1993). This sequence fits with the modified conscious competence model shown in Figure 2-2. However, sometimes a 'first action' may effectively coincide with first awareness – for example, teeth-brushing, which we begin to practise not through any theoretical conviction but because we are told to do it (Valente and Schuster, 2002). Alternatively, we may have first of all experienced someone else brushing our teeth and have become aware of it as a normal action that we want to practise ourselves as our motor skills develop. Action forms an integral part of our experience of life, so much so that it is often difficult to point to cause and effect. Where the model appears to be of questionable value, it is not so much in terms of what it includes as in terms of the sequencing. Does someone ask for expert advice, or take some action, because s/he has become aware of something, or is s/he aware because of the advice, or the action?

2.6.3 Feedback

There are similarities between an engineer's use of a feedback control gadget as an extension of his/her experiential world and a learner's use of feedback as a means of extending experience and understanding. This use will always be subjective for learners, though: they interpret what they hear or see in terms of their *own* experience and not that of the person communicating with them (von Glasersfeld, 1995: 159-60). This experience may be inadequate to show them a mechanism for what is actually happening, as when householders believe that cold enters their home rather than heat escaping from it. It follows that if they are able to keep

warm, they do not need insulation because the cold is already being kept at bay successfully.

A learner's use of feedback is part of an experiment in living, not a closed system. Its role in learning how to live in an uncertain world is set out by the educationalist John Holt:

> *We are obliged to act ... as intelligently as possible in a world in which ... we know very little, in which, even if the experts know more than we do, we have no way of knowing which expert knows the most. In other words, we are obliged to live out our lives thinking, acting, judging on the basis of the most fragmentary and uncertain and temporary information ... The young child is continually building what I like to call a mental model of the world, the universe, and then checking it against reality as it presents itself to him, and then tearing it down and rebuilding it as necessary ... We have got to learn ... this business of continually comparing our mental model against reality and being willing to check it, modify it, change it, in order to take account of circumstances.*
>
> (Holt, 1970: 144-145)

Reality is seen here as a flexible concept, something that 'presents itself to us'. This is clearly a constructivist interpretation, in which the perception of reality will change as the individual and the environment change. Feedback on our actions can thus act as a source of new awareness of a changing reality and a way of correcting incorrect information. It can also bring about a sense of personal efficacy, a spur to take further action.

This interpretation contrasts with the behaviourist representation of feedback as 'reinforcement' (Skinner, 1974). Reinforcement is a useful concept at times in explaining why we continue to act in a certain way or to move in a certain direction. It is what will strengthen or weaken the likelihood of a certain type of behaviour occurring again. If a hungry bird finds food in the bark of a tree, it will seek food in the bark again. If a cold home is brought to a more acceptable temperature by

setting the storage heaters in a new way (because the previous arrangement led to overheated mornings and underheated evenings), then that will also be repeated. But the view of feedback as reinforcement is unnecessarily limiting. The contrast between behaviourist and constructivist uses of the term feedback again hinges on the importance given to the thinking processes of the individual in relation to the environment. These are largely irrelevant to the behaviourist but vital to the constructivist, who sees feedback on experience as something that can lead to reflection and 'double-loop' learning, an understanding of processes as well as outcomes (Schon, 1983). Schon developed his theory of 'reflection-in-action' through studying professionals who reflected on each 'case' that came to them in the light of previous experience, combining general principles with the particular aspects of the case. This requires flexibility, along with a willingness to build new evidence into the theory and to experiment. Schon contrasts this with the 'technical rationality' model of professional practice, in which an all-embracing set of explanations and principles are applied to cases or problems as seems appropriate – a more limited process referred to as 'single-loop' learning. The debate about the nature of learning processes and the use of feedback applies to laypeople as much as to professionals.

Abstracting general principles from information is an exercise that will come more easily to some than to others – a point made by Williams (1983) in his discussion of how people understand energy usage. He concluded that direct advice on how to act would be more useful to some householders than education about principles and mechanisms: 'Instead of being given information on "Economy 7" and left to plan their behaviour accordingly, a consumer could be told 'Never switch your immersion heater on during the day!' (ibid.: 144). This illustrates a pragmatic aspect to the decision as to whether to promote double- or single-loop learning. Adolescents show

a development from heuristic (rule-of-thumb) to analytic processing of information and the capacity for double-loop learning, but many individuals do not make this transition fully and there may be too much emphasis on 'higher order competencies' among learning theorists (Kacsynski, 2001). If this is true, then some individuals are not learning because the teaching methods used are unsuited to the content of what is taught, assuming an analytical ability that is not there. But if the goal is always reduced to single-loop learning, the result is likely to be a loss of potential depth of understanding and innovation, even if specific targets may be met more easily. From the theory outlined above, it appears as though feedback can be used in *both* types of learning according to context and the ability of the learner, although we know little as yet about the relative contributions of each. If this is so, it occupies a pivotal place in the theory and practice of energy education.

2.6.4 Sequence in the 'conscious competence' model

Vygotsky claimed that different temporal sequences of elements in learning could be equally productive for different individuals. There may be crucial exceptions to Vygotsky's claim: some element in a given learning process may be essential as a starting point, for example, and no progress may be possible without it. Alternatively, some elements of knowledge may only 'work' in certain circumstances: for example, new information about central heating timers may only be operationalised if the learner already knows how to set one. The likelihood of multiple routes to a similar end-point in learning does call into question the usefulness of the conscious competence model. A related issue is whether any learning model should appear to have an end-point, rather than being cyclical or spiral in form. These issues are returned to in the empirical work and the discussion of findings.

2.7 Perspectives on learning and choice of research methods

Marton and Booth comment that

> *... the only route we have into the learner's own experience is that experience itself as expressed in words or acts. We have to ask learners what their experiences are like, watch what they do, observe what they learn and what makes them learn, analyse what learning is like for them. There is a wealth of important insight to be fetched from those experiences, although research methods differ radically from those that take an external view.'*
>
> (Marton and Booth, 1997: 16)

While behaviourists might well agree with the first sentence, they would find the remainder contentious. Is it worth going to the trouble of gaining insight into the learner's experience if the primary interest lies in the practical outcomes of that experience? If a householder cuts his or her carbon emissions by 20%, does it matter how and why s/he did so? A constructivist interpretation of learning involves claiming that both these questions matter, and opting for research methods that invite respondents to reflect on their experiences. These methods are discussed in Chapter 4, but it is worth stating at this stage that they are not entirely qualitative. The aim is to use quantity and quality together to build a representation of what is happening, in terms of what is easily observed and also in terms of what can only be inferred from accounts of memories, thought processes and aspirations.

2.8 Summary

Constructivism has been chosen as a framework for this study because it takes into account the development of meaning by the individual and also the significance of the relationship between learner and teacher: in the constructivist view, learning is active, social and situated (Lave, 1993). The behaviourist view of learning, by contrast, ignores the different meanings that different individuals will ascribe to the

information they receive, and educational techniques derived from this view act without reference to the awareness of the person they are designed for. Selecting a constructivist paradigm does not consign all behaviourist techniques to the dustbin; it does however reflect my belief that constructivism offers a more interesting and potentially productive mode of enquiry.

The home forms the immediate environment, in which and from which it is possible to learn reflexively, by trial and error or by the use of reason and analysis. The householder's understanding of how and why s/he takes a particular action in the home is significant because it points to the information, experience and thought processes that were influential in producing that result. Householders' and advisers' accounts of their experience can also shed some light on how their body of tacit – foundational - knowledge has been constructed, and on the role of the teacher.

It was argued that 'environmental awareness' is most commonly understood as awareness of problems and disruptions to natural processes, rather than awareness of the nature of those processes. Individuals may therefore have a generalised concern for the environment, but lack 'environmental literacy' that is related to their daily actions and that gives them the motivation and ability to act in more environmentally-sensitive ways. Feedback on consumption and actions was identified as a vital element in making daily processes more visible and comprehensible. What contributes to environmental literacy is also likely to contribute to energy literacy.

The 'conscious competence' model raises the possibility that there is a definable and constant sequence of processes in learning a skill or competence. A sequence of processes implicit in the model – and to be explored in this thesis – consists of

raising awareness, taking action and/or seeking expert advice, and the use of feedback. Constructivist theory indicates that these would relate to the selection of salient information and development of the ability to act, reflect and construct meaning. However, it leaves open questions of the extent to which there is a consistent pattern or sequence in the development of awareness and action. Before these questions are tackled directly in the empirical work, Chapter 3 reviews the literature on behavioural aspects of domestic energy use.

3 REDUCING DOMESTIC ENERGY DEMAND

3.1 Demand reduction priorities

Sustained study of domestic energy conservation only began with the first oil supply crisis in the industrialised nations, in 1973-74. At first, policymakers turned for help to technologists and economists in their search for ways of cutting demand. Even the progressive 'Low Energy Strategy for the UK', published at the end of the decade, barely mentions human behaviour in the chapter on domestic energy use and claims that

> *Britain ... can move into a prosperous low-energy future with no more than moderate change. All that is necessary is to apply ... some of the technical advances in energy use which have been made, and are still being made, in response to the oil price increases of 1973/74 ...*
>
> (Leach et al., 1979:9)

The early demand-reduction studies were based on variants of a relatively simple physical-technical-economic model, or PTEM (Lutzenhiser, 1993), but soon encountered the complexities of human behaviour. Studies such as those of Cornish (1977), Sonderegger (1978) and Winett and Neale (1979) represent a first step towards understanding domestic energy demand as a complex phenomenon involving preferences: they found that energy consumption by inhabitants of identical homes with identical appliances could vary by a factor of two or three, even in well-insulated dwellings. A seven-year study of 78 electrically-heated Swedish homes found that only 20% of variance in consumption could be accounted for, with family size the largest single element. The remainder could not be explained except by unquantifiable variables:

> *The family living in the house has a decisive influence on the energy consumption level ... variables which are not quantifiable by means of published particulars concerning the occupants, such as their habits and attitudes towards energy saving, may have a great influence.*
>
> (Lundstrom, 1980: 6, 8)

Through work such as this, it gradually became apparent how inadequate the PTEM was to account for the complex nature of consumption (Lutzenhiser, op. cit.). Researchers came to acknowledge the gap between potential and actual savings, attribute this gap to human choices and institutions, and recommend further study of these factors. This has been a gradual process, and sometimes a reluctant one (e.g. Stern and Aronson, 1984; Schipper et al., 1989; Vine, 1994; Lutzenhiser, 2002).

While the PTEM remained the dominant model of energy use, energy efficiency began to replace energy conservation as the dominant goal among policymakers during the 1980s: more efficient usage rather than less usage. This change fitted well with technical and economic interpretations of energy use, and also with the developing concept of ecological modernisation. Both efficiency and modernisation were promoted as 'win-win' strategies: the householder and the environment would benefit, while businesses would innovate and create new markets by cleaning up their operations (Hajer, 1997:31; ASE, 2002). Ecological modernisation, though, does not call for fundamental structural changes in the way a society is organised to use energy and other resources (Hajer, op. cit.). Likewise, energy efficiency usually only implies change up to a point. It is used in relation to the efficiency of technology rather than the efficiency of the economy as a whole. For example, it does not address household fission (the splitting of households into units with fewer people in each), the effects of increased purchasing power or the political imperative of economic growth (Norgaard,

1995). Neither does it involve the relatively new process of carbon accounting (Boardman, 2001). Yet all these issues are inescapable features of energy policy debates in the new century.

With the growing evidence towards the end of the 1980s that fossil fuel combustion was contributing to accelerated climate change, the chief reason for reducing demand had changed. Energy efficiency was coming to be seen as only part of a wider agenda: in itself, it was not going to be enough to change the trajectory of unsustainable consumption and might even be seen as legitimising it (Banks, 1998). Carbon conservation was needed urgently.

3.2 Understanding the householder

It has been widely accepted that learning to change energy-using habits and to invest in energy efficiency might involve overcoming certain positional variables or 'barriers'. In practical terms, these might be low income, tenancy, lack of home repair skills or ignorance of grant availability (e.g. Sadler and Ward, 1991); more abstractly, they might be habits or mindsets such as a sense of futility or lack of time (Hinchliffe, 1996; Grierson, 1998); or an association of consumption with social status (Mudyn and Ryzak, 1997). While some of these barriers might be overcome one by one, others were intractable:

> *Consumers actually do have the knowledge and an objective will to carry out savings, but ... decisions on electricity consumption are subordinate to decisions on which appliances are desired in the home ... The barriers thus lie in the lifestyle of individual consumers.*
>
> (Nielsen, 1993)

Does it make sense to describe an all-embracing concept like lifestyle as a barrier? This question had been raised in the early 1980s (Williams, 1983) but was not taken up in any systematic way until a decade later. By then energy use was increasingly recognised as being woven into a larger social and cultural fabric. Many of the 'barriers' were seen as such an integral part of the culture that it made little sense to treat them as exogenous variables and engage in an attempt to overcome them one by one. Instead, there needed to be a more imaginative and organic paradigm which could encompass a range of factors not often considered by students of energy demand, such as comfortable temperatures, the aesthetics of lighting, and tastes in cooking and bathing (Williams et al., 1985; Wilhite, 2001).

These more organic approaches involved a commitment to explore more fully the dimensions of everyday life and the structures affecting it. There was a shift from a problem-solving approach (how do we stop individuals from making this or that mistake?) to a more educational view (how can a society of individuals learn how to live more sustainably?).

Shifts in approach like this almost inevitably mean a temporary loss of focus, because there is no longer the drive and certainty, however illusory, that comes from dealing with a single issue (demand reduction) in a simplified frame of reference (PTEM). However, it is sometimes possible to see how a complex of factors can produce a desired outcome and how people have learned something along the way to that outcome. The widespread adoption of low-energy compact fluorescent lamps (CFLs) in Hungary, for example, was achieved by a combination of marketing campaigns carried

out by competitive suppliers, steep increases in the price of electricity, the identification of ownership of CFLs with modernity and a perception that they were aesthetically pleasing. This combination was strong enough to overcome the chief disincentive to purchasing CFLs, which was that they cost approximately 20 times more than tungsten bulbs of comparable wattage (Urge-Vorsatz and Hauff, 2001). A comparable story of combined technical, social and infrastructural influences comes from an analysis of the introduction of the EU Energy Label for cold appliances (Winward et al., 1998).

The conclusions reached by researchers on the most promising demand reduction strategies are linked to their understanding of how householders think and what options are open to them. The literature shows a range of such understandings, usually implicit rather than plainly stated. At one end of the spectrum is the view of domestic energy consumers as individual, rational-economic beings who are open to persuasion by economic incentives and accurate information (e.g. Hutton et al., 1986; Anderson, 1995). The emphasis there is mostly on measurable outcomes of interventions, rather than explorations of what produced the outcomes. One authority comments that it is often more or less taken for granted what lies behind an unfavourable outcome: many economists, engineers, scientists and social scientists are *'imbued with certain values ... that lead them to conclude that anyone not adopting energy efficiency is irrational or stupid, or a victim of market failures or hidden costs'* (Jake Chapman, National Energy Services, pers. comm.).

At the other end of the spectrum comes research on householders[1] as social beings whose use of energy takes place as a by-product of their lives in complex institutional and social environments. According to this analysis, energy-using behaviour is inexplicable purely in rational-economic terms (e.g. Wilhite and Ling, 1992; Lowe, 1996; Wilk, 1999). It will be altered by understanding and engaging with peoples' aspirations and practices, and with the structural and regulatory arrangements that determine supply: what happens within the home and in the wider environment can be restated in terms that are understood by non-specialists (Spaargaren, 1999). Most recently, this move towards dialogue has been extended to the adoption of renewable energy technology and the need for new ideas to be communicated between the different 'social worlds' of scientists, investors, energy suppliers and government agencies (Pohl and Gisler, 2003).

Somewhere in between these interpretations comes the 'social-psychological' view of the householder (e.g. Stern and Gardner, 1981). This is found in studies that take an essentially behaviourist view of how change might be brought about – seeing the householder as a vessel to be filled with appropriate information as a prelude to taking appropriate action – but that also highlight the significance of social influences on the individual, recommending strategies that recognise this. The stress is on issues such as social networks as a means of diffusing knowledge (Coltrane et al., 1986) and the training of energy efficiency auditors as communicators, not merely neutral channels for information (Yates and Aronson, 1983; Gonzales et al., 1988). Individual perceptions of the trustworthiness of information sources emerge as crucial (Craig and McCann, 1978),

[1] The term 'householder' is preferred, as it implies someone with more autonomy and a more multidimensional life than the reactive or passive 'consumer'.

with the degree of trust varying according to who is on the receiving end of an intervention. For example, the more excluded members of society tend to show lower levels of trust in institutions, paralleled by lower levels of trust in their ability to change or to effect change (Bynner and Parsons, 1997; Johnston and Jowell, 2001).

An exploration into how householders think about energy thus began to complement the debate over how best to influence energy demand through their actions; but the two did not always engage with each other. A unifying concept was needed to link what happens in the individual with what may be evaluated in aggregate.

3.2.1 Energy literacy

At the individual level, energy literacy is a concept that combines abstract knowledge with daily experience. It is complex, based on beliefs as well as on practical knowledge about how to use energy efficiently. When measured in terms of this knowledge, it was found to be significantly associated with domestic fuel consumption levels and to be related to factors such as standards of comfort, a sense of personal efficacy and an ability to reflect and learn (Gaskell et al, 1982).

Some of the earliest attempts to study the householder as a thinking and learning energy user came from the University of Hull Ergonomics Research Group. Their body of work brought together thinking on technology and design with observations of the behaviour of householders and included an argument for the simplification of heating controls (Bartram et al., 1985). There was a critique of the gap in understanding

between most householders and the scientifically-trained technicians and policy makers who design and legislate for domestic energy use:

> *Certain types of concept are difficult for people to handle and consequently their pattern of thinking may not follow the logic of science. Second, people draw conclusions from an impoverished knowledge base, one which is constructed within a particular belief system. If a 'fact' contradicts a 'belief' it may be rejected, even though objectively true. Moreover, beliefs are held within, and depend upon, social values. Thus a helpful suggestion from a* [fuel supplier] *may be rejected not on its merits but on the low social credibility of the source.*
>
> (Williams and Crawshaw, 1988: 14)

A comparably pioneering series of studies in the US threw light on householders' understanding of fuel bills and their interpretation of new information from informative bills (e.g. Kempton et al., 1982; Kempton and Layne, 1994; Egan, 1999). Like the Hull work, it builds a picture of the state of energy 'folk knowledge' and indicates how energy professionals might recognise and work *with* this knowledge instead of lamenting the ignorance of the layperson.

As suggested above, developing energy literacy requires belief, such as the belief that an individual can bring about significant change without compromising his or her standard of living. It also requires motivation (Curtis, 1991/92; Lenzen et al., 2001). What is more, belief and motivation must be durable enough to cope with changing circumstances: they need to be internalised if they are to produce more than superficial changes in response. A number of strategies for bringing about these conditions were proposed, and a variety of terms have been used to classify them: as behaviourist/passive and cognitive/active (Ellis and Gaskell, 1978); antecedent, consequent and social (Katzev and Johnson, 1987; Lutzenhiser, 1993); or hardware-focused and customer-focused (Harrigan et al., 1995). Dwyer et al. (1993) use a more

complex taxonomy, combining antecedent/consequent with individual/group and active/passive characteristics; Dietz and Stern (2002) are more concerned with the levels of regulation and voluntarism associated with a strategy. All these terms are useful in their way, but a complex categorisation is not of much use here, where an attempt is being made to work from first principles in developing a theoretical framework. The classifications mentioned above only overlap occasionally with those of learning theorists[2] and there is no point in complicating analysis of the literature beyond what the data will bear, or beyond what is needed to pick out themes and omissions in order to guide the empirical work. The choice for this review is therefore the simple classification that is most widely used, explicitly or implicitly. This makes a primary distinction between antecedent and consequent strategies, sometimes acknowledging social influence as a mediating factor.

3.3 Antecedent strategies

Antecedent strategies are commonly understood as antecedent to action: strategies to prompt or persuade householders that they should use less energy and/or invest in energy efficiency. In more general terms, they are strategies to build knowledge.

Methods of sending out a message to the public differ in terms of reach and intensity, as outlined in Figure 3-1. Thus an advertising campaign message can reach millions, but at a very low level of engagement, whereas personal advice reaches only one individual (or one household), but with the potential for detailed interaction.

---

[2] An exception should be made for the Ellis and Gaskell study. However, this was the earliest review found and only contains a small proportion of the available research.

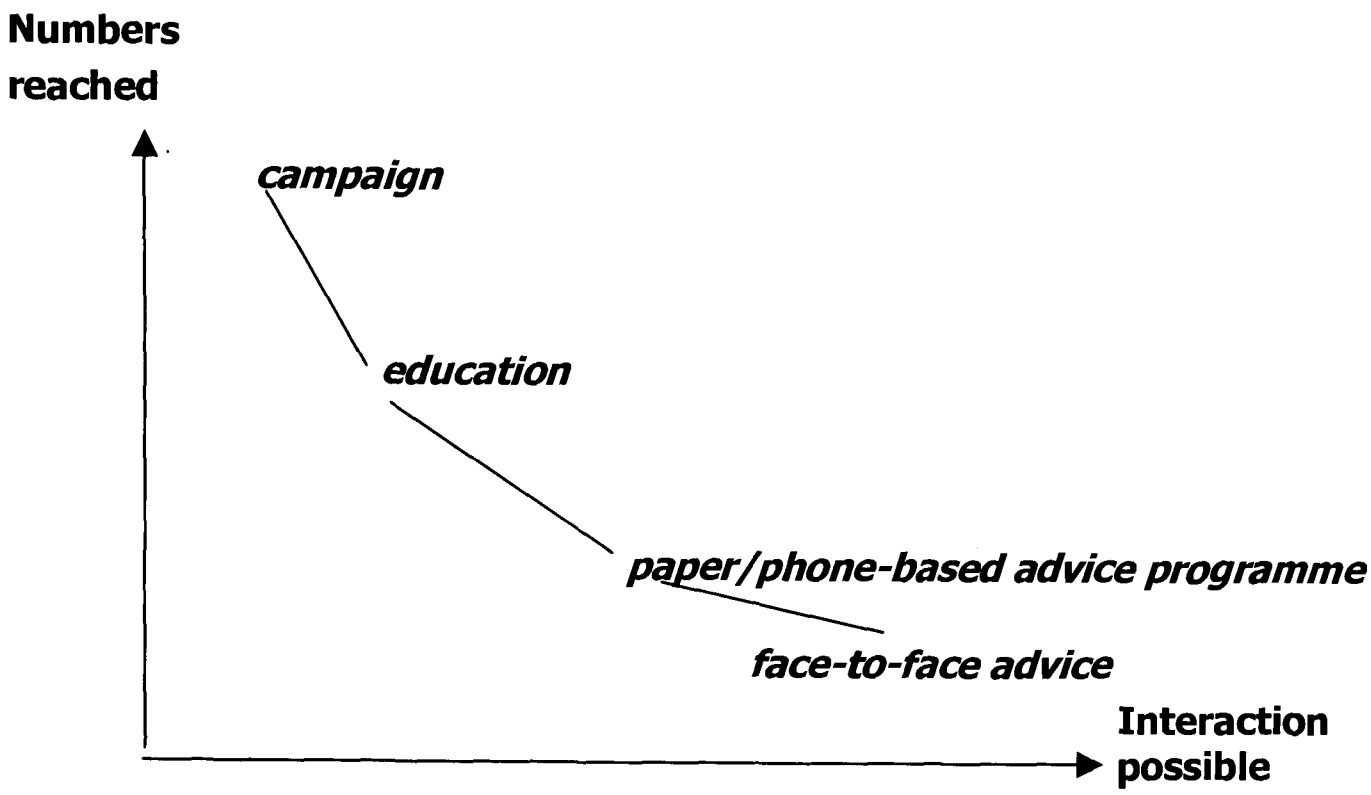


Figure 3-1: Scale and possible interaction of different antecedent approaches

Each type of antecedent approach showed in Figure 3-1 operates at its own level, qualitatively as well as quantitatively; it is misleading to think they can be directly compared with each other (Williams, 1983). For example, the potential for interaction is extremely important in terms of being able to check what the 'audience' has learned from an approach. If inaccurate information is sent out in the course of an advertising campaign, or if it is widely misinterpreted, the chances of correcting public understanding are very limited. Even if a public debate ensues, the terms in which it is conducted will be largely out of the hands of the advertisers. By contrast, teachers or advisers are able to control their own messages and to check understanding in the course of conversation, while the people consulting them are able to question anything they do not understand. Advertising and personal tuition or advice cannot therefore be compared simply on the basis of numbers reached, or on the basis of easily-measurable effects. The cost of 'reaching' a person or household will tend to rise along with the

degree of interaction, and will be relatively easy to measure, but the impact cannot be assessed wholly in quantitative terms.

3.3.1 Campaigns and mass media information sources

The information derived from an antecedent strategy such as an advertising campaign may convey a concept that means little or nothing at first (such as the slogan from the EST 'Einstein' campaign: 'Energy efficiency – it's clever stuff'). However, the information does not arrive in a vacuum. Most obviously, a 'social marketing' campaign message will face immense competition from the skills of 'counter-marketers' who sell products and services that increase energy use (Lutzenhiser, 2002). Someone who has been taught about energy only in the course of physics lessons may interpret subsequent energy information and advice differently from someone taught about it as a part of environmental studies, geography or economics. An individual who has learned nothing about how electricity is measured or what is a 'normal' consumption range for his/her home will not make much sense of information from meter readings or the electricity bill. These and other variables, many of them probably gained through informal channels, make up a body of tacit knowledge that will influence the way in which the intended meaning of an energy conservation message is interpreted.

There are few thoroughly-evaluated energy efficiency campaigns, and few unequivocal success stories. The main theme to emerge from the literature is that it is not sufficient simply to send out vague messages about saving energy: they need to be focussed on a variety of effective options which affect the main end uses; and their effect needs to be verifiable (Pimentel et al., 1998). Advertising messages need to spell out how to achieve

the desired goal, as clearly and specifically as possible, and they need to take the householder with them from the general intention to the specific action (Condelli et al., 1984; Peters et al., 1998). There is one well-documented instance of an energy-saving campaign in which some of the target audience of US householders were given water flow control devices for their showers (Hutton and McNeill, 1981). Those who installed the control devices adopted significantly more of the energy-saving tips provided in the campaign booklet and through the mass media than those who were only supplied with the booklet and media messages. The devices seem to have increased the credibility of the energy-saving tips so that more were acted upon. In terms of the conscious competence model, the flow controls introduced action into the process of learning.

This practical approach is unusual, however. It is more common to rely solely on a message. In the UK, two major campaigns 'Helping the Earth Begins at Home' and 'Are You Doing Your Bit?' appealed to a sense of altruism: they assumed that if the householder were told about the links between their actions and the wider good of their country and planet, they would act, especially if given guidance. 'Helping the Earth Begins at Home', in particular, aimed to explain the link between global warming and what members of the public did each day in their own homes. It ran from 1991 to 1996 but had little obvious effect. This was partly attributed to the advertisers having disregarded the evidence on public knowledge about the causes of climate change (Lofstedt, 1995). Previous studies had shown clearly that members of the public were concerned about 'the environment' but were confused about the nature and causes of climate change and ozone depletion (e.g. Hedges, 1991; Lofstedt, 1992), and this campaign did not dispel the confusion to any noticeable extent. In 1994, a survey of

over 1,000 individuals found that only 20% of them judged the statement that 'the greenhouse effect is caused by a hole in the earth's atmosphere' to be false (Witherspoon, 1994)[3]. Witherspoon commented that

> *To the extent that British policy makers have actually tried to create a climate favourable to tougher environmental policies, they have tended to do so through public information campaigns which show the scientific complexity of the issues and their likely outcomes. Our data suggest that this instrumental notion of behavioural change is inadequate, reflecting a ... romantic notion that knowledge, rather than affective social motivation, leads to changes in attitude and behaviour.*
>
> (ibid.: 108)

Witherspoon thus proposed that it is not enough to treat householders as rational individuals without also taking into account the personal histories, knowledge, aspirations, attachments and political views that affect their motivation and understanding.

The most recent energy awareness campaign in the UK, 'Are You Doing Your Bit?' was more modest in its message than 'Helping the Earth begins at Home'. Aiming to target '87% of the UK population who say they are concerned about the environment', its main aim was to 'inform people that small actions can make a significant contribution to protecting the environment'. The early advertisements, from 1998-2000, were jokey and accessible. Yet an evaluation carried out in year two of the campaign suggests that, while 89% of respondents recognised some form of the advertising, only 21%

---

[3] in January 2003, 69% of a representative sample of the UK population agreed or strongly agreed with the proposition that 'climate change is caused by a hole in the earth's atmosphere' and only 17% judged it to be false (Jane Palmer, 4CE project, pers. comm.).

remembered the slogan without prompting and there was little observable change in people's actions or intentions[4] (COI, 2000).

The evaluations of these two campaigns raise some important issues. In particular, there is the question of how much it mattered whether the public knew about the nature and causes of climate change, in terms of prompting them to save energy. After all, it is not necessary to know about this in order to want to save energy for other reasons, such as avoiding waste, resource depletion, or pollution. All these are familiar and easily-understood concepts. Alternatively, people could have learned more about climate change during the course of the campaigns than they were willing to admit and taken refuge in denial of the seriousness of what they are faced with (Marshall, 2001).

The first campaign was also criticised for ignoring the role of government, business, energy suppliers or regulatory bodies: how much is it reasonable to expect individuals to take responsibility, when those bodies that they see as far more powerful than themselves appear to be left out of the picture? (Hinchliffe, 1996).

In terms of learning theory, a mistaken mental model has to be corrected somehow if it is to be a foundation for useful knowledge; but even an accurate mental model will be inadequate unless accompanied by motivation to act, which in turn requires a sense of efficacy (Eden, 1993). Energy literacy, combining factual knowledge with belief and motivation, had somehow been largely unaffected by these 'altruistic' campaigns.

[4] The campaign later developed a slightly stronger set of messages but then had its funding diverted into combating the foot and mouth epidemic

The UK government has also funded two campaigns that aimed their message in a different direction, at self-interest rather than altruism. 'Monergy', the first, drew a direct parallel between invisible energy and tangible money – for example, showing a man throwing £5 notes out of a window to illustrate unnecessary heat loss. 'Energy Efficiency – it's clever stuff' targeted homeowners aged 25-53 in the ABC1 socioeconomic groups. There seems to have been little or no evaluation of the Monergy campaign, but the evaluation of 'Energy Efficiency' was not encouraging. The campaign cost £2.5 million and generated some 88,500 calls to a hotline, of which 47,119 concerned heating or insulation and 19,446 led to faxes being sent directly to installers of heating or insulation. That is, the cost per call was £28.25 and the cost per call leading to likely action on heating and/or insulation was £128.56 (Novem, 2001). These were high prices to pay in public money for *possible* gains in energy efficiency. It is not known whether this type of message was ignored by those who had noticed other campaigns, noticed by those who had ignored other campaigns, whether it confused people who were accustomed to more 'altruistic' messages about energy or served to reinforce and complement such altruistic messages. There is no qualitative evaluation and so it is impossible to form a judgment.

The history of social marketing campaigns suggests that it is easy to overestimate their ability to raise public knowledge of the issues and willingness to act. For example, a review of mass media health campaigns claims that behavioural changes in the desired direction of 1-5% of the population are typical (Valente and Schuster, 2002). Where energy is concerned, part of the reason for the limited impact appears to have been insufficient recognition of the state of public knowledge about general and specific

aspects of energy conservation. But it could be that without the campaigns, disappointing as they seem, the situation would be worse than it is. Given that it took at least two decades to make drink-driving unacceptable and to reduce smoking in public places, the UK national energy efficiency campaigns could be re-interpreted as initiatives that may only make themselves felt over a long period of time, in synergy with other events and information sources.

Printed energy information is material aimed at increasing public knowledge of energy issues, rather than persuading the public to adopt a particular course of action: it is therefore more neutral in character. Official information in the UK ranges from printed energy-saving tips in leaflets circulated by fuel suppliers, voluntary agencies and Energy Efficiency Advice Centres (EEACs) to detailed technical material on energy efficiency available from the Building Research Establishment and rarely used by non-specialists[5].

The single most effective form of information to date is probably the energy label. The EU Energy Label had a considerable impact on purchaser decisions for cold appliances within three years of its introduction (Winward et al., 1998), and the introduction of comparable labelling schemes for buildings has been effective in several countries when used in integrated programmes to encourage energy-efficient retrofits (Henderson et al., 2001). Specificity and salience appear to be the main single reason for the effectiveness of these schemes. By contrast, unsolicited leaflets or information packs achieve little if anything (Heberlein, 1975; Brandon and Lewis, 1999), although they have had some

[5] More sophisticated on-line energy information has become available recently, such as a guide for householders, builders and designers produced by the Federal Government of Australia (2002).

effect when used in conjunction with feedback by volunteers in experimental studies (Gaskell et al., 1982; Mansouri and Newborough, 1999).

Informal or semi-formal information sources on domestic energy issues – those not stemming directly from a recognised authority – have an impact that is barely investigated. Those in the mass media, mostly relating to home improvements and DIY, could be accessed and studied relatively easily (although there is very little research on these sources as yet), but beyond them are all the elusive conversations, comments and personal recommendations that guide people's actions. It is difficult to assess the power and persistence of informal material like this, variable as it is in quality and quantity.

3.3.2 Education

Where information and social marketing are relatively limited in scope and ambition, aiming to change specific practices, education is understood here as a process that equips householders with general principles and skills (Dietz and Stern, 2002: 46). Energy education is now established as a component of formal education, in the National Curriculum for under-16s[6]. It may be seen as a subset either of environmental education or of something more akin to home economics: one relatively abstract, the other more practical. It is worth noting that environmental education has grown in standing over the same period that home economics has declined in importance. Young people are not taught much about energy management skills in the course of formal education, as suggested in Chapter 2. As a result, they may be missing out on some of the knowledge that they need in order to make the most of environmental education

(e.g. Fien, 1993; Salmon, 2000). The signs are that, although younger people know more in abstract terms about the relationships between energy and environment, they expect higher levels of consumption than their elders (e.g. Gigliotti, 1992). We know little about the practical outcomes of formal energy education as young people grow up and become responsible for their own homes, and about what combination of formal and informal education older adults receive and apply in the course of their lives.

3.4 Rewards and penalties

The use of material incentives or penalties may be antecedent *or* consequent: the promise or prospect is antecedent, the reality consequent. There has been some evidence that behaviourist techniques using rewards and penalties can persuade householders to reduce their consumption (most explicitly by Cone and Hayes, 1984; see also Hutton and McNeill, 1981, and Kasulis et al., 1981). In these studies, though, householders were assumed to act according to rational-economic models, an assumption that was increasingly discredited as time passed (Costanzo et al., 1986; Lofstedt, 1995; Guy and Marvin, 1999). Incentives were also limited in what they could achieve on their own, as extrinsic influences. They tended to produce 'minimum compliance' (de Young, 1993) and to be of value only in the short term (Ellis and Gaskell, 1978; Dwyer et al., 1993)[7]. Once it had been associated with a reward, it was as though the behaviour was not regarded as intrinsically interesting or important, and there was therefore little point in continuing with it once the reward was withdrawn.

---

[6] For example, the widely-used 'New Modular Science for GCSE' (Heinemann, 1997).

Research into rewards and penalties typically deals with experimental adjustments to an established system of usage and payment, such as the introduction of time-of-use pricing. But if the system itself offers little or no motivation for change – for example, if pricing is such that an adjustment offers savings that appear trivial to fuel-rich customers – such research is unlikely to demonstrate any major effects (Kennedy, 1999). As elasticity of demand is normally low, only major shocks to the system such as the oil supply crisis of 1973/4 are likely to produce significant changes in overall demand, such as the 17% reduction in demand per household between 1973 and 1985 in the USA, largely achieved through thermostat changes and insulation (Meyers, 1987). Motivation is related to the *meaning* of the reward or penalty – something that is constructed by the householder in a social and experiential context.

3.5 Feedback, a consequent strategy

Feedback in some form is by far the most widespread consequent strategy to reduce overall energy consumption. Before reviewing the literature, it is worth emphasising the inadequacy of normal feedback to domestic consumers of gas and electricity. Householders once assessed their fuel supplies and rate of consumption by checking their stocks of solid fuel and candles, but now they rely for the most part on *'the meter in the basement and the bill in the mail that record consumption in inscrutable units'* (Socolow, 1978: 212). With the introduction of direct debit payments, the bill has been replaced by a monthly statement reminding them of a payment that is constant throughout the year; even if they still pay a quarterly bill, it is normally based on an

---

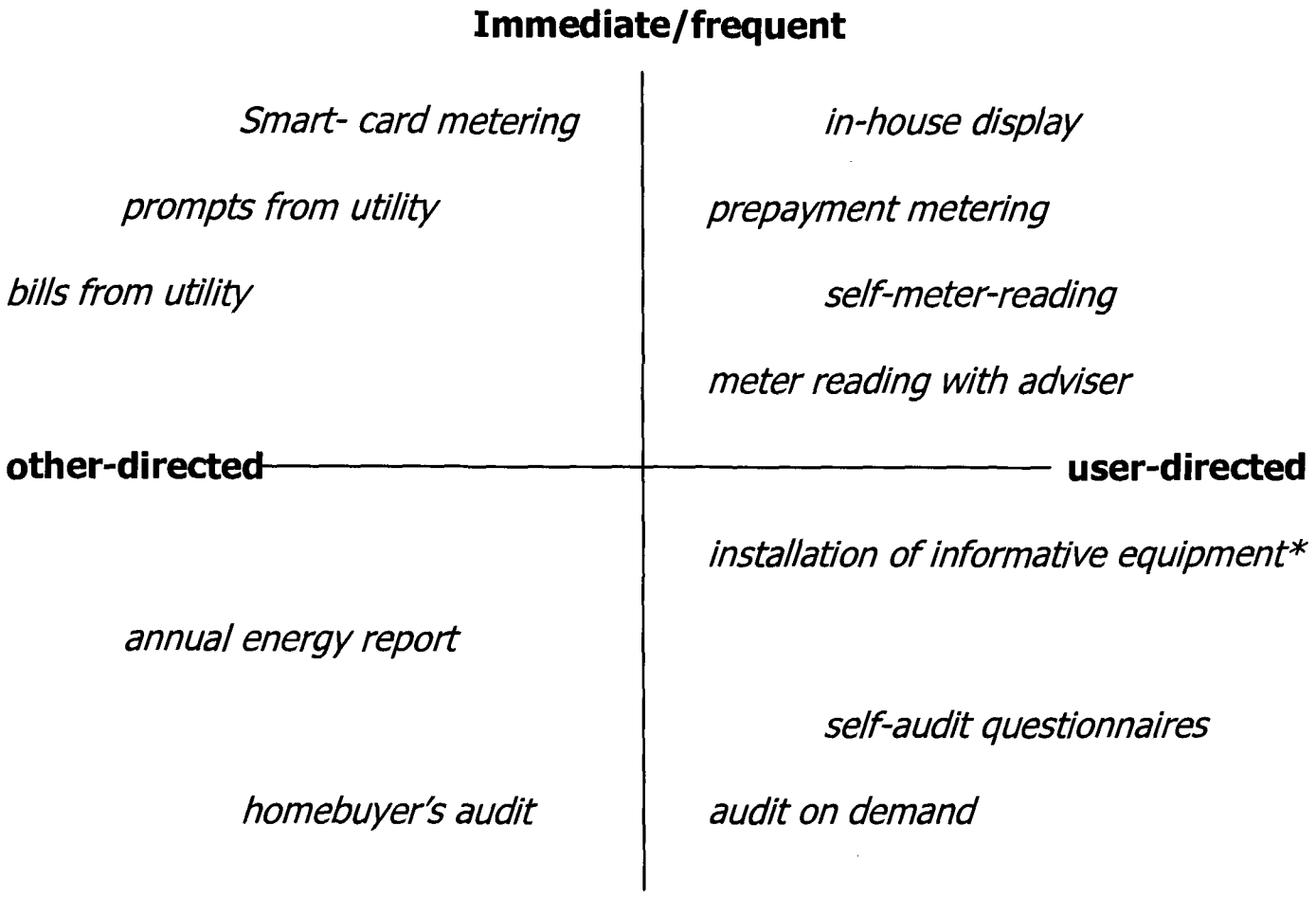
[7] These findings, based on short-term experiments, appear to ignore the everyday reality of householders choosing low-cost tariffs for off-peak electricity.

annual meter reading plus three estimates and gives no indication as to the relative size of different end-uses of energy. This is a flimsy base on which to build knowledge. Commenting on US consumers' (in)ability to analyse their consumption, Kempton and Layne condemn the payment information system by analogy:

> *For readers whose familiarity with current energy billing has dulled their appreciation of its absurdity, we ask them to contemplate parallel examples ... consider groceries in a hypothetical store totally without price markings, billed via a monthly statement like 'US$527 for 2362 food units in April'. How could grocery shoppers economise under such a billing regime?*
>
> (Kempton and Layne, 1994: 857)

This situation can be altered at several different levels by the use of better feedback, as a range of studies has shown. Figure 3-2 shows different types of feedback in terms of their immediacy and degree of control by the householder. At one extreme are single audits carried out by a surveyor – assessments of the state of the home[8]. At the other are displays of consumption over a given period on a display screen or smart meter, immediately accessible to the householder. In between are those types of feedback that rely on an intermediary such as an adviser, or the utility bill; or the 'inadvertent' feedback that may come from acquiring new equipment and learning how to use it.

[8] The inclusion of these under the definition of 'feedback' may be questioned, but it was decided to include audits because they represent an evaluation of the state of the home as a consequence of the builder's and/or residents' actions.



*for example, solar panels with displays showing energy input or water temperature

Figure 3-2: Feedback in terms of immediacy and control

Source: Darby (2001)

Immediacy and control were chosen as dimensions for Figure 3-2 because of the recurrence of these concepts in the energy literature (e.g. Dobson and Griffin, 1992; Hackett and Lutzenhiser 1991). However, they also make sense in the context of educational theory on feedback and experience (Kolb, 1984; Fraser and Greenhalgh, 2001). A homebuyer's audit, at one extreme, is provided by an employee of the mortgage provider on a single occasion and is intended to alert the new householder to what needs doing. More directly and immediately, a digital display of fuel consumption at a given moment and over the past hour, day and month can give a dynamic account

from which the householder can learn something about which appliances consume most and the consumption consequences of different types of behaviour.

The earliest UK review of social research into energy consumer behaviour charted a gradual change in approach, from stimulus-response experiments offering rewards or penalties to studies of feedback intended to encourage the householder to experiment and learn. Its authors concluded that the latter 'cognitive' approach was more likely to have a long-term effect, treating the householder as an active rather than passive recipient of information (Ellis and Gaskell, 1978). The 38 studies whose quantitative outcomes are summarised in Table 3-1 broadly support this conclusion, though it is not always easy to deduce from the written accounts what processes were at work in the course of the experiments.

Table 3-1: savings demonstrated by feedback studies

Savings	**Direct* feedback studies** (n=21)	**Indirect* feedback studies** (n=13)	**All studies 1975-2000~** (n=38)
20%	3		3
20% of peak			1
15-19%	1	1	3
10-14%	7	6	13
5-9%	8		9
0-4%	2	3	6
unknown		3	3

Source: Darby, 2001
* direct feedback = direct displays and meter reading; indirect feedback = informative billing or information provided by someone other than the householder.
~direct, indirect and inadvertent feedback

Table 3-1 summarises findings on one dimension – energy savings – from a review of 38 feedback studies carried out between 1975 and 2000, showing a pattern of outcomes that stayed more or less constant over time. Most early feedback studies are open to criticism on the grounds that they were carried out in conditions that would be difficult

to replicate in daily life – for example, having a researcher post the previous day's consumption on the front door each morning, with an energy conservation message (Palmer et al., 1977); but the later and more 'ecological' studies produced comparable savings. By the 1990s, in feedback as in other areas of behavioural research, the proportion of studies carried out in ecological conditions had grown (e.g. Wilhite and Ling, 1992 and 1995; Garay and Lindholm, 1995). There was also some development of research into householder perceptions of feedback (Kempton and Layne, 1994; Egan, 1999; Aune, 2001).

Out of the 38 projects reviewed, the four most effective in terms of savings involved direct feedback, supporting the view that this may also be the most productive from the point of view of householder learning. There did not seem to be any correlation between the scale of a project and the outcome in terms of reported savings and awareness: the spread of results for the 12 larger-scale projects, with experimental samples of 200-2000, mirrored that for the whole range. The only notable difference between categories was between the modal or median savings from direct feedback and the lower figures for indirect feedback.

In contrast with antecedent strategies, feedback has been judged as 'value-free' and 'entirely instrumental' in its pure form (Ellis and Gaskell, 1978: 50). But feedback does not operate in isolation and is useless if the householder does not already know enough to use it to improve his/her understanding and to act appropriately (Williams, 1983; Lord et al., 1996). Some antecedent information may be necessary, plus the ability to read a meter or understand a bill, plus the ability to select a suitable point of reference against

which to compare the feedback. This minimum level of information and ability will not be value-free but situated in experience.

3.5.1 Metering and direct feedback

Where householders begin to track their consumption through meter-reading or some form of direct display, the evidence summarised in Table 3-1 indicates that they typically make savings of 10%. The effect can be long-lasting (Wilhite, 1997; Henryson et al., 2000), and it can be substantial in some instances. The most dramatic is the introduction of individual metering where there was none before. For example, changing from master-metering to individual metering led to drops in summer electricity consumption of 30-50% in all-electric student apartments in California. The students were suddenly faced with the prospect of paying for their electricity according to usage, instead of having the cost absorbed on a uniform basis in their rents (Hackett and Lutzenhiser, 1991). A shift from master-metering to individually-operated smart prepayment meters – making the meter both accessible and essential for electricity use - gave an average fall in consumption of 20% by some 500 tenants in Stockholm apartment blocks (Birka Teknik og Miljoe, 1999).

We know nothing about levels of awareness in the Stockholm experiment, but the drops in consumption in the Californian apartments almost all occurred because the students decided to switch off their air-conditioning completely. As the authors comment, a microeconomic model would have produced a much more 'graded' response: yet the students' state of awareness did not result in such a response. Instead, they showed far more latitude in their needs for comfort than might have been expected, perhaps in

conjunction with poor understanding of their controls (Hackett and Lutzenhiser, op.cit.). The response was highly satisfactory in terms of energy-saving, at least in the short term, but implied that the students were limited in their ability to understand and control their energy use. In other terms, they were limited in terms of their energy literacy, or their tacit knowledge concerning energy use.

Smart prepayment metering, which informs the householder about consumption each time s/he needs to charge the meter, also provides opportunities for learning and saving. Recent experience in Northern Ireland with a smart 'keypad' meter shows encouraging results in terms of savings (Boardman and Fawcett, 2002 and pers. comm.) and there was enthusiastic support for such metering from the UK National Electricity Consumer Council (NECC, 2000). However, widespread introduction of these meters in the UK is not likely in the near future (Dave Barnes, Ofgem, pers. comm.).

The most convincing endorsement of direct feedback in the literature was that of Dobson and Griffin (1992), who supplied 25 households with a 'residential electricity cost speedometer' showing consumption and cost/energy displays for different loads and giving feedback on an hourly, daily, monthly and annual basis. They reduced their average daily consumption by 12.9% in comparison with control groups. Most significantly, qualitative data showed that they 'began thinking about their electricity usage in ways not possible without specific feedback' – for example, asking the utility for information on replacing their resistance heating systems with heat pumps. Those in the feedback group reported that they had increased their use of the feedback display over the 60-day test.

Results such as these encourage the view that direct feedback is a promising route to follow in reducing demand; and learning theory would tend to support this. But the special conditions for each study make comparison of outcomes very difficult, and the special conditions are closely related to the awareness of those taking part in the experiments. What makes the reaction of 100 individuals in Scandinavia, supplied with direct-display feedback for three months, different from that of 75 in California, encouraged to read their meters for six months? Separating out effects of culture, socioeconomic characteristics, housing types, weather conditions, timing and exact feedback type is not possible without a large number of meticulously-conducted studies to draw on; and even if they existed, such studies would provide only a snapshot of what has happened in the past, rather than an account of dynamic processes. A meta-analysis of existing studies is only able to give pointers to what 'works', such as immediacy, clarity and specificity of information (Darby, 2001); with so little qualitative data, it is impossible to shed much light on *how* it might work.

3.5.2 Indirect feedback

Informative billing provides householders with enough information to allow for valid judgements on whether their energy use is changing over time (because the bill can give weather-corrected data), how their usage compares with that of others, or (rarely, with specialised metering) how their energy is divided between end-uses. These types of information are known respectively as historic, comparative and disaggregated feedback, and examples of all three are given in Wilhite et al., 1999. Historic feedback on bills has helped in raising customer awareness of energy issues and in reducing consumption against controls, with long-lasting effect (e.g. Arvola et al., op. cit.; Wilhite

and Ling, 1995). A number of papers on the US experience demonstrate the usefulness and low cost of informative billing in which the supplier can give weather-adjusted consumption data and compare it with historical consumption or with neighbourhood norms, while the householder is in a position to interpret the data in terms of past behaviour, appliance purchases or household changes (Kempton and Layne, 1994; Kempton 1995; Lord et al., 1996). Comparative (or normative) feedback appeared likely to reduce consumption by high energy users and 'reinforce' low users in their behaviour (Egan et al., 1996), although in some instances it was rejected or even associated with increased consumption (Layne et al., 1988; Brandon and Lewis, 1999). Much depended on context, selection of comparators and presentation (Iyer et al., 1998).

There is a clutch of experiments with written feedback (based on frequent meter readings) that broadly supports the findings from informative billing, though most results are again reported with qualifications. For example, written feedback did not bring about energy savings with householders who had relatively low consumption to begin with (Bittle et al., 1979) or who spent a very low percentage of their income on energy (Winkler and Winett, 1982). In one test, it brought about savings for the year of the experiment, but consumption rose again after the feedback ended (van Houwelingen and van Raaij, 1989).

Utility deregulation may offer new opportunities for feedback and informative billing, as competing companies are keen to retain consumers wherever possible but have few tools for this apart from altering the price of fuel – a very short-term and unreliable expedient. In a bid to increase customer loyalty, provision of an extra service in the

form of informative billing or smart-card metering may be attractive in some contexts (e.g. Bengtson, 1997; MacConnachie and Eonnet, 1999). The studies reviewed for Table 3-1 demonstrated that customers appreciated informative bills at intervals of 30 to 50 days – an important consideration in a deregulated energy market – even if they did not save energy as a result (Garay and Lindholm, 1995; Kempton, 1995).

There are now new sources of indirect feedback in schemes and websites which employ some version of the 'ecofeedback' used by Global Action Plan and referred to in §2.5.2. This *'provides a means for householders to monitor their energy consumption, a target level of consumption to try to meet and advice on how to reduce their actual consumption to achieve the target'* (Walker, 1996). Typically, such schemes supplement the information supplied by the householder in order to set it in context and indicate where the respondent stands in relation to a benchmark such as the average size of the human 'ecological footprint'. Examples are described in Walker (ibid.), GAP (1998 and 2003) Staats and Harland (1995) and Lenzen et al (2001). All rely on the motivation and actions of the individual, sometimes with the addition of peer pressure and encouragement, and can be seen as test beds for energy feedback in a broader social and ecological context.

3.5.3 Audits

An accurate audit tells the householder what state the house is in and what can be done to improve it, at what cost, giving information to promote action. Stern and Aronson commented as long ago as 1984 that *'energy audits are usually seen by policymakers as an almost irresistible offer of something for nothing, rather than a process involving*

communication, motivation and belief', and research to date shows that they are not often acted on when there is insufficient communication, whether this is between householder and auditor or between the householder who makes the audit him/herself and the advice centre that makes recommendations based it (Coltrane et al., 1986; Lindseth, 2001).

A productive audit is therefore usually one with a social dimension of some sort, even if this is a single discussion with a trusted auditor (e.g. Yates and Aronson, 1983; Stern, 1992). There may need to be some compelling personal link or community involvement to increase the likelihood of action from an audit programme, while context and presentation affect the initial uptake. A US review of home energy audit programmes found that advertising greatly increased the uptake of audits and that word-of-mouth recommendations could swell it further (Hirst et al., 1981). When US National Fuel Gas mailed out an annual energy report to each customer with weather-corrections, accompanied by a card describing their audit programme, they raised interest to such an extent that they generated a year's backlog of requests for audits (Harrigan et al., op. cit.). This is a dramatic example of how information that relates to an experienced reality – the home – can motivate householders to learn more.

In the UK, the Energy Rating Reports supplied by Woolwich plc to their customers are designed to reach householders at the critical stage in their lives when they are in new homes and likely to be most open to suggestions for improving their property (Coltrane et al., 1986). Appendix 4 reports on the impact of these reports on a small sample of new homeowners, showing their potential value in stimulating interest and action. With

the likely future introduction of a Sellers' Information Pack containing an energy report for all UK homebuyers, there is potential to extend basic home audits far more widely than has been the case so far (SIP, 2000). Recent evidence suggests that there would be general support for energy efficiency ratings for all homes in the UK, with 70% of a random sample of 1024 adults supporting the idea in principle[9] (Gallup/Strutt and Parker, 2002).

3.5.4 Feedback in context

As the literature review progressed it became clear that feedback is never given or received in truly controlled conditions, whatever the intention of the researcher. It depends on contextual or supplementary factors for effectiveness, whether or not these are deliberately introduced. For example, interaction of some sort is often needed in order to make sense of feedback (Gaskell and Pike, 1983; Williams, 1983; Harrigan et al., 1995). This interaction is usually personal, but does not have to be: the use of advanced technology can bring about better awareness and control of consumption (Brandon and Lewis, 1999; Honore and Elle, 2001). The literature suggests that energy advice combined with follow-up and feedback can improve both comfort levels and the likelihood of savings (Sluce and Tong, 1986; WLEAP, 1994-97; Harrigan, 1992).

Some research that combined written or video information and metered feedback to householders has found a convincing synergy between them (e.g. Gaskell et al., 1982; Winett et al., 1982; Mansouri and Newborough, 1999), though a large-scale Norwegian

[9] although only 22% said that they would give 'great consideration' to energy efficiency when buying a house

study reported that written information on how to save electricity added nothing to the savings achieved by frequent billing with historic feedback (Wilhite and Ling, 1995). This suggests that the Norwegian customers already knew how to save electricity and were well-motivated, but needed the prompt given by the informative bill to spur them into action (Wilhite, pers. comm.). A comparison of the impact of direct-display feedback given to householders in California and Canada found that it enhanced learning among the 'low-knowledge' Californians but did nothing to enhance the Canadians' knowledge about which actions would save most energy: like the Norwegian recipients of informative bills, they already knew enough to act effectively (Hutton et al., 1986). Results such as these undermine the neat three-stage conscious competence model, suggesting that awareness and action are not necessarily precursors of feedback but may follow it. The relationships between the three elements of awareness, action and feedback are not always linear and neither are they always clear. The conclusion that feedback research has been *'marked by a simultaneous lack of concern with theory and overemphasis on application'* still holds (Katzev and Johnson, 1987: 67).

3.6 Energy advice programmes

The studies referred to so far broadly support the hypothesis that feedback on consumption leads to energy saving by giving householders accurate and specific information as a basis for learning. However, it may not work for everyone; at any rate, not in isolation. Domestic energy advice emerged from the conviction that something more specific than large-scale antecedent and consequent strategies was required in order to bring about energy conservation and to relieve fuel poverty: that *'direct advice*

may be a good substitute for education', because most people cannot work out everything from first principles (Williams, 1983)[10].

From small-scale beginnings, energy advice has become available in a variety of forms, with between 3% and 5% of the population of the UK receiving some each year (Boardman and Darby, 2000; NFO BJM, 2002). The nature and quality of this differs widely (e.g. New Perspectives/TNS, 2002), but advice is recognised as a significant means of reducing demand (Sheldrick and Macgill, 1988; DEFRA, 2002). The Energy Advice Providers' Group of the Energy Saving Trust is in the process of commissioning research and building consensus on the potential benefits of advice and the setting of minimum standards (EST, pers. comm.).

Energy advice is classified here under two broad headings, fuel poverty-related and carbon-focussed advice, because these reflect different approaches and preoccupations which are revisited in the empirical work and discussion of findings.

3.6.1 Fuel poverty-related advice programmes

Fuel poverty relates to both housing conditions and household income: an improvement in either may lift a household out of fuel poverty, even if only temporarily. Energy advice to the fuel poor is normally designed to improve 'energy efficiency, comfort and the

[10] The advice referred to here is the 'formal' variety, from advisers with some accreditation, although of course many of us learn a great deal from informal advice given by acquaintances. Kempton et al., 1992, gives a good example of misunderstandings about how to use a thermostat, presumably passed on informally among householders. Formality does not guarantee accuracy, however.

ability to achieve affordable warmth' (Green et al., 1998). A lasting solution to fuel poverty may not involve consuming less energy, which could be dangerous to health, but it is likely to require capital investment in energy efficiency measures as well as training the householder in the use of equipment and controls. Giving advice to the fuel poor means paying careful attention to the householder's way of life as well as the details of their home and energy-using equipment[11]. Employing people with good local knowledge as advisers helps to ease communications, putting householders in touch with people who understand their situation and speak their language (Optima Energy Services, 1989; Whitington, 2001). In terms of the conscious competence model, something akin to what is shown in Figure 3-3 takes place, with the householder and adviser together negotiating the pathway from unconscious incompetence to conscious competence and evaluating the results of their actions in terms of comfort, savings and programme effectiveness.

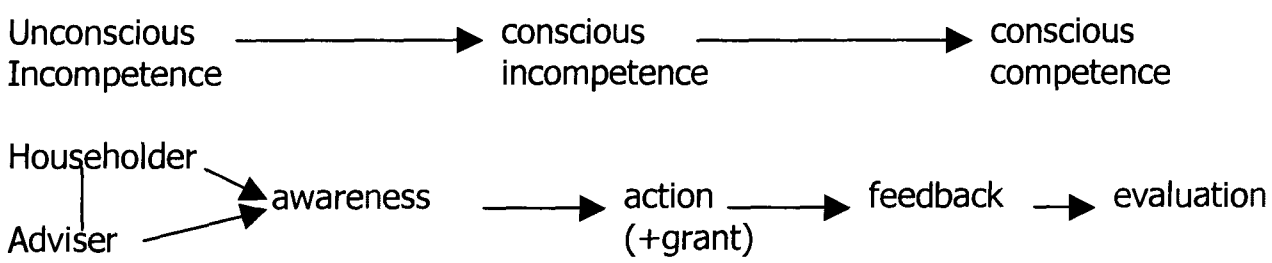


Figure 3-3: Diagram of possible stages in fuel poverty-related advice

Evaluation is not the end of the process, of course. A more accurate representation would continue the model onwards and show how evaluation can feed into the tacit

[11] There is no reason to doubt that these principles would also govern the best approach to the fuel-rich, but they are assumed to be able to do more themselves to improve their energy efficiency, in terms of increasing their knowledge and having the money to invest.

knowledge of advisers and the way in which they give advice subsequently. It would also show how feedback informs the householder and leads to a new level of awareness: something like the process shown in Figure 3-4. This leaves out the notions of incompetence or competence, concentrating solely on what may happen during the progression from one state to another.

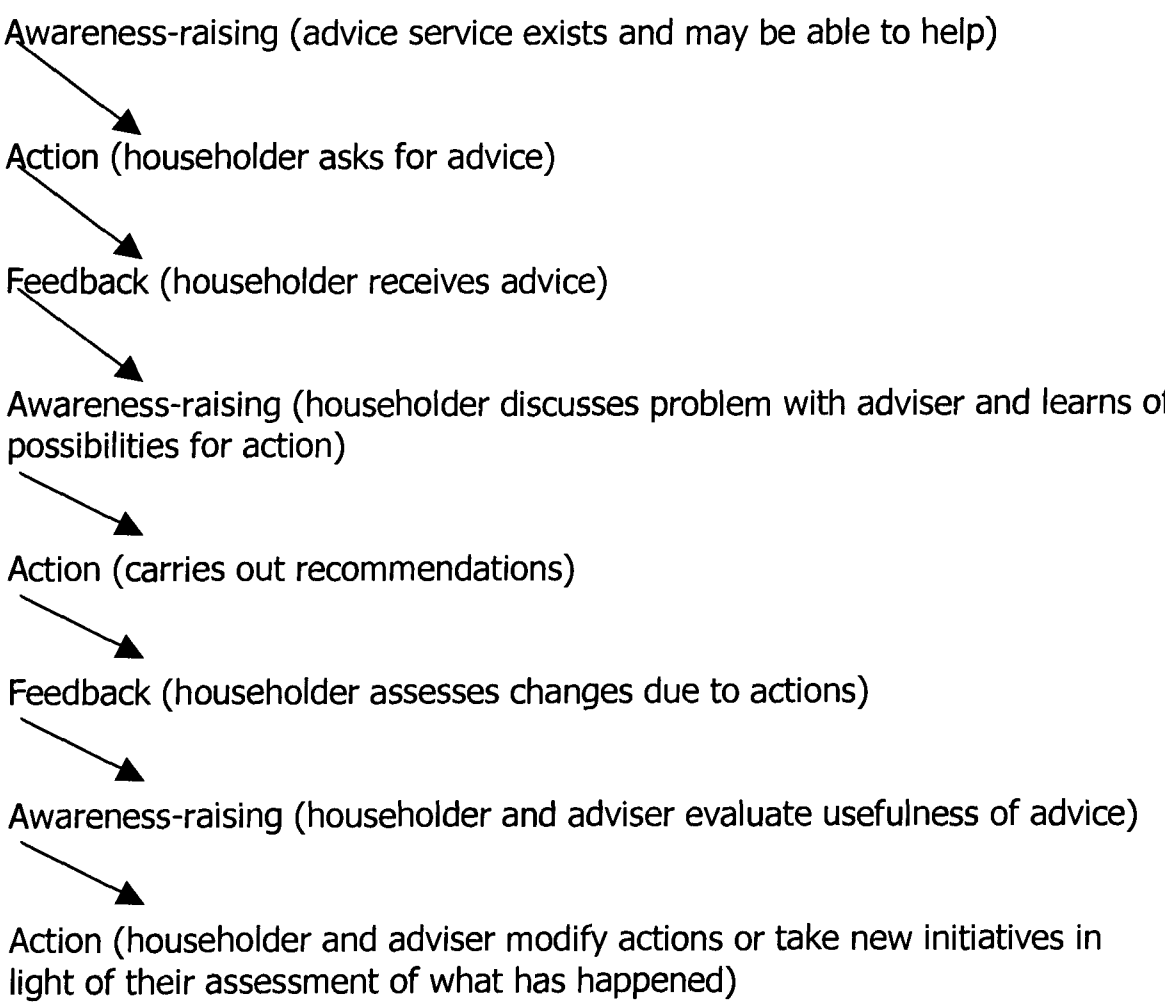


Figure 3-4: Variant of the conscious competence model used in giving personal advice

3.6.2 Carbon-focussed advice programmes

From the point of view of policy makers, all domestic energy advice is carbon-focussed to some extent, because of their awareness of international pressures to reduce emissions. The term is used here where carbon reduction is seen as the *principal*

concern of the advice provider, rather than poverty alleviation. Fuel rich householders are more likely than the fuel poor to have the financial resources to improve their energy efficiency, by definition. An adviser or auditor is therefore likely to encourage them to invest their own money and find their own solutions from what is on offer, rather than to make arrangements on their behalf (Bob Jackson, Thames Valley EEAC, pers. comm.). Also, carbon-related advice programmes may have more scope to encourage adoption of renewables than poverty-related programmes, because they can interest people in investing their own money in them. This is a new area of expertise but also an opportunity to reach out to people who are more interested in new technology than in modifying existing systems.

The main providers of this type of advice in the UK are the EEACs and the fuel suppliers. Although they are also major suppliers of advice to the fuel-poor, they often lack the time, expertise and ability to provide home visits or face-to-face consultations that are necessary. Their mode of operation is based on the premise that accurate knowledge from a trusted source assists the householder to adopt more energy-efficiency technology and to take energy-saving actions (although it does not guarantee either); while lack of knowledge is a significant barrier standing in the way of useful action (Gaskell et al., 1982; Nielsen, 1993; St George, 1991; Schultz, 2002). A typical carbon-focussed advice programme is based on the system shown in Figure 3-5.

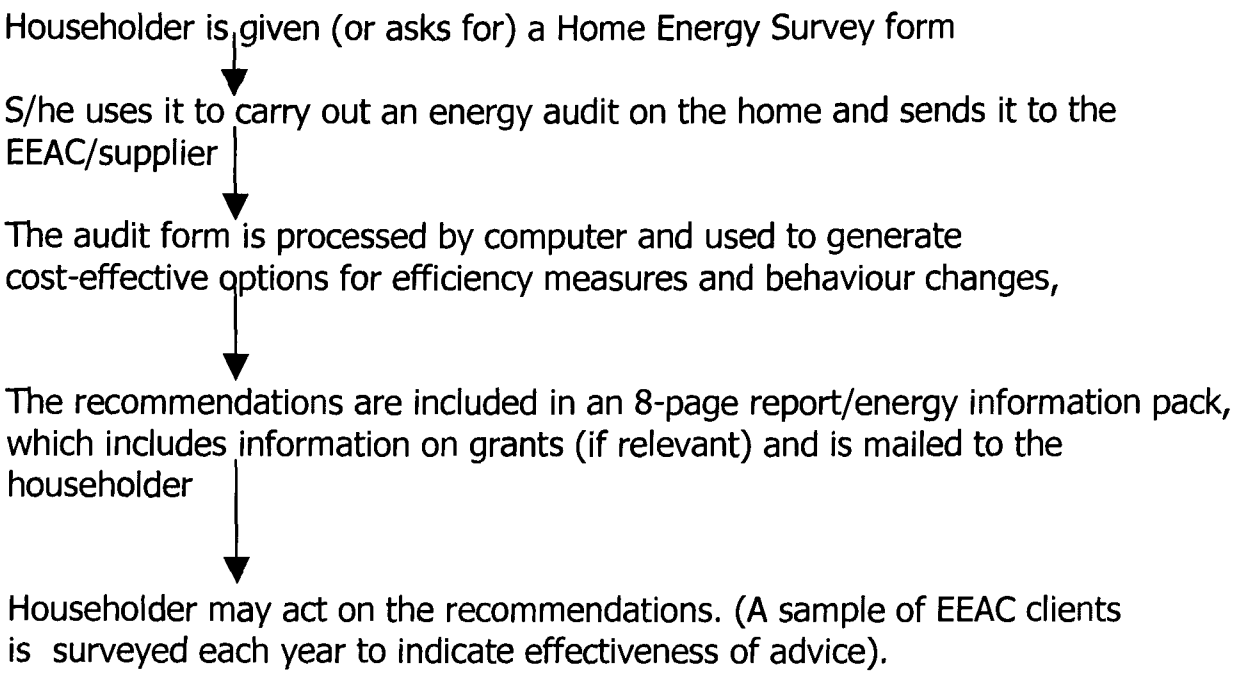


Figure 3-5: The most common UK advice process, as carried out by an EEAC or fuel supplier

This paper- and computer-based process relies on the householder to be literate and to have enough knowledge from other sources to be capable of interpreting and acting on the advice. It may be accompanied by a phone call or face-to-face interview at an advice centre, but in around 70% of cases it is not: the householders are on their own with their advice and must make the best sense of it that they can (Boardman and Darby, op. cit.; NFO BJM 2002). In terms of the conscious competence model, the process concentrates mostly on raising initial awareness by publicising the service and then involving householders in the audit (an action). The information gained from the audit is used to give information to the householder on the state of the property (feedback) and formulaic[12] advice on how to improve it. It is then up to the householder to interpret the advice and act as s/he sees fit; it is possible to consult the advice centre or fuel supplier a second time, though this is not the norm. This scheme is shown in

[12] This is most suitable for homes of standard design. If the building is pre-1950, or if there is more than one extension, the computer may come up with 'solutions' that do not make sense (Lisa du Lieu, Kirklees EEAC, pers. comm.)

Figure 3-6 which, as in Figure 3-4, shows awareness being increased as a consequence of action and feedback. It appears as though this type of advice can start a process of learning that continues over an indefinite period, in the right circumstances and with a suitably motivated householder.

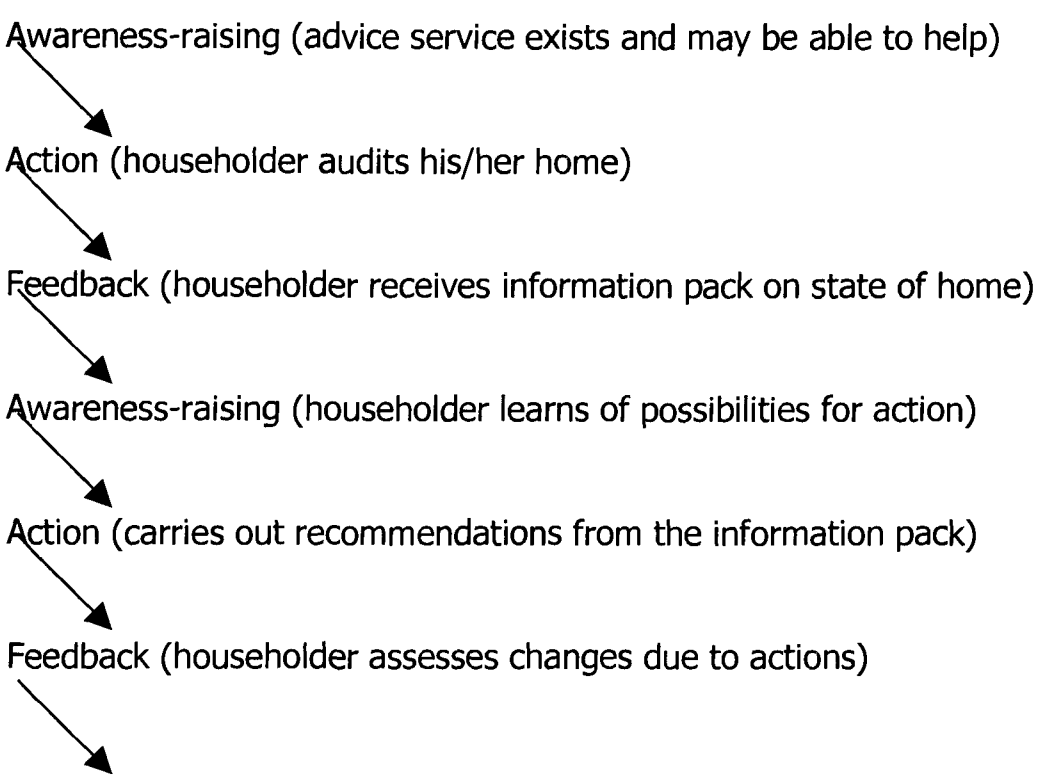


Figure 3-6: Variant of the conscious competence model used in giving formulaic advice

This standardised system can look promising, but it is far from having universal application. 29% of all EEAC clients in 2001 did not remember their contact with an EEAC when surveyed six months to a year later, while 60% could not recall receiving an information pack (NFO BJM 2002). It could be that the pack never reached them, or was thrown away unopened, or rejected on account of length, complexity, mistakes or perceived irrelevance: there is no evidence on this. The aim of the programme to date has been to maximise overall savings by reaching as many households as possible, not to maximise the savings per household by supplementing the written advice as needed.

3.6.3 Evaluation of advice

The earliest energy advice programmes in the UK grew up as dispersed local initiatives and the earliest evaluations were carried out during the late 1980s. As the first programmes were almost all locally funded to relieve fuel poverty, there was no pressure to systematise the evaluations – they simply needed to demonstrate an improvement in conditions. Those evaluations that survive showed benefits in terms of comfort and fuel savings from advice given in the home to low-income householders (Sluce and Tong, 1987; EEO, 1988). Later evaluations mostly supported these findings[13] while adding comments on likely criteria for success, such as building on the learning opportunities offered by installation of a new heating system (Joyce and Kosmina, 1996) and developing community outreach (Morrison, 1994).

The only serious criticism of the concept of in-home energy advice came from a study carried out on three York housing estates. The only advice evaluation in the UK to be set up for research purposes and conducted with control groups, it was also the only one to conclude that face-to-face advice had been unproductive:

> *For low-income households in inefficient homes, unsolicited energy advice aimed at changing behaviour is no substitute for cost-effective improvement to the building fabric.*
>
> (Walker and Oseland, 1998)

The key words in this conclusion are 'inefficient' and 'unsolicited'. They point to the importance of assessing the relative value of physical and behavioural changes within a given household, along with the futility of unwanted or imposed advice. This evaluation suffered from a number of serious limitations: control groups were unintentionally given

advice from other sources during the course of the study; face-to-face advice given to the intervention group was formulaic and low-quality, without trying to establish what the householder knew; the printed information was hard to understand and often misleading; and the advice was given purely for research purposes and not as part of an ongoing programme (Darby, 1999). It was a classic instance of rigid adherence to a research protocol altering the nature of what was being researched. This study did however disturb the consensus that advice was normally beneficial, and it opened up the debate on priorities.

The two reviews of the effectiveness of advice programmes in the UK conclude that energy advice programmes of various types can be effective in reducing consumption and/or increasing comfort, and give indicators as to how this is achieved: personal contact, home visits, 'opportunistic' advice linked to installation of measures, allowing the client to define the problem and giving clear written back-up information (Green et al., 1998; Boardman and Darby, 2000).

In aggregate, measured fuel savings from behavioural change alone, following in-home advice, can average 11% over several hundred clients (WLEAP, 1994-97); while paper- and phone-based advice gives estimated savings of 4-5% (NFO BJM, 2002; Downs, 2002). Green et al. estimated that both client-led and opportunistic advice yield fuel savings of approximately 10% (op. cit.), although there are likely to be differences in take-up. None of these aggregate figures, though, gives a realistic picture of the range of possible outcomes: from the people who do not apparently respond to advice at all to

[13] There is likely to be a bias towards favourable conclusions in surviving evaluations.

those who make radical changes and achieve savings of as much as 50% or more of their fuel bills while improving their comfort (WLEAP, 1997).

The Energy Saving Trust (EST) evaluates the EEAC programme using market research techniques (e.g. New Perspectives/BMRB, 1996a; NEMS, 2000; NFO BJM, 2002). Householder respondents who have received EEAC advice, plus controls who have not, are asked to report on measures installed or planned and any changes in behaviour, and savings are estimated on the basis of these figures. Respondents are also asked about the mode of advice they received and about how useful they think the advice was. Not surprisingly, client-led advice is more likely to be responded to than other types, because of the stated interest and motivation of the householder. A recent survey gave figures of 63% of householders responding to opportunistic advice by installing measures, whereas 78% of those receiving client-led advice did so (New Perspectives/BMRB, 2002). EEAC clients who had spoken to a member of staff as well as going through the paper-based process rate the advice most highly, and are more likely to have acted upon it than those who only had personal contact or who only had paper-based advice (NFO BJM, op. cit.; New Perspectives/BMRB, 2002). In constructivist terms, personal contact allows the adviser to identify what the client knows and where s/he needs help (the zone of proximal development); while the printed information acts as a point of reference that supports and supplements what is learned during any dialogue with an adviser. The most important point is that the householder is exposed to two successive sources of information, one of which s/he is able to interact with. Whatever s/he knows at the outset, from formal or informal sources, there is an opportunity to build on that and an opportunity for some sort of dialogue.

There is little evidence available on how people learn from advice and what they learn, but there are pointers. The value of dialogue with an adviser seems established, for many if not all householders. So is the value of advice or information from more than one source, producing a cumulative effect; or advice that may be unsolicited but is linked to some new development in the householder's circumstances (opportunistic advice). Opportunistic advice is generally unsolicited, but is given meaning by being attached to life events: installation of heating systems, for example, or a move to a new home. Advice can be seen as consisting of complementary contributions from the adviser, able to provide information from his/her body of knowledge, and the householder, able to contribute information about consumption but also about the context for the advice and what the aim should be. This is an ideal, not always realised.

Learning theory offers a way of integrating 'direct advice' with a broader educational approach by recognising and developing both explicit and tacit knowledge. Householders' and advisers' experiences of advice will give some idea of what is possible and also of common factors in their learning, and analysis of these experiences can point to necessary minimum conditions for energy literacy.

3.7 Summary and research questions

Research into behavioural aspects of domestic energy demand has developed in scale and nature over the past 35 years. In the early years a basic physical-technical-economic model was linked to a problem-solving, barrier-demolishing approach to demand management. This is evolving into a paradigm that takes into account preferences and behaviour, treating householders as active social beings with multiple

interests, sources of knowledge and perspectives rather than one-dimensional agents of policy. However, the dominant paradigm in the literature as it relates to change and learning has been behaviourist, stressing environmental influences on behaviour rather than individual thought-processes.

In spite of the recent introduction of a more cultural perspective to research, the categories used by energy researchers do not often overlap with those used by learning theorists. There has been no smooth transition from the previous chapter, because the terminology has changed somewhat. This chapter and the preceding one have reviewed work carried out in two paradigms, whose essentials are summarised in Figure 3-7.

From the behaviourist approach...	***...to the constructivist***
Behaviour stems from environment	Behaviour stems from environment + individual thought – a dialogue
Reality is 'out there', awaiting discovery	A working model of reality is constructed 'in here'
Interpersonal/structural relationships are marginal	Interpersonal/structural relationships are significant
Focus on inputs and outcomes: what happens in between is 'black boxed'	Focus on processes
Recognise cognitive aspects of learning only	Recognise cognitive and affective aspects
Approach a task by working backwards from the defined, wished-for outcome	Approach a task by working forwards from the resources, knowledge and abilities available

Figure 3-7: Movement from a behaviourist to a constructivist paradigm

There is a challenge in linking the contributions of research into energy-related behaviour and those of learning theorists, and investigation of experience offers a

promising line of enquiry. From the literature on antecedent and consequent strategies for demand reduction, it is possible to derive pointers to what is significant in achieving energy conservation or efficiency: clear, specific and accessible information; feedback; affective motivation; and some interactive means of communicating messages about energy. But none of these operate in a vacuum and we know very little about the significance of informal learning or the synergies between formal and informal sources of information. This significance is linked to the construction of meaning by the learner, another shadowy area. Hence the need to discover more about householders' experience of energy and of how they interpret the information that comes their way, as well as whether and how they act upon it.

Research into demand management strategies shows that antecedent and consequent methods may contribute to change in energy-using behaviour, but are rarely sufficient in themselves. Other factors are also needed – especially to bring about the energy literacy needed to make durable changes – but it is not clear what these factors might be. For the time being, they are subsumed under the heading of awareness. Energy advice offers a useful means of exploring the issue of how awareness is developed and the processes involved in different types of advice can be mapped approximately by using terms from the modified 'conscious competence' model. In theoretical terms, advice combines elements of demand reduction strategies discussed in this chapter: antecedent interventions with specific information and the possibility of dialogue, sometimes accompanied by the provision of feedback to the adviser and/or the use of feedback by the householder. Evaluation of advice programmes indicates that the range of outcomes is wide, but as yet there is little explanation for this. Advice theory needs developing and

learning theory surely has something to offer. The remainder of this study considers relationships between factors in learning, as seen from the inside and outside of the household. In particular, it addresses these questions:

1. What do people's understandings of themselves as energy-conscious or energy-aware mean, in terms of what they know, what they do day by day, how they invest and what they plan?
2. What is the significance of informal learning as part of the process of learning about energy?
3. What infrastructural or social factors promote or impede learning?
4. Is there an identifiable sequence of processes in learning about energy? In particular, does the awareness-action-feedback model set out in Chapter 2 hold good?

These are addressed in the chapters that follow and discussed in Chapter 8.

4 METHODOLOGY

In order to test whether there is an identifiable sequence of learning processes in the achievement of energy awareness, questioning from a number of angles is needed. There is also a need for *open* questioning as to how people learn, in order to see what concepts and sequences appear spontaneously. In this chapter, the chosen methods are set out and discussed in general terms. Details of the survey and interview methodology are given in Appendices 2, 3, 5 and 6.

4.1 Choice of scale

In terms of scale, the aim is to look at the micro- and meso-levels of energy usage and conservation: households and advice/audit programmes. The household was chosen as the basic unit of analysis for the micro-scale, with one person normally answering on behalf of the household. This does run the risk of giving an inadequate picture of the range of views and behaviour within the household, and of the nuances of interactions between household members (Palmborg, 1986; Lutzenhiser, 1993). However, it was assumed that the person most involved in energy decisions would answer the questionnaires and give the interview in most instances and would give the most appropriate information, and this assumption was largely justified by the information supplied in the interviews. It was possible to discuss the ways in which energy-related choices were negotiated and decided according to the preferences of different members of the household.

The household respondents interviewed and surveyed came from a variety of backgrounds. They were:

- villagers from Launton in north Oxfordshire
- Council tenants (or former tenants) in West Lothian
- mortgage-holders with Woolwich plc from around the UK.

Advice providers represent an institutional meso-level, which has analytical value as a bridge between the individual and the societal framework within which individuals operate (see Sheldrick and Macgill, 1988, for a discussion of this). A range of providers was interviewed in order to establish areas of agreement and debate. They were based in:

- Calderdale District Council (West Yorkshire)
- Oxford City Council
- West Lothian District Council
- Kirklees Energy Efficiency Advice Centre (West Yorkshire)
- Thames Valley Energy Efficiency Advice Centre

The reasons for selecting these respondents are given below in $4.4. The interviewing style and the structure of the interviews allowed for analysis of householder and adviser responses independently of each other, as well as identification of the points at which they show common features.

National policymaking and evaluation are commented on in Chapters 1, 2 and 3 and discussed in Chapter 8. In the chapters dealing with empirical findings, they are only considered to the extent that respondents mention them.

4.2 Choice of approach

The choice of approach stems from the premise that people's understandings of energy use are a valid subject for enquiry, as valid as their behaviour (Williams, 1983). This immediately implies that a positivist approach alone is not enough to achieve the aims of the research: instead, the uncertain business of constructing meaning out of accounts (interpretations) of experience has to be attempted as openly as possible (Denzin, 1994). This pluralist approach, using 'hard'/objective and 'soft'/subjective data, is intended to give reliability and validity to the analysis (Gaskell and Pike, 1983).

In exploring the processes by which householders in the UK learn about their energy use, it was necessary to enquire at different levels of objectivity, ranging from a simple count of the numbers of low-energy lightbulbs installed in a home to a probing of householders' understanding of the term 'energy-conscious'[1]. There is no well-defined methodology for carrying out such an enquiry, though - it is not for nothing that interpretative geographers have been described as 'methodological eclectics' (Eyles, 1988). Even when a method has been selected, many decisions have to be made about implementation, as Piaget recognised when carrying out his interviews with young children: 'It is so hard to find the middle course between systematisation due to preconceived ideas and incoherence due to the absence of any directing hypothesis!' (Piaget 1929: 9). The task was to choose locations, respondents and methods at each stage that fitted as well as possible with the aims of the research, recognising their interdependence; and to be willing to re-structure the research, as themes developed from the early enquiries.

---

[1] This term was used with the Launton householders because their village had won a competition for an 'energy-conscious village'. It was thought best to stay with this term rather than to use 'energy-aware', and it was judged that the two terms were similar enough to be interchangeable.

In order to guard against the biases that creep in when some of the evidence relies on fallible recollections and perceptions, checks were built in whenever possible (Clark, 1998). Data sources were 'triangulated', using material from different sources and relating them to each other in order to 'counteract the threats to validity identified in each' (Fielding and Fielding, 1986: 31). Thus interviews with the West Lothian householders could be checked against case notes[2] and against the reports of the advice programme; Launton residents' perceptions of their energy-consciousness could be compared with their accounts of what measures they had installed in their homes; and the transcripts from interviews with advisers could be compared with what was observed and with literature from the various advice programmes.

Semi-structured interviews of householders and advisers were intended to give cohesion to the enquiry while allowing respondents to express themselves in their own terms (Foddy, 1993; Mason, 1996). This self-expression was extremely valuable, yielding much information and interpretation that would never have emerged from responses to 'closed' questions. It also gave an indication of how well respondents understood the terms of the discussion.

The householder interviews were complemented by interviews with experienced advisers. The data were 'open coded' to identify any new concepts that could be incorporated into the analysis (Strauss and Corbin, 1990; Foster, 1996). Finally, the terms of the initial 'conscious competence' model were evaluated in the light of the concepts that had emerged in interviews and through use of the survey data.

---

[2] Used in confidence.

Some well-used lines of questioning were rejected, partly because it was felt that they had served their turn. The persistent findings of weak links between attitudes and behaviour were one reason for not asking questions relating to general environmental attitudes (Taylor, 1997; Peters et al., 1998). Similarly, questions on environmentally-related routine behaviour were minimised because of the tendency for respondents to answer questions in ways that showed their wish to comply with perceived norms (Hackett and Lutzenhiser, 1991; Morris and Schagen, 1995).

The work on understandings and actions was intended to produce an account of the meanings of 'what is' and 'what could be' in advice programmes (Fielding and Fielding, 1996; Schofield, op. cit.). Energy statistics and data on provision of advice and audit services, along with interviews with those involved in monitoring and evaluation, allow for an exploration of the structural aspects of energy conservation and alleviation of fuel poverty.

4.3 Sequencing of research

Some work carried out previous to this doctoral study is relevant, in that it began to establish the aims, dimensions and working methods of various advice programmes that might be suitable for study. Much of this is contained in two publications on energy advice to disadvantaged households (Green et al., 1998; appendices 1 and 2 of Boardman and Darby, 2000).

In the early stages of this study, in addition to the collection of written material on audits and advice programmes, there were discussions with two senior staff members of Woolwich plc, Chris Reynolds and Ian Cook, on the setting up of an enquiry into the usefulness of the Home Energy Reports prepared for Woolwich mortgage-holders by

Ekins Surveyors. Advisers in West Lothian, Calderdale, Kirklees, Oxford and Thames Valley were interviewed about the nature of their work.

Several points emerged from this work that are salient for what followed. They include the stress placed on awareness-raising activities by advisers, particularly those from the EEACs; the extent to which advisers gained job satisfaction from their sense that the householder had benefited from the advice, and the wish for more resources to follow up advice adequately and check on the outcomes; personal contact as a way of contributing to effectiveness; the view that information (general) could be substituted for advice (specific) for some householders in some instances; and the argument that householders could apply knowledge gained in one aspect of their lives to other aspects. These points were noted and incorporated into the framing of questions for the next phase of the research.

In preparation for the Launton householder surveys and interviews, there was an interview with the Village Organiser of the Launton entries that earned the village the title of 'Oxfordshire Energy Conscious Village of the Year' in 1995 and 1996. The Woolwich and Launton surveys were developed and piloted at roughly the same time, and responses to the pilot versions of the questionnaire were used to adjust the content and ordering of the final questions for both surveys. Two-thirds of the questions in both surveys are identical or closely comparable, while the remainder takes into account particular circumstances for each set of respondents.

The main body of material, described below, was collected over a period of 16 months from the initial interviews in West Lothian in November 2000 to the final interviews in Launton in March 2002.

Figure 4-1 shows the sequence in which topics were examined and the way in which they fed into each other.

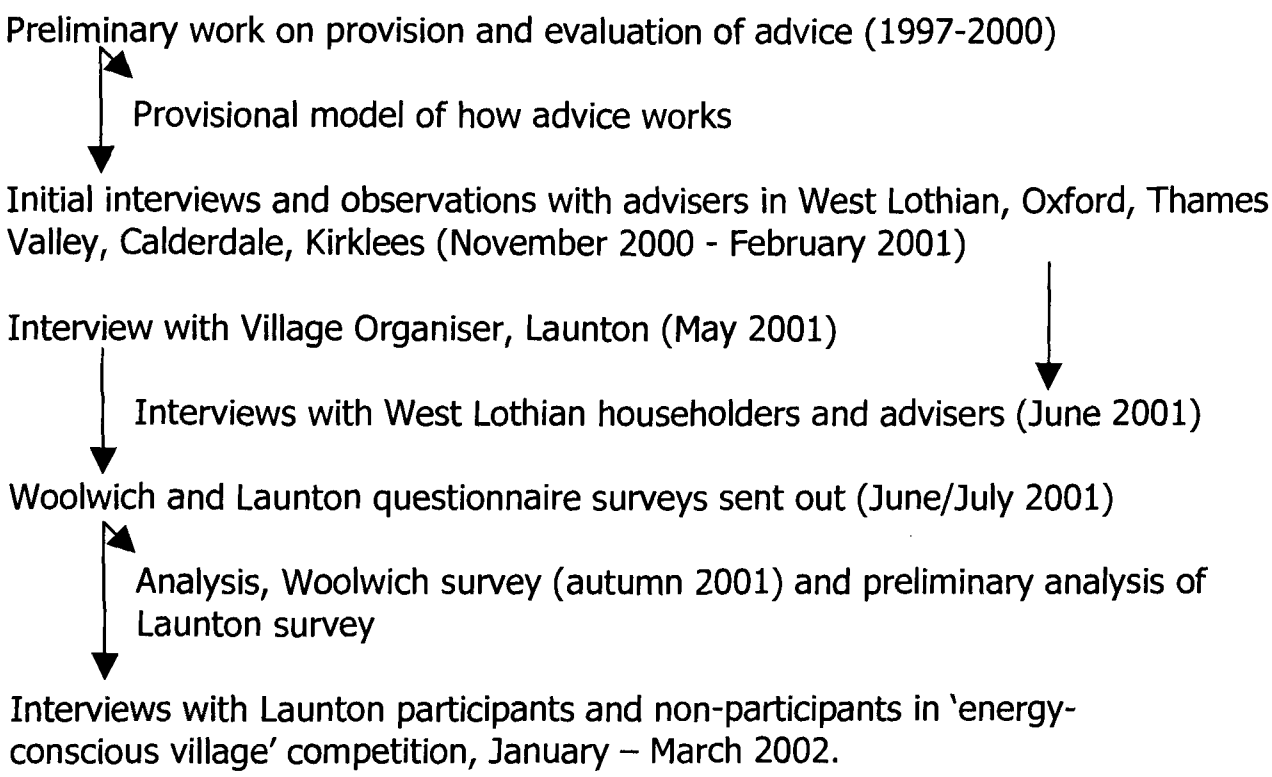


Figure 4-1: Sequence of research activities

4.4 Sampling

As with most primarily qualitative research, the aim was to reflect diversity among householders and types of advice programme rather than to be fully representative (Barbour, 2001). The main approach was that of theoretical sampling:

> *In place of the random sampling of statistical research, this involves gaining selective access to appropriate groups of people ... involved in living through the research problem and encouraging them to teach the researcher about it from their various perspectives ... it is not the sheer number, 'typicality' or 'representativeness' of people approached which matters, but the quality and positionality of the information that they can offer.'*
>
> (Cook and Crang, 1995: 11)

Table 4-1 shows characteristics of the advice programmes selected for study.

Table 4-1: Characteristics of energy advice and audit programmes sampled

Process	Calder-dale	Kirklees EEAC	Launton	Oxford	Thames Valley EEAC	West Lothian	Woolwich
Awareness-raising	y	y	y	y	y	y	
Advice type	Inter-active	Formulaic/ interactive	Formulaic	Inter-active	Formulaic	Inter-active	Formulaic,
Advice on measures	y	y	y	y	y	y	y
Advice on behaviour	y	Some	Some	y	Some	y	
Home visits	y	y		y		y	
Audit by surveyor	(HEES)			(HEES)		(HEES)	y
Self-audit		y	y		y		
Follow-up		Some	Some	Some	Some	y	
Use of feedback						y	
Evaluation	HECA	EST	OXEAC, EST	HECA	EST	WLCES/ HECA	Appx 4 of this study

Note: HEES = Home Energy Efficiency Scheme
HECA = Home Energy Conservation Act
EST = Energy Saving Trust
OXEAC = Oxfordshire Energy Advice Centre, now Thames Valley Energy Efficiency Advice Centre
WLCES – West Lothian Council Energy Services

The programmes in Calderdale, Kirklees, Oxford, and West Lothian dealt mostly with low-income households and fuel poverty issues, and all gave home visits as part of their service (Kirklees was unusual among EEACs in this respect). The West Lothian advice project was chosen as an example of what was believed to be exceptionally effective advice work and illustrative of best practice: 'what could be' (Schofield, 1993). The primary focus of the programme was on alleviating fuel poverty in the district and the research aim was to examine it from the perspectives of both householders and advisers. The West Lothian interview protocols are given in Appendix 5. The main interest lies in the usefulness of feedback as a part of the advice process, but there are also questions relating to awareness-raising: the householder's knowledge and perceptions prior to advice, and why s/he contacted the advice programme.

The West Lothian interviews are supplemented with material from other fuel-poverty-focused advice programmes. An experienced home energy adviser in Oxford gave an individual account of his intensive approach, while the interviews with an energy conservation officer and a home adviser in Calderdale illustrated the place of advice in a programme that filled gaps in the statutory provision of energy efficiency measures to the elderly and chronically ill or disabled. Like the West Lothian programme, it had won a national award and peer recognition for the quality of its work.

The Calderdale, Oxford and West Lothian programmes were selected because of the reputations of their advisers' careful, detailed home visits. Kirklees EEAC was a promising subject of study as a comparator, on two counts. First, the 'territory' and projects overlapped with those of Calderdale, but the Kirklees advice service operated in a different manner. Second, it belonged to the same network as the Thames Valley EEAC but was situated in an area with contrasting social and economic conditions. The Thames Valley EEAC advised more affluent householders than Kirklees, most of them owner-occupiers; its advisers did not provide home visits. It had evolved from the Oxfordshire EEAC, which had been responsible for organising the 'energy conscious village' competition that was won by Launton in 1995 and 1996.

For the Launton research, interviewees were selected on the basis of their responses to the 'energy conscious village competition', as given on their survey forms, while for West Lothian they were selected because they had experienced detailed in-home advice with follow-up. Details are given in Appendices 2, 3 and 5.

The home energy audits carried out by Woolwich plc represent one of the largest such initiatives to date and could well be the precursors of a mandatory national system of

energy audits provided with each mortgage survey. They also operate in an 'opportunistic' way, contacting householders at a point in their lives when they are thinking about design, refurbishment and equipment for their new homes (Green et al., 1998). The audits were unsolicited – undertaken as a routine part of the mortgage survey – and recommendations for home improvement were limited in number. The advice therefore concerned only the fabric of the building and the householder's appliances; it did not deal with behavioural change. The Woolwich mortgage holders were buying homes valued from less than £30,000 to over £250,000 across the UK; interviewees were selected from among them to cover a spread of experiences as judged from the survey information.

The advice sent to Launton villagers by the Oxfordshire EEAC was comparable to that in the Woolwich energy report, in that it was based on a survey and processed by computer. However, in Launton there was the possibility that it would have had a different effect because it would have come to a more 'prepared' household: the advice was solicited in that it was a response to the Home Energy Survey completed and sent to the EEAC by the householder. There was a strong social component to the competition, with villagers attending a workshop, community leaders and other villagers visiting their neighbours to encourage them to join in and, in the second year, the publicity and motivation that came from having won the competition in the first year. There was also no upper limit on the recommendations for change given in the EEAC written advice – they could run to a dozen or more – and the advice covered behaviour as well as physical measures.

The questionnaire survey of 460 Launton households yielded 232 usable responses. These were supplemented by interviews with ten participants and three non-

participants in the competition, along with six relative newcomers who had not lived in Launton at the time of the competition. The interviews fill out some of the survey data and are used to illustrate specific points, particularly in terms of householder satisfaction with their homes, aspirations, energy awareness and monitoring of fuel consumption data from meters and bills.

While the Woolwich plc clients might have been given leaflets, discussed energy issues, filled in a Home Energy Survey or been advised prior to receiving their audit, there was no way of knowing at the outset. With the Woolwich programme of energy audits, there had been no systematic attempt to raise awareness before the audit reports arrived, as had been the case in Launton. The Woolwich survey therefore could have provided material for comparison with the Launton survey. Because of the low response rate[3] to the Woolwich survey, though, it was not possible to draw any conclusions on this point. Instead, the material was used to complement the Launton survey when appropriate. The Woolwich findings are presented in full in Appendix 4 and referred to in Chapter 5.

Broadly speaking, the material from West Lothian, Calderdale, Kirklees and Oxford had been intended to provide data on action and feedback, and that from Launton and the Woolwich mortgage-holders to give information on awareness-raising and action. In practice, though, all the data sources yielded some data that related to learning through advice as a process involving awareness, action and feedback: differences between the sources are differences of emphasis only.

---

[3] Only 66 out of 2,000 forms were returned in usable form. This was partly an indication of the low level of interest in the subject and partly due to poor photocopying and collation of many of the forms by the Woolwich. A comparable survey of Woolwich mortgage-holders, carried out at the time when the respondents received their audit (i.e., when the subject was fresher in their minds), achieved a response of 256 from a sample of 2,000 (Rosie Parnell, pers comm).

4.5 Choice of questions

The questions asked for this study were designed to elicit as much information as possible on the issues set out in the introduction and, in particular, on the research questions given at the close of Chapter 3. Some choices of question were straightforward enough, others more problematic. For example, it was decided not to question the West Lothian householders about 'the environment', because it was known that almost all of them had asked for help on the basis of difficulties in achieving affordable warmth (WLCES annual reports; George Trist, pers comm.). In the event it became clear from the West Lothian interviews, case files and observations of advice visits that almost all of the householders had asked for advice because they were facing a crisis. Asking about their views on 'the environment' would most likely have seemed irrelevant, baffling or even insulting (see Macgnachten and Jacobs, 1997). Perceptions of the environment were however discussed in the face-to-face interviews with the Launton householders, while recognising the loaded and contested nature of the subject. People are conscious of the social acceptability of being environmentally aware and are likely to present themselves in those terms (Weber, 1999). For that reason, information on energy-consciousness and 'environmental' action was compared with the more objective data from the questionnaire survey – for example, did respondents who *thought* they were strongly energy-conscious live in homes with a large array of energy efficiency measures and/or low energy costs?

4.5.1 Exploring householders' learning processes

In exploring householders' learning, both formal (advice programme) and informal sources were considered. Thus the surveys asked respondents whether they had ever asked for energy advice, whether they had been given it from any of a range of

sources, and what the advice had been. Where the respondents had had home energy reports (whether based on self-audits or on the work of a surveyor) they were asked how much use they had been and to what extent they had been acted upon. The data on personal characteristics and housing gave some indication as to whether particular categories of homeowners used the audits. Survey respondents were asked about their investments in energy efficiency rather than changes in their energy-using behaviour, because self-reported changes in behaviour are notoriously unreliable (Kantola et al., 1984; Mullaly, 1998). Any comments on day-to-day behavioural change were noted, though.

The interviews included questions as to why householders had sought advice, what the advice had been, how much use it had been, what had changed as a result – including their thinking – and whether they had passed on energy advice to anyone else, or recommended it to their friends and neighbours. Respondents were encouraged to go into detail about any of these topics. They were also asked to reflect on what had first encouraged them to think about energy and what encounters and activities had had an impact on their thinking.

The West Lothian and Launton householders were asked to tell something of their 'energy histories' as indicators of their (tacit) knowledge and experiences prior to contact with an advice programme. Finally, the Launton interviewees were each asked how they would go about cutting their carbon emissions by 60%, if obliged to do so. This question was added to find out what the interviewees saw as their options: for example, did they see carbon saving primarily as a matter of frugal behaviour, better equipment, a change in fuel mix or a change in lifestyle? The information shed some useful light on other findings.

The interviews with advisers included questions on the processes of advice and structural issues that might affect them: for example, the installation of measures under the Home Energy Efficiency Scheme and the type and quality of advice from the installer that might accompany it, as compared with that available from other sources. The influence of the means of communication – telephone, face-to-face conversation and paper – was also discussed with advisers.

4.5.2 Exploring sequence in the 'conscious competence' model

The model was explored in terms of peoples' lived experience of awareness, action and feedback. (An initial testing had taken place when the model was presented to over a hundred energy advisers and energy conservation officers[4] and the general reception was favourable – that is, the advisers saw the model as a useful way of thinking about their work. This suggested that there were valid elements to the model, but still left many questions unanswered.) The empirical research then attempted to ask direct questions about the model, or about aspects of it. For example, the Launton survey asked respondents specifically whether they thought of themselves as 'energy-conscious', followed up by interview questions about what they understood by this term. Both surveys contained a series of questions on the extent to which respondents had asked for, and used, sources of advice and information; the number and type of alterations they had made to their homes and their plans for further alterations; and the extent to which they monitored their consumption by reading the meter, having a prepayment meter or checking and keeping their fuel bills. Energy advisers were shown the model and asked to comment on it from their experience.

[4] During 2001, at a meeting of the Energy Advice Providers' Group of the Energy Efficiency Partnership for Homes and later at the HECA National Forum and the Neighbourhood Energy Action National Conference.

Some of the research was more indirect and open in nature, to find out more about the factors involved in learning and to what extent they corresponded to processes in the 'conscious competence' model. This indirect approach involved asking interviewees about their 'energy histories', about how they had come to seek out advice and what had happened as a consequence. The emphasis was on encouraging the respondent to describe what had happened in his/her own terms.

4.6 Analysis

The inquiry did not start out with a full set of tightly defined categories for coding and analysis. Some, such as age, tenure and numbers in the household, were relatively straightforward. Others, such as whether and how often a householder practised Do-It-Yourself (DIY), would only indicate whether the category appeared to be significant and merited further investigation. Still others (such as the simplified use of heating controls) were only discovered in the course of interviews.

Because of the openness of many questions, a variant of grounded theory was used although the full coding procedure was not followed as set out in Strauss and Corbin (1990). Instead, the intention behind grounded theory – that of allowing the interview data to speak and contribute to the formation of concepts for analysis – was put into practice in a way that could be combined with the more quantitative evidence from surveys and other sources. Not all of the concepts used in analysis, though, were generated by the respondents. As a recent evaluation of qualitative research methods points out, this is rarely the case (Barbour, 2001). The research may have been exploratory but it still relied on guidance by concepts from the literature on energy conservation behaviour and on learning.

For the surveys, coding was indicated on the questionnaire forms, as shown in Appendices 2 and 3. There were relatively few responses to the more open survey questions (e.g., suggestions for improvement of Home Energy Reports) and these were easily dealt with in terms of coding.

According to grounded theory principles, the criterion for deciding that enough data have been collected is theoretical saturation – the point beyond which no new categories have been created or seem likely to be created (Strauss and Corbin, 1998: 136). This can be a daunting requirement, and it is near-impossible to judge whether it has been fully met. Interviewing continued until enough material was available to come close to this ideal, based on the views of people representing the main categories of interest among advisers and householders. The analysis took place during a period of over a year, during which time some of the provisional findings could be fed into the last stages of data-gathering. The Launton householder interviews – the last to be carried out – were most influenced by earlier work.

4.6.1 Use of terms: awareness, action, feedback and effectiveness

Awareness of energy is difficult to assess, describe or analyse but this study attempted all of these because of the perceived importance of the concept. Thus, householders from a village that had won a prize for being 'energy conscious' were asked directly what they associated with the term. More obliquely, the unsolicited responses of West Lothian householders to a range of questions were coded for references to understanding of energy. The householder responses were then compared with advisers' understandings of the operation of their advice programmes and the development of energy awareness.

Another method of assessing awareness is to ask about specific issues in order to test observation and the drawing of inferences. For example, is the householder aware of the home in terms of its physical characteristics and use of energy? Of a link between fossil fuel use and climate change? Or of the existence of energy advice and its potential to be of use? Are householders aware that their energy costs can be affected by their actions? Can they give instances of any sources of information on energy efficiency? Have they ever asked for advice? All these elements of awareness were explored.

Action was measured largely in terms of measures installed – alterations to the home – and plans for further measures. The criterion for counting an energy efficiency measure was that it should involve a separate decision to install.

Feedback was a problematic term, though less so than awareness. In practice, much feedback on domestic energy consumption comes indirectly in the form of fuel bills, or directly as meter readings and observations (the size of the woodpile, the level of oil in the tank, the degree of comfort in the home, the difference between two dwellings in terms of fuel consumption). However, feedback may also come in a more interactive form, as when an adviser checks the impact of adopting advice with a householder and there is the possibility of discussion. Respondents were asked about the extent to which they took note of meter readings and bills, and about any changes they had noticed following advice.

The effectiveness of energy advice can be measured in quantitative terms to some extent. Indicators such as fuel and money savings, debt reduction and increases in the mean temperature of the home during the winter are the main quantitative factors

employed (see Green et al, 1998), and all except the last were used in this study. But effectiveness is a term that can include more qualitative factors, such as comfort and ability to understand how to use heating systems and electrical appliances to best effect. These were also explored.

4.7 Generalising from findings

While the sampling outlined above covers a variety of types of householder, advice and evaluation, it does not provide a representative sample of the situation in the UK. To what extent is it possible to generalise from the findings and to draw conclusions applicable to the UK or further afield? An attempt was made to study a range of situations that would be sufficient to cover something of each of the categories set out by Schofield:

> *Three useful targets for generalisation are 'what is', 'what may be' and 'what could be'... 'What is' refers to studying the typical, the common and the ordinary... 'What may be' refers to designing studies so that their fit with future trends and issues is maximised... 'What could be' refers to locating situations that we know or expect to be ideal or exceptional on some a priori basis and studying them to see what is actually going on there.'*
>
> (Schofield, 1993)

The choice of recipients of home energy audits as subjects for research anticipates 'what may be' – the statutory use of Sellers' Information Packs for homebuyers. As the work of the EEACs, with their use of self-audits and paper-based advice, is still expanding, the Launton study and the EEAC adviser interviews constitute research into 'what is' and also into 'what may be'. The West Lothian, Oxford and Calderdale programmes – examples of recognised good practice – cover 'what is' and 'what could be', and the interviews with their advisers are a means of exploring viable possibilities for the future. The householder and adviser interviews were also used to flesh out some of the theory set out in Chapters 2 and 3, and to discover how applicable it is in

daily life (Herbert, 2000). The data are used throughout to point to wider generalities where this seems justified.

4.8 Summary

Working at the level of households and advice programmes, the approach adopted is broadly phenomenological, concentrating on interpretation of situations and actions through the understanding of participants but attempting to link householders' understanding of their energy use to measurable outcomes where possible. Three research methods were chosen: semi-structured interviews with advisers and householders; survey data to frame and complement some of the interview material; and use of reports and national statistics to set the empirical material in context. Sampling for interviews is theoretical, aimed at what particular individuals have to convey about their experiences, actions and interpretations. By using this combination of methods, the aim is to build insight into the construction of meaning, the role played by different types of learning and the social and structural relationships that influence advice provision and effectiveness.

Most of the data come directly from householders, not mediated through advisers or other sources. In formulating the questions, it was assumed that householders learn not only from formal sources of energy advice but through other, informal channels. The interviews with advisers complement what was learned from the householders, contributing material on how they see their work, what makes for effective advice and what structural conditions they operate under.

The difficulties in defining and measuring awareness and effectiveness were briefly discussed. There are few shortcuts to understanding these: the ambiguities have to be acknowledged in the course of questioning, categorising and analysing.

The three chapters that follow report on empirical work on the effectiveness of energy audits and advice, considered in terms of awareness, action and feedback. Chapters 5 and 6 are concerned mostly with the householder's perspective; Chapter 7 examines energy advice, and the opportunities and constraints for advice programmes, from the point of view of the adviser.

5 LAUNTON: RAISING AWARENESS IN A VILLAGE

The accounts which follow come from a community that won a competition for the 'Oxfordshire energy-conscious village of the year' in both 1995 and 1996. The research conducted there was designed to explore meanings of the term 'energy-conscious'[1], the influence of social factors on learning, and whether indicators of awareness are associated with indicators of action and feedback use in the ways suggested by the 'conscious competence' model.

The material comes from a questionnaire survey carried out during the summer of 2001 in the village of Launton, supplemented by interviews of 19 villagers who had been chosen to represent a range of levels of (self-assessed) energy awareness and views on the impact of the competition.

The Launton data are supplemented by the findings from a smaller-scale questionnaire survey of homeowners from around the UK, all customers of Woolwich plc. These had brief energy audits carried out by professional surveyors as part of their mortgage surveys and were then given a 'Home Energy Report' with recommendations as to the most cost-effective improvements in energy efficiency they could carry out in their new homes. The findings were written up into a report for Ekins Surveyors, who carried out the surveys on behalf of Woolwich plc. Appendix 2 contains the survey forms and interview protocols used for the Launton and study, and Appendix 3 for the Woolwich

[1] As explained earlier, the term energy-conscious was used in the survey and in interviews because of its relative familiarity, in preference to energy awareness. However, in this chapter both terms are used interchangeably.

study. Appendix 4 gives the full Woolwich report.

5.1 The REAP competition; an exercise in awareness-raising

The Oxfordshire Rural Energy Action Project (REAP) was co-ordinated by the Oxfordshire Energy Efficiency Advice Centre (EEAC). The aim was to raise awareness of energy efficiency in rural communities in the county by way of a competition, with a view to increasing the uptake of advice from the Centre, by 'enlisting the enthusiasm of the local people to win money for their own local community energy efficiency initiatives'. There was an ambitious set of objectives:

- *To raise awareness of energy efficiency in the home, through promoting the benefits of insulation and heating controls, as well as adopting energy saving behaviour;*
- *To promote the benefits of energy efficiency in community buildings;*
- *To promote the benefits of reduced fuel bills and increase comfort levels;*
- *To increase understanding of the environmental benefits of reduced CO_2 emissions – global warming and climate change*
- *To benefit the local economy through promoting investment in energy efficiency;*
- *To help to address the problems of fuel poverty in rural areas.*

(Final report on REAP, Oxfordshire EEAC, 1996)

Community organisations were expected to play a crucial part in disseminating information and engaging attention, so that their members would turn to the EEAC for advice. At that point the EEAC would be responsible for continuing the process:

> *It is important to realise that this campaign is about raising energy awareness. As the participants are motivated primarily to help the village, the Centres (EEACs) have to work harder to get the individual householder to be supportive of energy efficiency and improving their homes.*
>
> *This can be achieved through emphasising the points that can be scored by adopting energy saving measures and the individual householder prizes that can be won ... Through the REAP competition, Oxfordshire EEAC is encouraging communities to pull together for a common cause – benefiting their village – and in doing so is also demonstrating its commitment to Local Agenda 21 which proposes actions throughout the world to achieve sustainable development*
>
> (ibid.).

Actions were thus seen as a consequence of awareness, and awareness was a necessary first step that would have to be worked at. It seems to have been assumed that householders would not be motivated by the idea of energy efficiency for its own sake, at any rate not until after they had experienced its effects for themselves.

The competition was organised in 6 stages, as outlined by the EEAC report on REAP:

(i) Find village organiser (VO)
(ii) VO establishes a record of each house in the village and volunteers distribute Home Energy Surveys (HESs) to each. They collect completed surveys, or householders mail them to the EEAC. The EEAC provides free computer-generated energy saving information packs to all households who have sent in a completed survey to the EEAC, suggesting energy efficiency measures they could adopt, giving a Freephone number to call and supplying information on available grants and discounts.
(iii) EEAC provides an energy efficiency workshop if required.
(iv) The EEAC provides score sheets and leaflets explaining how to win points, delivered by volunteers.
(v) EEAC collates information from HESs.
(vi) Presentation of awards. The village with the highest number of points won a cash prize to spend on local community initiatives.

The central action promoted by the competition was completion of the Home Energy Survey (HES) self-audit questionnaire by the householder. The completed HES forms, sent in to the EEAC, were taken as evidence that householders had gone on to receive

energy efficiency advice based on the information in the forms. The competition score sheets then provided information on what actions the householders had taken following the advice. Examples of an EEAC Home Energy Survey, and of the Woolwich/Ekins Home Energy Report (resulting from a survey), are given in Appendix 1.

Points awarded for actions ranged from 8000 per community registered by a given date down to 50 per radiator fitted with a reflective foil backing. 200 points were given per central heating timer fitted, and 500 per house fitted with cavity wall insulation. No-one was to be deterred from taking part because of lack of money: householders could also earn points for the village by changing their behaviour and adopting no-cost or low-cost measures. They were awarded 1000 points for 'only using the heating, lighting and appliances you need', and points gained in this way accounted for almost three-quarters of Launton's score. (A copy of the village's scoresheet is given in Appendix 1.) Much of Launton's reputation as an energy-conscious village therefore rested on self-reported behavioural change.

5.1.1 Launton village and the organisation of the competition

The Launton Village Appraisal (LVA), published in 1993, describes how the village contains many houses and bungalows built since the 1950s, along with a core of buildings that go back to the 16th century. By the summer of 2001 there were 460 dwellings (interview, Village Organiser). The residents are relatively prosperous and 92% of those surveyed owned their homes – well above the national average. There was a high level of social activity at the time of the LVA, with 37 organisations active in the village.

A recurring theme in the interviews was a regret that Launton was not on the natural gas grid. This accounts for householders' estimates of their fuel costs being higher than those for the Woolwich survey, as they had to rely on oil, solid fuel, liquid petroleum gas (LPG), Calor gas or electricity for their heating[2]. It also had some effect on their perceptions of energy use: specific efforts have to be made to order, pay for and supervise the delivery of all these alternatives, apart from electricity. It could be argued that the people of Launton were more energy-aware than average simply because they relied more than average on heating fuels that were more visible than mains gas

Mrs Pat Mitchell was the REAP Village Organiser (VO) for Launton. As such, she was a key figure in the competition: her role was *'primarily one of raising awareness': displaying posters, networking and asking as many households as possible to take part in the competition'* (Oxfordshire EEAC, 1996). The arrangement was illustrated in the report on the competition by the model in figure 5-1.

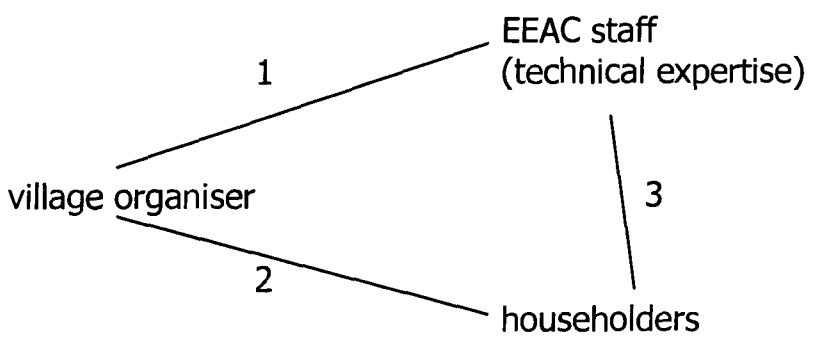


Figure 5-1: Communications between EEAC, Village Organiser and householders

Source: Oxfordshire EEAC, 1996

[2] Apart from a few who burned wood.

She gave her views on this role, which she saw as primarily one of 'getting the message across':

> *The message that ... they could actually help themselves, help the village, help the country and help the universe... In that order. I felt that first of all they must help themselves. They were, in my mind, helping to reduce their living costs. They were going to help the village by winning a prize. They were going to help their country by reducing its energy usage, because of the, what's it called ...*
>
> I: ... Agenda 21?
>
> *That's it ... It was basically trying to get the message across: help yourselves to help us to help others.'*

This interpretation differs from the one expressed above, where the EEAC team aimed to use village solidarity to engage interest in energy efficiency. In the Village Organiser's thinking, there seems to be an identification between individual, local community and national or even international community. This is expressed in interpersonal terms – 'helping' – rather than in energy terms. She also commented on the three-stage conscious competence model of advice that was described to her during the interview, emphasising the importance of the initial stage and discounting the need for follow-up:

> *To me, the competition was raising awareness. And the by-product for the people who took part was that they got advice. Which they could take or they couldn't take ... There was no follow-up. But I think that you have to leave something to the individual. You can only give them advice, you can't make them take it. Like taking a horse to water, isn't it?'*

This last comment emphasises the importance of the individual taking the initiative: an advice programme should treat people as responsible adults rather than spoon-feeding them.

The Village Organiser chaired the Launton Environmental Group (LEG) at the time of the competition and the Group played a considerable part in spreading the word about REAP[3]. She described how they first became involved:

> *LEG ... were looking around for speakers. And having been on the parish council, I know quite a lot of the people at Cherwell* [District Council] ... [someone] *came out and gave us a free talk and told us about the competition ... We only had about 12 people at our groups ... but the 12 people said 'Yes, let's see what we can do.' So we went for it. They sent us out the packs and we started coercing friends and neighbours!*

LEG members also distributed leaflets and hosted a workshop, at which EEAC staff sold low-energy light bulbs (CFLs) at £1 each and explained how they worked. Between 52 and 70 households participated in the first year of the competition (1994-95), according to the EEAC and village organiser respectively. The Energy Saving Trust, who hold the data for all EEACs, have records of 33 HESs sent in during that year from Launton (EST, pers. comm.). Although participation was relatively low, Launton achieved the highest level of active involvement in the county and won the first prize, which was presented at a high-profile award ceremony.

The second time REAP was held, in 1995-96, LEG made a greater effort to involve as many people as possible, helped by the publicity from the first competition. Participation rose to over 50% of all households in the village, with 239 entries recorded by the Village Organiser, 200 of whom had not competed before[4]. The Village Organiser gave

---

[3] They had several other activities and interests at the time. For example, only an eighth of the LEG bulletin produced in January 1996 is given over to the REAP competition and the possibility of Launton winning £6000. The rest is taken up by the need for a preservation order for some local elm trees, wildlife gardening, plans for weekend walks in the area, sending yew clippings for medical research, weather data for Launton and a diary of events.

[4] The EST holds records of 287 HES forms from Launton postcodes during 1996, some of which would have arrived after the competition deadline.

talks to several local organisations, while LEG members delivered EST/EEAC material and home-produced leaflets around the village on up to six occasions (interview, Pat Mitchell). In that second year, the EEAC estimate of savings on fuel expenditure was £106-176 for each of the 52 Launton households who had been thorough enough to send in a score sheet. The behavioural component of this estimate was very large: from 71-74% of the total score[5]. Interviewees mostly supported the realism of the estimated savings, although they were vague in their calculations as to how they would have come about:

> *I think it probably sounds quite realistic, because I seem to recall from the meeting that we went to the other day that for instance a 100w bulb actually takes 140w when you take the by-product uses and switches ... so in fact if you say that we're using a 23w as against that - and I'm not sure how many we've got in this house - it's quite considerable.*
>
> (Respondent L16, who had carried out a number of energy efficiency improvements in addition to installing CFLs.)

Another couple showed a higher level of understanding:

> (She): *£2 to £3 a week ... our electricity bill did go down, but I wouldn't have said by that much. Perhaps you'd save something on oil if you were having foil behind the rads ... Yes, and more insulation in the loft as well ... I don't know whether we were on oil then – can't remember ... We were on wood, we were on coal then, weren't we? And that was the most un-energy efficient thing that we had, I think...*
>
> (He): *I think the big saving really might be notching down the thermostat a degree – one or two degrees.*
>
> (L11)

---

[5] Yet behaviour was not credited with more than 37% of total savings in 2000-2001 when evaluating national EEAC performance (NFO BJM, 2001).

It is of course difficult to make sensible estimates of fuel savings from the information available, without records of consumption. The second response does imply that some significant savings were made, though the first is unconvincing.

The competitions certainly had an impact on awareness in Launton, with so many participants and so much publicity. It would have been hard for residents to ignore them while they were in progress, and the commitment and persistence of the Village Organiser and the LEG seem to have been major factors in winning the first prize two years running. EEAC staff concluded at the time that REAP had been a very worthwhile exercise (Oxfordshire EEAC, 1996); but it remained to be seen whether it had had a lasting effect (see §3.4 on the limitations of rewards for energy conserving behaviour), what significance it had held for the householders who had been involved, and what this meant when compared with the awareness and actions of householders who had not been involved.

5.1.2 Village response to the 2001 survey - categories for analysis

The questionnaire forms for this study were delivered to all 460 households in the village by members of the Launton Environment Group. 50% of the villagers responded, using the stamped addressed envelopes provided. 159 respondents had lived in Launton at the time of the competition and 94 remembered participating – roughly 35% of the villagers who were recorded as having taken part (52-70 in the first year and 200 more in the second).

For the analysis, respondents were first divided into three main groupings according to participation in REAP. These were:

- 94 participants in the REAP competition
- 65 residents who stated that they were in Launton at the time of REAP but that they did not participate (by decision or by default), or had forgotten about the competition.
- 73 relative newcomers to the village, who were not living in Launton at the time of the competition.

Interviewees were selected from all three categories, as shown in Table 5-1. They were also chosen in order to include a mix of individuals according to self-assessed energy consciousness, monitoring of their electricity use and the extent to which they thought that the competition had made an impact on them ('it started me thinking', 'I did more as a result of the competition', or 'the competition made no difference'). Energy-consciousness, monitoring and competition impact were chosen out of a number of possible indicators because they related to core elements of the inquiry: awareness, the householder's use of feedback and the effectiveness of the competition.

Table 5-1: Some characteristics of Launton interviewees

Code	Gender	Age*	Education	REAP	Energy conscious-ness~	REAP impact	Monitor #
L2	M	51-65	degree	Yes	Not really	-	
L5	F	51-65	A-level	Yes	Fairly	none	Yes
L8	M	>65	vocational	Yes	Not really	-	
L10	M+F	51-65	vocational	Yes	Fairly	additive	
L11	F	51-65	A-level	Yes	Fairly	initial	
L16	M	51-65	vocational	Yes	Very	additive	Yes
L18	F	31-50	vocational	Yes	Fairly	additive	
L20	M+F	>65	GCE/GCSE	Yes	Very	initial	Yes
L23	F	>65	vocational	Yes	Very	additive	Yes
L25	F	>65	vocational	Yes	Fairly	none	Yes
L95	M	31-50	No formal qualification	No	Not really	-	
L98	M	>65	degree	Newcomer	Fairly	-	
L102	F	51-65	No formal qualification	No	Fairly	-	Yes
L105	M	51-65	GCE/GCSE	Newcomer	Not really	-	
L107	M	31-50	GCE/GCSE	Newcomer	Fairly	-	Yes
L110	F	31-50	GCE/GCSE	Newcomer	Very	-	Yes
L112	F	18-30	degree	Newcomer	Not really	-	Yes
L118	M	31-50	degree	No	Fairly	-	
L120	F	31-50	vocational	Newcomer	Fairly	-	

*Age of the person who filled in the survey. The wives of L23 and L25 were interviewed and came into a younger category.

5.2 Awareness

It soon became apparent how complex a concept energy awareness is. It is one thing to speak of awareness of the existence of a tangible object: altogether different to speak of awareness of an invisible entity with endless associations. Formal education had something to do with a self-assessment of energy-consciousness – those seeing themselves as 'strongly energy-conscious' were almost twice as likely to have university degrees as the rest – but that does not give many clues as to what energy awareness might consist of in its particulars. How was it going to be possible to say anything sensible about the growth of energy awareness in a set of individuals on the basis of their survey responses and a limited number of interviews?

Some potential indicators of awareness were drawn from the survey data, and these are shown in Table 5-2, along with the related questions in the survey form. These questions were selected because they were thought to indicate curiosity, a disposition to observe and monitor consumption, a motivation to conserve carbon and a tendency towards learning in either a social or a solitary context. They are therefore a selection based on what seemed reasonable from learning theory and from the literature on energy and behaviour. Energy awareness could of course take other forms and this is an attempt to identify and discuss some likely forms, not to give an exhaustive account of all possibilities.

Table 5-2: Indicators used in analysis

Indicator	Comments
Self-assessments of energy-consciousness (Q26)	The interviews allowed explanations as to what the term 'energy-conscious' meant to the householder.
Assessments of impact of competition (Q27)	Perceptions of the effectiveness of REAP and of changes in awareness of the respondent.
Self-assessment as 'very careful' with fuel use (Q15c)	This was a question to supplement self-assessment of energy-awareness, using more traditional language
Discussion of energy-related issues in the home (Q16)	Discussion of energy might contribute to awareness and learning
Remembered 1+ source of information/advice (Q18)	Awareness of external sources of knowledge, plus indication that they have been tapped
Had asked for energy advice (Q17)	Awareness of the existence of advice, plus curiosity
Ratio of energy alterations to total alterations (Q11)	Relative significance of energy-related alterations to the householder
Ratio of energy plans to total plans (Q12)	Relative significance of energy-related plans for the home
Solar water heating (WH) planned or owned (Q11,12)	Awareness of the possibility of using renewable energy, or actual use of renewables
Recognition of link between climate change and fossil fuel consumption (Q20, interviews)	Relatively abstract knowledge, but may affect actions and interests
Perceptions of 'the environment' (from interviews)	Indicative of what environmental factors were significant to the interviewee
Read meters regularly (Q17)	Continuing alertness to consumption
Monitor fuel usage (read meter, check and keep bills) (Q17)	As above, only more so

Q26 of the survey asked householders whether they would describe themselves as 'definitely not', 'not really', 'fairly' or 'strongly' energy-conscious. Table 5-3 shows that the largest category was of the 'fairly' energy-conscious – of limited use for analysis, because it is likely to contain such a wide spectrum of meanings. By contrast, only 21 respondents were willing to describe themselves as strongly energy-conscious, suggesting that they saw themselves as out of the ordinary.

Table 5-3: Self-assessment of energy awareness by Launton residents

Self-assessment of energy-consciousness	**Number**	**Percentage**
Not really energy-conscious	51	22
Fairly energy-conscious	147	63
Strongly energy-conscious	21	9
No response	13	6
Total	*232*	*100*

Responses to the question on energy-consciousness are combined with other possible indicators of awareness in Table 5-4. Almost all the selected indicators in the table turned out to show a significant association with the self-assessments. Those who saw themselves as strongly energy-conscious were far more likely than others to say that they were very careful with their fuel use, and to plan (or, in two instances, to own) solar water heaters. The energy-conscious respondents were also more likely to discuss energy with others in the home and to have asked for energy advice: there was a social or interactive dimension to their awareness. They were more likely to have remembered at least one source of information or advice and to have monitored their energy usage regularly. There is a danger of circular argument here: that an indicator could be said to show awareness because it is associated with self-assessments of awareness, as shown in the table. However, even allowing for this circularity (which is hard to avoid), it does

appear that self-assessment can be a valid indicator of a degree of interest, watchfulness and active engagement with energy use.

Table 5-4: Percentages of aware/less-aware householders with indicators of awareness

	Strongly energy-conscious (n=21)	**Fairly energy-conscious** (n=147) #	**Not really energy-conscious** (n=51)#
Self-assessment as 'very careful' with fuel use (Q15c) ***	76	24	6
Discussion of energy-related issues in the home (Q16)***	86 (12/14)~	56 (65/115) ~	29 (11/38) ~
Solar WH planned or installed (Q11, 12)***	48	17	10
Remembered 1+ source of information/ advice (Q18)**	76	56	37
Monitored (read meter, checked and kept bills) (Q17)**	52	31	16
Had asked for energy advice (Q17)*	38	19	10
Read meter regularly (Q17)*	57	39	24
Recognition of link between climate change and fossil fuel consumption (Q20)	43	38	53

13 people who did not respond to the question were omitted from the analysis, as it was not clear whether to assign them to 'fairly' or to 'not really'.

~ only those in households with two or more adults were counted.

*** differences significant at $p<0.001$ - χ^2 is > 13.82, 2 degrees of freedom.
** significant at $p<0.01$ - χ^2 is >9.21, 2df
* significant at $p<0.05$ - χ^2 is >5.99, 2df.

The only selected indicator that bore no relation to the self-assessments was recognition that burning fossil fuels was a highly significant contributor to accelerated climate

change [6]. While this finding does not necessarily mean that the respondent did not connect fossil fuels with climate change at all, it does suggest that energy consciousness is linked in people's minds far more with day-to-day actions, interactions and curiosity than with knowledge of environmental issues on the global scale. It may be one thing to be careful and conscious and another to be informed; and the two conditions may only overlap occasionally in a single individual.

5.2.1 Action and awareness

If the conscious competence model is valid, then action flows from awareness. Do the data show that an aware person is more likely to be active, as the model would predict? Table 5-5 shows that there is a significant positive relationship between self-assessed awareness and installation of energy efficiency measures.

The ratio of energy-related alterations to total home alterations was very similar for all three groupings. The relative significance of energy, as measured (roughly) by home alterations, did not appear any greater for the energy-conscious respondents than for the rest. However, the respondents who thought that they were energy-conscious had more energy-related *plans* than those who did not; and there is some indication that they also had a higher proportion of energy-related plans to the total.

---

[6] This was taken to be shown when the respondent marked 'Burning coal, oil or gas, and electricity from these, eg in buildings and cars' as the main cause of increased atmospheric carbon dioxide in recent times (Q20), or (if they ignored the request to mark only one option) as one of the main causes.

Table 5-5: Self-assessed awareness, installation of energy efficiency measures and planned efficiency measures

	Strongly energy-conscious (n=21)	Fairly energy-conscious (n=147)	Not really energy-conscious (n=51)
Mean number of energy-related alterations since moving in (Q11)	3.19[1]	2.43	2.12
Ratio of energy-related alterations to total alterations	0.70	0.68	0.62
Mean number of energy-related plans for next two years (Q12)	0.76	0.42	0.39
Ratio of energy-related plans to total plans for the next two years	0.64	0.70	0.51

Note: the figures given are means; the Mann-Whitney U significance test used relates to the median figures for each column.

[1] different from column 4 (not really energy-conscious) at $p<0.05$, using the Mann-Whitney test

5.2.2 Experience and awareness

Householders were asked their response (on a five-point scale) to the statement 'I/we try to use fuel for heating, lighting, hot water and appliances as carefully as possible'. Three-quarters of the sample agreed or strongly agreed that they were 'careful' with fuel and only 7% disagreed. This is perhaps unsurprising: it is easy to make minor energy savings by performing small actions such as switching off lights, and likely that many people do this enough to regard themselves as careful in some sense (Banks, 1998).

The relationship between care and awareness is not straightforward, though. Of the 169 people who agreed or strongly agreed that they tried to use fuel as carefully as possible, 81% claimed that they were fairly or strongly energy-conscious, but the rest saw themselves as 'not really energy-conscious' – on the face of it, a contradictory pair of chosen statements from the options on offer. This 'not conscious but careful'

grouping did not differ significantly from the first in terms of meter reading or asking for advice; or in terms of the ratio of energy-related alterations to total alterations. However, when asked how many energy-related *plans* they had for the next two years, the ' not conscious but careful' grouping had a ratio of 29% energy-related plans to total plans, as opposed to 56% for the fairly or strongly conscious. This adds to the indications in Table 5-4 and 5-5 that awareness has overtones of thinking ahead and being open to new possibilities such as solar water heating.

In the interviews it was possible to ask villagers what they meant by their response to the question as to whether they considered themselves energy-conscious. There were two types of reply. The first was pragmatic, believing that energy-consciousness is a matter of basic economics:

> *I like to keep my bills down. I mean, at the end of the day it saves me money, doesn't it?*
>
> (L107, newcomer, fairly energy-conscious)

The second type of response was more detailed and associated energy consciousness with specific behaviour patterns that were regarded either as desirable, eccentric or a mixture of the two. The fullest description from experience was given by someone who saw energy awareness as part of a pattern of life that included transport, recycling and finding her own fuel from renewable sources:

> *I suppose I would tend to turn heating off a lot, probably even to the point of being cold at times and putting more clothes on. And if ever I see any wood, I always ask people, 'Can I have it?' I try not to use the car very much ... and I recycle everything. Now, that's probably not energy. But I have one small bag of rubbish a week ... I have four compost bins going. So I do think about things, really. I'm also aware that it could be better, but doing these things isn't always possible.*
>
> (L23, participant, strongly energy-conscious)

Two interviewees expressed their belief that energy consciousness could go too far, becoming eccentric and involving deprivation. Yet both turned out to have more interest in energy than might have been supposed at first. One described himself as 'not very energy-conscious', but it turned out that this was largely because of his unusually *high* awareness of what was possible in terms of efficiency. He appeared to be one of the most experienced and knowledge of all the respondents, a keen home improver who had installed many efficiency measures, but he claimed not to be energy-conscious because of what he was *not* willing to do:

> *Someone who isn't energy-conscious would have electric fires on, wouldn't double-glaze the house, wouldn't worry about loft insulation, wouldn't worry about draught exclusion, etc.*
>
> I: But you've done these things.
>
> *... Well, I'm not absolutely nuts about it. I remember some years ago, going to look at a house in London where they'd virtually hermetically sealed the place and filled the cellar up with water, with some sun heaters on the roof which got the water about the temperature of 65 ... And then they pumped that round radiators in the house very, very gently and slowly, so that it didn't use any electricity. And they got the house to about 65 or 66 degrees, which was bearable if you're wearing a coat! And that cost them next to nothing. It did not appeal to me. And that's green stuff which I'm not really into.*
>
> (L2, participant, not really energy-conscious)

The other interviewee immediately interpreted energy-consciousness in terms of recycling rather than energy:

> I: I wonder what you think might make the difference between someone who wasn't very energy-conscious and someone who was really energy-conscious?
>
> *Well, the obvious – I immediately think of the tree-hugger. And I mean he's an energy-conscious person who has all sorts of containers for his rubbish and everything is recycled ... I wouldn't go down that route. I would class myself as Mr Average.*
>
> (L105, newcomer, not really energy-conscious)

On the basis of that response, it would be easy enough to agree with the man's view of himself. However, when asked later in the interview how he might be able to save 60% of his carbon emissions, he volunteered that:

> *I would love to be able to use these energy – what is it? The glass absorbs... the panels take in the light and turn that into power for you. But whether we're in a position, i.e. in England, to be able to run a house on that, I don't know. And then, if that was the case I'd need assistance in purchasing that. But ... that would help as far as the environment's concerned.*

He then went on to ask about solar water heating as well as photovoltaic cells and – at the very end of the interview – became enthusiastic about the possibilities for low-impact housing, although maintaining his distance from some aspects, as a man of the mainstream:

> *I've seen these programmes with chaps building their own houses and they're environmentally conscious, they've gone a little bit overboard, and they've panelled their own roofs with them* [PV cells]*. I'm very envious, it would be ... well, of course it'd save a lot of money ... there was the chappie even went as far as his sewerage, went through* [reedbeds]*... I just thought that was a bit over the top.*

Both these interviews show that even those who do not consider themselves to be energy-aware may have knowledge that would not have been picked up and remembered if they had not had an underlying interest in something *related* to energy: installing efficiency measures, or the appeal of being more self-sufficient and designing one's own home.

A theoretical possibility is that those who do not regard themselves as energy-conscious may still have knowledge derived from practical experience, which can be applied if necessary to make sense of any new energy information they receive. One interviewee

was an HGV driver who had renovated several buildings as a sideline. His response to the question about energy-consciousness was:

> *I don't really think about it. I turn the lights off behind me rather than waste lights, but that's probably as far as it goes.*
>
> I: What kind of things does a really energy-conscious person do, that would be different from you?
>
> *I don't know really. I suppose they'd have the walls insulated ...*
>
> I: Do you know anyone like that?
>
> *My mum and dad – they always have the walls done. I mean, when you do the buildings these days, you have to ... I mean, that extension out there, it's got polystyrene in the floors. Which you never used to have to do, but you have to now.*
>
> I: ... if you've had to do renovations, you must know a certain amount about the building regs.
>
> *Yes*
>
> I: What do you think of them?
>
> *Some of them are all right. It wasn't too bad, I did up two cottages, and the walls were 18" thick anyway. So they were quite warm ... you need* [floor insulation] *two inches thick. You buy it in sheets of 8 x 4 polystyrene*
>
> (L95, non-participant, not really energy-conscious)

He denied ever having used any energy advice or information from a formal source, but had learned a great deal from working with his father:

> *A lot of it is common sense, building. I mean, I'm not a builder by trade but I can do it.*
>
> I: Did you pick it up from your father?
>
> *Yes, he's always been Do-It-Yourself and he did help me with the first one – he spent every weekend over here ...*

Asked about what the word 'environment' meant to him, the respondent said that it meant 'What's going on around the immediate area ... the village'. He often passed wind turbines in Devon and Cornwall in the course of his work, and liked them:

> *I find them attractive. I don't think they're an eyesore at all. Wouldn't worry me if there was one on the hill at the back of the house ... If you have to have them then you have to have them, don't you?*

The outward signs of energy this man is using were associated with what he finds at the builder's merchants, what he learns from the inspection requirements for what he builds, what he experiences in terms of comfort (for example, the inconvenience of having to change gas cylinders when running a bath), and the presence of wind turbines as a sign of where electricity comes from. This sort of input to his knowledge was far more significant than abstract knowledge[7]. He had never asked for energy advice and did not remember using any energy-related information, yet he had a base of knowledge available for building on – if this could be done in a way that would be noticed and appreciated. Possible routes would be via building materials and regulations, fuel bills (which he kept) and distributed generation.

5.2.3 Social learning - discussing fuel use

Householders were asked whether they had discussions or arguments about how warm their homes should be, or about how much the lights and appliances should be switched on. Table 5-6 shows that those who discuss energy use at home were far more likely than others to remember sources of information and advice. (They were also likely to

[7] He saw car pollution as the main contributor to UK carbon dioxide emissions, not surprisingly for a man whose daily work was driving.

use more of them: a mean of 1.1 sources for discussers compared with 0.7 for non-discussers.) The figures for being 'very careful' and for asking advice come close to significance at the 0.05 level (χ^2 = 3.45 and 3.36 respectively for 1 df, where the threshold figure is 3.84[8]). There is no statistically significant connection with regular meter-reading, or with interest in solar water heating, although the numbers point in the same direction; and there is no apparent connection at all between discussion of fuel use and awareness of a link with accelerated climate change. Those who discuss energy at home can be seen as engaged in building up a vocabulary and a body of tacit knowledge which will help in making sense of other information about energy: advice, meter readings, bills and other written information.

Table 5-6: Percentages of discussers and non-discussers~ with indicators of awareness

	Discussers, often or occasionally (n=91)	**Non-discussers (n=84)**
Remembered 1+ source of information/ advice (Q18)	74***	44
Self-assessment as very careful with fuel use (Q15c)	30	17
Had asked for energy advice (Q17)	25	13
Read meters (Q17)	43	36
Possession of solar WH / plans (Q11, 12)	23	14
Recognition of link between climate change and fossil fuel consumption (Q20)	42	45

~in households with 2+ adults
*** significant at $p<0.001$, χ^2 = 14.60, 1df.

[8] Yates' correction was applied to all calculations with only 1df.

5.2.4 Monitoring as a possible awareness-raiser

Whether monitoring can be seen as an indicator of awareness is open to question: again the question of cause and effect emerges. Monitoring of the effectiveness of a single measure – for example, has the installation of cavity wall insulation brought down the heating bill? – might be a direct consequence of taking action by installing that measure. But *continuous* monitoring, when people check their meters and bills regularly, could stem from habit and a more general curiosity, or from a wish to control fuel expenditure.

Table 5-7 shows relationships that fit with the general trends outlined in Table 5-4, but in which two stand out. Those who read their meters regularly were more likely to have asked for advice than those who did not, and they were considerably more likely to have plans for solar water heating or to possess it. Monitoring is associated with indicators of awareness, and it is likely that this is because it supplies continuing information that can be built into the householder's body of knowledge.

Table 5-7: Percentages of meter readers and others with indicators of awareness

	Reads electricity meter (n=83)	**Doesn't read meter (n=149)**
Possession of solar WH/plans (Q11,12) ***	28	11
Had asked for energy advice (Q17)*	26	14
Self-assessment as 'very careful' with fuel use (Q15c)	31	22
Discussion of energy-related issues in the home (Q16)	56 (39/69)	49 (52/106)
Remembered 1+ source of information/advice (Q18)	58	50
Recognition of link between climate change and fossil fuel consumption (Q20)	42	40

*** significant at $p<0.001$, $\chi^2 = 12.58$, 1df
* significant at $p<0.05$, $\chi^2 = 4.63$, 1 df

The interviews support the view that monitoring is a habit that can become entrenched at relatively early stages of life. One interviewee commented on how he was influenced when young:

> *We were one of the first houses in the country to have metered water... We piloted the water meters. I remember we used to have a little card by the toilet and tick it every time we flushed it!*
>
> I: Has that affected you, do you think?
>
> *Well, when all the hippos*[9] *came out for toilets, I put those in most of the toilets.*
>
> (L118, non-participant, fairly energy-conscious)

Another, when asked about whether her meter-reading and bill-checking was habitual, commented that

> *I think I'm just anal! I think it's my personality more than anything ... I just like to know everything. I have a briefcase and I have all my motor insurance, my everything, documented and enveloped and names on them, when they expire and everything.*
>
> (L112, newcomer, not really energy-conscious)

There is more to monitoring than personality, though. Other interviewees had developed the habit of monitoring at the stage when they become responsible for paying utility bills or when they had to economise. One described how she began checking consumption when her son was born and the family had to manage on a single income in a larger house. Later, a high electricity bill for the pub she managed had caused her to change the cooler and install CFLs, reducing her costs from £600 per month to £250 (interview, L110).

[9] Water-saving devices that go in the cistern.

Most of the Launton sample could be described as fuel-rich; only 16% stated that they wished they could afford to pay more for their fuel (Q15b). All those interviewed declined to give an upper limit that they would be prepared to accept in their fuel bills: they accepted that they would pay whatever was necessary in order to stay comfortable. Any monitoring of meters and bills on their part was therefore carried out from curiosity rather than from hard necessity: in feedback terms, the fuel rich do not necessarily have a point of reference – affordability – against which to measure their consumption.

5.2.5 Awareness of causes of climate change

Table 5-8 shows the strength of the association between participation in the competition, length of residence in the village and a grasp of the importance of fossil fuel burning as a contributor to accelerated climate change. The sample is sharply differentiated, with the newcomers the most knowledgeable and the non-participants the least. Almost all this difference is accounted for by the difference between non-participants and the rest: there is no significant difference between the participant and newcomer groups.

Table 5-8: Percentages of participants and others recognising link between climate change and fossil fuel consumption

	Participants (n=94)	**Non-participants** (n=65)	**Newcomers** (n=73)
Recognition of link between climate change and fossil fuel consumption (Q20)***	46	22	51

*** significant at $p<0.001$, $\chi^2 = 13.85$, 2df

Yet Tables 5-4, 5-6 and 5-7 showed that there was no significant association between recognition of this link and self-assessment of energy awareness, discussion of energy at home or meter-reading. This strongly suggests that knowledge about climate change

belongs in another category conceptually from day-to-day energy use. The interviews support this.

A fairly typical account of a general sense of looming environmental problems 'out there' in the atmosphere, rather than any specific framework of cause and effect, was given by a teacher in her thirties:

> I: I wondered about any moments in your life that started you thinking about energy?
>
> *At school, I think, and the geography teacher telling us in the 80s that they'd found a hole in the ozone layer, and that got me started to think ... because people were petrified ... that it was just going to grow and get bigger and we weren't going to have any protection from the sun and that seasons would change. It was a bit like atomic bombs, when everyone went 'Oh my god, we're going to die'...*
> I: How did you see that as related to energy?
>
> *We were told ... it was because we were using coal and natural resources and because people were using sprays. So the part about heating, it was because we were using heating and then obviously in the late 80s you had all the pit closures ... and it's all one big issue ... it's energy and being environmentally conscious seemed to be ... and, this is probably so naive, because we were told it was smokeless fuel, this anthracite* [in her stove]*, I thought, oh, well, that's all right, because it's not bad for the environment.*
>
> (L112, newcomer, not really energy-conscious)

Those who saw themselves as strongly energy-conscious were not necessarily any clearer on the distinction between climate change and the growth of the ozone hole, or on the state of scientific debate on causes of climate change. One 'strongly energy-conscious' couple supplied the following prescription for cutting down on their carbon dioxide emissions:

> *He: Well, I have unleaded petrol for a start in the car ... we don't have any coal fires in the house.*
>
> *She: I don't use aerosols...*

He: I don't see how householders can cut down much except aerosols. And the gases in the fridges and that, they're reduced, aren't they?

(L20, participant, strongly energy-conscious)

These extracts have shown something of how awareness is constructed from personal experience. They demonstrate how self-assessment of awareness is backed up by more objective indicators, and how these indicators are almost all easily observable or even tangible in the lives of respondents: talking to people, reading, seeing. Informal sources of information clearly play an important part in learning – indeed, for most interviewees they appeared to play a dominant part. A knowledge of the mechanisms of climate change had little or nothing to do with the other indicators of awareness studied.

5.3 Action in the home - DIY

The Launton data were analysed in terms of whether anyone in the household practised Do-It-Yourself, as it was thought that this would affect householder perceptions about themselves. If they assessed themselves as energy-conscious, for example, was it because they saw themselves as agents capable of bringing about change in their homes, and did this affect the extent to which they understood the principles involved in energy efficiency and conservation? Taking the indicators used in Table 5-4 and setting them against DIY practice gives the set of relationships shown in Table 5-9. This shows less evidence for DIY as a predictor of energy awareness than self-assessment of awareness does, using the same set of indicators. Those most likely to ask for advice and to remember using information are *not* the keenest where DIY is concerned: they

are those who practise it occasionally and are perhaps less confident in their own ability than the enthusiasts.

Table 5-9: Percentages of DIY practitioners and other householders who show indications of awareness

	DIY often (n=80)	DIY occasionally (n=92)	DIY seldom/ never/NR (n=60)
Remembered 1+ source of information/advice (Q18)*	51	62	40
Had asked for energy advice* (Q17)	11	26	17
Possession of solar WH/ plans (Q11,12)*	16	24	8
Self-assessment as 'very careful' with fuel use (Q15c)	25	22	32
Discussion of energy-related issues in the home (Q16)~	57 (41/72)	51 (38/74)	41 (12/29)
Read meters regularly (Q17)	42	33	32
Monitored (read meter, checked and kept bills) (Q17)	36	26	22
Recognition of a strong link between climate change and fossil fuel consumption (Q20)	42	43	33

~only those in households with more than one adult were counted
* significant at $p<0.05$, 2df. $\chi^2 = 7.14$, for sources of information, 6.45 for advice and 6.18 for solar water heating

However, Tables 5-10 and 5-11 show DIY as associated with energy-related *action*, as might be expected, and with finding the EEAC information pack useful – although not with participation in the competition. It beings to look as though two separate modes of learning may be involved: a practical and a more theoretical type. The first type will comprise people who are more 'hands on' in their approach to life and may even be averse to written information unless they can see a very clear need for it. Those who occasionally do their own repairs and alterations might well be more in need of advice and information than those who are well-practised, or those who hardly ever make changes to their homes.

Table 5-10: Percentages of DIY practitioners and other householders who show indications of action

	DIY often (n=80)	DIY occasionally (n=92)	DIY seldom/ never/NR (60)
Mean number of energy-related alterations since moving in (Q11)	2.84[1,3]	2.26	2.00
Mean number of energy-related plans for next two years (Q12)	0.64	0.47[2]	0.17
Mean number of energy-related plans in total (Q12)	1.02	1.24	0.93

Note: the figures given are means, but the Mann-Whitney U significance test relates to the median figures for each column.
[1] different from column 3 (occasional DIY) at $p<0.05$;
[2] different from columns 2 and 4 at $p<0.05$
[3] different from column 4 at $p<0.01$.

The differences in energy-related plans for the three groups are more marked when considering the near future (the coming two years) than overall, suggesting that DIY practitioners see the alterations as more feasible than the rest of the respondents: not just a good idea, but a practical proposition. Those who only carry out DIY occasionally had the greatest number of plans overall, but most of them were for the distant rather than the foreseeable future – perhaps no more than vague aspirations.

Table 5-11: Percentage participation in REAP among long-term resident DIY practitioners

	DIY often (n=51)	DIY occasionally (n=62)	DIY seldom/ never/NR (n=46)
% participating in REAP	67	56	54
% of participants who remember receiving an information pack and carrying out 1+ recommendation~ *	80 (24/34)	62 (20/35)	43 (9/25)

~ respondents in this group overlap almost exactly with those participants who said that they had found the pack useful.
* the difference between the groups is significant at $p<0.05$, 2df. $\chi^2 = 6.65$.

Table 5-11 shows that an interest in DIY had little to do with whether someone participated in REAP. However, it did seem to have made a difference to the proportion who went as far as carrying out an audit, reading their information pack and acting on it. It seems likely that those who were most enthusiastic about DIY were already aware to some degree of what REAP was trying to tell them, and had the background (tacit) knowledge to 'do more' when prompted by their information pack. They were more likely to act on what they learned from it because they felt more competent, or were more familiar with the material. The interviews support this interpretation. One interviewee commented that *'I'm aware of the things* [to do with energy], *because I'm interested in technical things'* (L2). That is, he already 'spoke the language' of energy efficiency and home alterations. As shown in Table 5-12, and as might be expected, DIY practitioners had a history of more alterations than the rest of the sample. However, the ratio of energy to non-energy alterations remained more or less constant throughout.

Table 5-12: DIY and history of home alterations

	DIY often (n=80)	**DIY occasionally (n=92)**	**DIY seldom/ never/NR (n=60)**
Mean number of alterations since moving in	4.42[1, 2]	3.25	2.88
Ratio of energy-related to total alterations	0.64	0.70	0.69

Note: the figures given are means, but the Mann-Whitney U significance test relates to the median figures for each column.
[1] different from column 3 (occasional DIY) at $p<0.05$;
[2] different from column 4 at $p<0.001$

Table 5-13 shows that there is no significant difference between meter readers and others in terms of energy-related actions taken. Habitual use of feedback was therefore not necessarily associated with energy-related action, although it was associated with awareness (Table 5-7).

Table 5-13: Meter reading and history of home alterations

	Reads electricity meter (n=83)	**Doesn't read meter (n=149)**
Percentage who made at least one energy-related alteration since moving in	78	75
Mean number of energy-related alterations since moving in	2.57	2.30
Ratio of energy-related to total alterations	0.70	0.65

5.4 The impact of REAP on awareness and action

The findings discussed above relate to all those surveyed in 2001, whether or not they had taken part in the REAP competition, and show something of how people may build up their awareness over time. These findings act as a background to an evaluation of the REAP competition as an attempt to raise awareness, using social contacts and the incentive of prizes as a way of encouraging village residents to improve their energy efficiency.

5.4.1 Home alterations undertaken by respondents

The number of alterations carried out by the three groupings of REAP participants, non-participants and newcomers is shown in Table 5-14. This shows that participants had done more to their homes *in general* than non-participants, since moving in; but also that non-participants have been 'catching up' to some extent in recent years.

Table 5-14: Alterations carried out by participants, non-participants and newcomers

	REAP participants (n=94)	**REAP non-participants** (n=65)	**Newcomers since REAP** (n=73)
Mean number of alterations pre-REAP	3.54[1]	2.83	n/a
Mean number of energy-related alterations pre-REAP	2.63[1]	2.03	n/a
Mean number of alterations post-REAP	0.74[2]	1.02[2]	2.01
Mean number of energy-related alterations post-REAP	0.49[2]	0.71[2]	1.32
Ratio of energy-related to total alterations, pre-REAP	0.74	0.72	n/a
Ratio of energy-related to total alterations, post-REAP	0.66	0.70	0.66
Ratio of energy-related plans to total plans for next two years	0.51	0.65	0.61

Note: The figures given are means.
[1] The medians for each group of participants are significantly different from the median figures for non-participants, $p < 0.05$, using the Mann-Whitney U test
[2] Significantly different from the median figures for newcomers, $p < 0.001$

It is striking that the ratios of energy-related alterations and plans to total alterations and plans are very similar for all groupings. The competition does not seem to have altered the perceived importance of energy efficiency relative to other investments in the home.

The differences in energy-related alterations could of course be accounted for in ways that have nothing to do with the impact of the competition. For example, REAP participants might have lived in their homes for longer on average than non-participants and have had longer in which to carry out alterations; or they might have needed to do more because they acquired their homes in poorer condition.

Neither of these explanations seems to hold. Eighty percent of participants had lived in their homes for 10 years or longer, as opposed to 72% of non-participants – not a major difference. Neither does not look as though REAP participants acquired their homes in poorer condition than non-participants and therefore needed to do more to them. The average number of energy efficiency measures in place for the two groups on arrival in their homes[10] was 2.83 for participants and 2.75 for non-participants. Taking the three most significant measures – loft insulation (LI), cavity wall insulation (CWI) and double glazing (DG) – gives a mean of 1.14 for participants and 0.95 for non-participants.

Participants had therefore done more to their homes between moving in and the time of the competition than non-participants, in spite of the initial state of their housing being slightly better. To give the most dramatic example, participants were twice as likely to have installed cavity wall insulation before REAP, although they had bought homes that were more likely to have insulated walls already. Table 5-15 summarises the findings for four different measures, showing how loft insulation was the only measure to be installed more by participants than by non-participants *after* the competition.

The Launton findings on participation and housing condition are supported by the Woolwich survey: energy ratings[11] for the homes of those who found the Woolwich Energy Rating Report useful were higher on average than for those who did not. Installation of cavity wall insulation, the most 'invisible' measure, appeared to be the main achievement of the recommendations made to Woolwich clients; in Launton, the most aware residents had already done this before the competition, which seemed to

[10] Q9 in the survey
[11] SAP (Standard Assessment Procedure) rating, from 0 to 100 in order of increased efficiency.

have little further impact. The overall level of wall insulation was high in Launton, with 45% of respondents having at least some of their walls insulated – partly a reflection of the high proportion of dwellings constructed since 1930 with cavity walls, but perhaps also an indication of relative wealth and awareness of this measure. Only 12% of the British housing stock had cavity wall insulation, less than a decade ago (EHCS, 1996).

Table 5-15: Participants and non-participants acquiring and installing energy efficiency measures

	% of REAP participants (n=94)	**% of non-participants (n=65)**
Acquired CWI with house	27	14
Installed CWI pre-REAP	*29* [1]	*14*
Installed CWI since REAP	5	8
Acquired LI with house	62	54
Installed LI/additional LI pre-REAP	37	32
Installed LI/additional LI since REAP	*16* [2]	*5*
Acquired HWCI with house	67	75
Installed HWCI pre-REAP	40	25
Installed HWCI since REAP	8	3
Acquired thermostatic radiator valves (TRVs) with house	15	20
Installed TRVs pre-REAP	16	12
Installed TRVs since REAP	6	6

[1] difference significant at $p<0.05$, $\chi^2 = 4.02$, 1 df
[2] significant at $p<0.05$, $\chi^2 = 3.93$, 1 df

REAP can be said to have made a major difference to installation of measures in respect of only one measure: low-energy lamps. 62% of participants had installed at least one CFL at the time of the survey in 2001, as opposed to only 26% of non-participants[12]. This is at least partly due to the REAP energy efficiency workshop at which CFLs were sold very cheaply to village residents.

---

[12] This difference is significant at $p = <.001$, $\chi^2 = 18.19$, 1 df

5.4.2 REAP and indicators of awareness

So far, it appears that people took part in REAP because they were *already* somewhat energy-conscious: not necessarily those most in need of advice. Did REAP manage to raise their awareness further in some way? Table 5-16 shows a relationship between REAP participation and self-assessment of energy awareness. Participants emerge as more energy-conscious (by their own account) than non-participants. Yet when newcomers are brought into the analysis, the table shows that there was no significant difference between the participants and newcomers in terms of self-assessed energy-consciousness.

Table 5-16: Self-assessments of energy awareness: participants, non-participants and newcomers

	% of REAP participants (n=91)	**% of non-participants (n=58)**	**% of newcomers (n=70)**
Strongly energy-conscious	14	2	10
Fairly energy-conscious	67	66	69
Not really energy-conscious	19	33	21
Total	*100*	*101*	*100*

The differences between participants and non-participants are significant at $p<0.05$, $\chi^2 = 8.77$, 2 df. There is no significant difference between participants and newcomers.

Why should there be this similarity? One possible explanation is that a higher level of formal education among the newcomers brings about levels of awareness that are similar to those arrived at by whatever processes led to participation in the competition, and/or by having participated. 42% of newcomers had a degree, compared with 18% of participants and 11% of non-participants, and in the UK 'the most powerful single

predictor of green behaviour[13] is degree-level education' (Taylor, 1997). Another is that newcomers' recent experience of installing energy efficiency measures helped raise their estimation of their own energy awareness: 53% of them had installed at least one efficiency measure since January 1995, as opposed to 23% of both participants and non-participants. But if installation alone boosts awareness, why are participants and non-participants so different in their estimations of energy-consciousness? The first explanation is more convincing, if incomplete. It suggests that a high level of energy-awareness is likely to be associated with factors such as higher education, but that awareness is also built up in other ways.

Participants' responses to the competition are shown in Table 5-17. The figures demonstrate how those who now see themselves as energy-conscious were far more likely to consider that the competition had made some *difference* to their energy-consciousness, whether this was because 'it started me thinking' or because 'I'd already thought about [energy] but it made me do more'. Participation in the competition was therefore seen as a cause of their level of consciousness, not as an effect – or not *only* as an effect.

[13] Green behaviour was taken to comprise actions such as thermostat setback, rejecting overpackaged goods, waste separation and buying organic food.

Table 5-17: Participants with different levels of energy awareness and reactions to REAP

	% of strongly energy-conscious participants (n=13)	**% of fairly energy-conscious participants (n=61)**	**% of non- energy--conscious participants (n=17)**
REAP started them thinking	15	26	12
REAP encouraged them to do more	47	30	-
REAP made no difference	38	44	88
Total	*100*	*100*	*100*

Note: the differences between the three groups are close to significance at $p<0.01$, with $\chi^2 = 13.64$, 4 df.

The most energy-conscious were most likely to say that taking part in REAP had encouraged them to 'do more' to improve their energy efficiency, while the fairly energy-conscious were more likely to say that REAP had 'started them thinking' than the other participants. REAP is therefore perceived as having 'moved on' their thinking in some way. According to this version, some participants moved from a low level of consciousness to 'starting thinking' and becoming fairly conscious. Others moved from some intermediate level to become more strongly energy-conscious, while about half of all participants said that nothing had *changed* in their consciousness, whether they regarded themselves as conscious or not.

Taking action did play a part in these changes. Eighty-eight percent of participants recalled receiving an information pack from the EEAC, though only 56% remembered acting on at least one of the recommendations in the pack. Almost three-quarters of those who acted on recommendations said that REAP had either started them thinking or had encouraged them to do more; conversely, almost 90% of those who did *not*

remember acting on a recommendation said that REAP had made *no* difference to their energy-consciousness. There is an extremely strong association between remembering action based on a recommendation from the EEAC and remembering that the competition had achieved some change in outlook.

These findings support the idea of a growth in awareness *through* action, along with the earlier finding that energy-consciousness was linked with a larger number of efficiency measures installed in the home. The REAP initiative appeared to speed up this process by encouraging some people to take some action, even if there is no evidence from the survey that it had a continuing effect in terms of recent installation of measures (see Table 5-15).

Action was also integral to the *continued* raising of awareness: for those who were not energy-conscious at the outset, the competition did nothing if they did not participate to the extent of taking action. For the rest, taking action widened their experience and made it more likely that in 2001 they would describe themselves as fairly or strongly energy-conscious.

Categorising respondents according to their views on the impact of REAP could give further insight into the possible relationships between awareness and whatever took place during the competition, but there is no conclusive evidence from doing so. In Table 5-18, the indicators of awareness in Table 5-4 are matched against views on the impact of REAP (started thinking/did more/no difference). Only one – seeking advice – shows a statistically significant association, although the numbers point in the same

direction, with each row apart from the last showing a higher figure for those who 'did more' than for the rest. This reinforces an assessment of REAP as one element in a wider set of processes, and one that may have proved a turning-point for some individuals.

Table 5-18: Percentages of participants with different reactions to REAP, with indicators of awareness

	Started thinking (n=20)	**Did more (n=24)**	**No difference/ (n=50)**
Had asked for energy advice (Q17)*	25	46	14
Self-assessment as 'very careful' with fuel use (Q15c)	30	38	30
Discussion of energy-related issues in the home, 2+ adults (Q16)	50 (8/16)	59 (13/22)	45 (17/38)
Discussion of energy-related issues in the home, 2+ adults (Q16)	40	54	34
Possession of solar WH / plans (Q11, 12)	25	38	14
Remembered 1+ source of information/ advice (Q18)	60	83	58
Monitored (read meter, checked and kept bills) (Q17)	15	38	30
Read meters (Q17)	25	42	34
Recognition of a link between climate change and fossil fuel consumption (Q20)	35	38	54

* differences significant at $p<0.05$, $\chi^2 = 8.66$, 2 df

Table 5-19 uses the personal assessments again, but this time in relation to action and plans. It shows a markedly lower proportion of energy-related plans for the next two years among those to whom REAP 'made no difference'. The figures here support the view that action is an element in *continued* learning. Those who 'did more' adopted more recommendations than the rest and also seemed likely to carry on 'doing more':

they were *planning* more than those who thought the competition had made no difference to them.

Table 5-19: Different reactions to REAP and indicators of action

	Started thinking (n=20)	**Did more (n=24)**	**No difference (n=50)**
Mean number of REAP recommendations adopted (measures only, inc. CFLs)	0.95[1]	1.54[2]	0.64
Mean number of energy-related plans within next two years	0.45	0.62[2]	0.22

[1]The median figures for those who 'started thinking' are significantly difference from the medians for those who 'had already thought about energy but did more', $p < 0.05$, using the Mann-Whitney U test.
[2]The medians for the group who 'did more' are significantly different from the median figures for those who said the competition made 'no difference', $p < 0.01$, using the Mann-Whitney U test.

Those who claim that the competition made no difference to their awareness included 14 participants who had nonetheless carried out at least one recommendation from their information pack. One of them implied that REAP had prompted her to act rather than changing her mindset in any way, and that a failure to engage with some villagers was due to their (different) predispositions or levels of awareness:

> *... [REAP] makes you do things rather than just thinking that yes, you agree with it and you should do it. You actually go out and buy energy-saving light bulbs.*
>
> I: Do you think there were any opportunities missed there? If it were to happen again ... things you think could be done differently?
>
> *Probably not. I think it was pretty high-profile in the village so that people who didn't take part probably wouldn't have done however it had been* [organised].
>
> (L5, fairly energy-conscious)

Another interviewee appeared to agree, though locating the divide between actors and non-actors not so much in terms of predisposition as simple willingness to rouse themselves and do something:

> *I think most people are of a mind on these things, they do want the best. It's just getting around to doing it. And it's not too difficult if you just get that little push, somehow...*
>
> (L25, fairly energy-conscious)

What had made her energy-conscious was:

> *... just the way we live.*
>
> I: What has made a difference? ...
>
> *I think being married to an engineer... For instance, when we moved into a flat in London and there was no central hearing at all, it was a pretty derelict place and we started from scratch and he was deciding what sort of radiators we needed. He researched that to find out exactly the size of the room, what we needed etc, and he's just done this again for my daughter ... And I think that has opened my eyes a lot ... I think it must be more subconscious than a conscious thing, really ... and also, perhaps in the course of conversation with people sometimes, with things like cavity wall insulation or double glazing. It's just some sort of general awareness through listening to programmes on radio or whatever.*

These two interviewees seemed to be saying that their awareness had not been changed noticeably by the competition: only their level of activity. But both had been involved in installing major efficiency measures in their homes prior to the competition – cavity wall insulation and double glazing – and they were either keen on DIY activities themselves or their partners were. It could be argued that the competition had not added much to what was already a substantial body of experience. The second interviewee, in particular, described a series of events, actions, observations and interactions that had built her awareness over the years.

Two respondents had clearly been active in installing energy efficiency measures in their homes recently (one as a direct consequence of REAP) but did not respond to the question of whether REAP had altered their state of awareness. One remembered his information pack and said that

> *As I remember it, there wasn't anything there that we hadn't more or less done. I know it sounds arrogant. But there wasn't anything significant to do ... But it was a nice checklist for us.*
>
> (L2, not really energy-conscious)

He did not think that the competition had altered his thinking at all: instead, it had reinforced his belief that he had done all that he reasonably could to improve energy efficiency in his home. This has been identified as a common block to the work of the EEACs (New Perspectives/BMRB, 1996).

The other said that the competition had encouraged him to take some action, but he was ambivalent about whether his awareness had changed as a result. He did however state that some sort of global environmental awareness had developed at around the time of the competition, though not to the extent that he could define the nature of the problem or connect it with his own actions:

> *Well, sort of global warming sort of stuff brought it on* [thinking about energy]*, I suppose.*
>
> I: When was that?
>
> *I suppose five years ago, something like that.*
>
> I: So did you see this competition as linked to that?
>
> *Yes*
>
> I: How have your thoughts developed over that time?

Well, I wish somebody'd make up their mind which way it's going. Because some people say that when the ice melts it'll be warmer and some people say when the ice melts it'll stop the Gulf Stream and be colder. So nobody really knows which way it's going. I mean, it's obviously not a good thing to get rid of the ice. If only we could convince the Americans to do something about it.

I: You're fairly convinced yourself that what humans do is having an impact?

Oh yes.

I: And that what individuals do makes a difference?

Yes. I've never really understood. It's, what is it? Ozone they're short of. Well it's easy enough to make ozone. It's only O_3, isn't it? There's plenty of water and there's plenty of heat in the Sahara. They could make a great big factory, if you like, using the solar heating in the Mediterranean ... why can't it just be, whoosh, pushed up?

(L8, not really energy-conscious)

The survey collected data on the energy efficiency measures installed before and after the competition. These show that only approximately one-third of all measures installed since the competition could be accounted for as a direct consequence of the competition. Informal sources of information were likely to have influenced the rest. The findings from the (smaller) survey of Woolwich mortgage-holders show that three-quarters of all measures installed since moving into the dwelling appeared not to have stemmed from any formal advice (although the entire sample had received *some* advice in the form of their energy audit).

For the population in general, an even higher proportion of energy efficiency actions are likely not to be directly influenced by formal energy advice. The importance of other possible sources of information and advice – such as the mass media, conversations with neighbours and visits from heating engineers – is almost certainly underrated by policymakers.

5.5 Learning in sequence

There is a relationship between respondents who had asked for advice and those who remembered using sources of information, as shown in Table 5-20. There is also a progression in terms of advice asked, actions carried out and plans, according to how many different sources of information were cited. The main message is of a sequence in which knowledge is cumulatively constructed and in which action is implicated. The figures for Launton residents planning solar water heating (or, in two cases, owning it) also show how information use is linked to awareness of possibilities. There is a striking relationship between the number of sources of information remembered and the willingness to consider installing solar water heating.

Table 5-20: Relationship between cumulative knowledge build-up, action and planned action

Number of information sources remembered	Mean no. of energy-related alterations in past 6 years	Mean no. of energy-related alterations since moving	Energy-related plans for coming 2 years	All energy-related plans	% planning or owning solar WH panels	% asking advice
0 (n=110)	0.47	1.80	0.40	0.92	6	8
1 (n=73)	0.84	2.48	0.41	1.14	19	23
2 (n=25)	0.72	2.68	0.52	1.12	28	28
3+ (n=24)	1.62	3.71	0.71	1.58	50	42

The Woolwich data show a similar pattern to that in Table 5-20, with almost 90% of those who said that they had asked for advice saying that they remembered more than one source of energy-related information, while only 46% of those who had not asked for advice did so.

An example of sequential learning was provided by a woman who described various stages during the previous decade when she had expanded her awareness of energy and also – as time went on – of a relationship between energy and the environment in a more general sense. The sequence is shown in Figure 5-2, with comments on learning processes added in parentheses.

> Moved into damaged house as a tenant of the local authority, where her father installed radiators for her (action).
>
> However, the house was still cold and draughty. As a member of a group of single parents, she heard about grant-funded draught-proofing for families who relied on state benefits (raised awareness).
>
> Installed draught-proofing (action), though this was still less than fully effective (feedback).
>
> Her children came home from school with a homework project: *'We had to look to see how we were trying to conserve energy. So I think it's really through the school that it come about ... they had to start saving cans and saving bottles and paper and tinfoil and then look at how they saved – how many times they'd left a light on'* (action, observation, raised awareness).
>
> Took part in the 'Energy-conscious village' competition. Filled in a HES and checked the house carefully in order to do so (action). Received written advice (explicit knowledge) and acted on some of it (action).
>
> Continues to take an interest in energy- and environment-related issues: *'the other day we were looking [on TV] at – it was about peat, the peat bogs and about the coal and how the resources are running down. And how it's affecting everything, you know, the surrounding area'* (raised awareness).
>
> (Interview, L18)

Figure 5-2: Learning sequence as described by a Launton householder

This sequence illustrates not only how action and experience build up awareness and a body of tacit knowledge, but how chance interactions with others can add to someone's awareness and body of knowledge. It could be that children are an under-recognised

means of teaching adults, for example (see Capener, 1997). When those with and without children at home were compared, there was a highly significant association between recognising the contribution of fossil fuel combustion to climate change and having children (χ^2 = 9.08, 1df). The strength of association between age of respondent and recognition of the significance of fossil fuels was weaker, though still significant (χ^2 = 5.84, 1df, when those aged 50 and under were compared with older respondents), suggesting that children add something to the effect of relative youth. Higher education, surprisingly, did not show up as a significant factor in relation to this type of knowledge.

5.5.1 Are the categories in the conscious competence model realistic?

The survey data on actions, plans and use of information provide a check on validity, a supplement to the material on consciousness. They show how people often do the 'right' things without apparently reasoning in energy terms, and how closely energy is tied in with other factors in life: the fraction of home alterations that are energy-related is surprisingly constant across the sample studied, regardless of age or energy-consciousness. But the survey data do not provide an accurate means of categorising people in terms of competence. Examination of whether respondents could be fitted into categories such as 'consciously incompetent' shows how approximate such terms are.

The 'conscious competence' model as described in Chapter 2 suggests that the sample would have contained those who were 'unconsciously incompetent'. These hypothetical people, according to my interpretation of the model, would have been non-participants in REAP, would not have asked for advice or have monitored their consumption, would

know little about buildings, have done little or nothing to their homes and not have planned anything, although they lived in homes in need of improvement. Perhaps those who never responded to the survey can be taken to be the unconsciously incompetent: in constructivist terms, they were not interested in energy and paid no attention to questionnaires about it.

Three of the 19 interviewees (L95, 118 and 120) seemed as though they might be 'unconsciously incompetent'. All were non-participants or newcomers who did not check their meters, and none of them had any CFLs. Although all had loft insulation, two did not have their cavity walls insulated and had not insulated their hot water tanks. However, none of them neatly fits a profile of unconscious incompetence. Two knew a good deal about buildings and appliances from their experience of carrying out or overseeing alterations, and so did the third from her work as a services manager. All three were keen on DIY work. They were not unaware of the possibilities for action. It would be more accurate to say that they had not translated what they knew was possible into action, for one reason or another. They were thus closer to being *consciously* incompetent than unconsciously incompetent.

Several of the interviewees do not appear consciously competent when looked at as individuals in terms of a holistic picture of what they have done, how they perceive themselves, whether they show indicators of awareness or what they plan to do. Yet they do not appear incompetent either, or to have reached the high level of awareness/tacit knowing implied by unconscious competence. The exercise of trying to group the Launton respondents in terms of the model illustrates how diverse they are,

and how the shape of the 'zone of proximal development' is different for each. Their consciousness is almost bound to be partial, derived from a different set of experiences. For example, one man was very exercised by the size of his fuel bills. Living in a bungalow that was not designed for efficiency, run on expensive LPG, he was frustrated that there did not appear to be anything more he could do. He monitored his consumption carefully – meter and bills – and had asked advice:

> *We had somebody from British Gas come and have a look when I first moved in here, because the very first bill that I had was 400 and odd pounds ... And I thought, Blimey, that's expensive. And so they came round and they said, 'You're doing everything correctly, loft's insulated properly ... not a lot you can do.' LPG is three and a half times more expensive than natural gas... She was virtually telling me that we were doing our best to economise and we couldn't do any better ...*
>
> (L107)

He and colleagues routinely shared lifts into work and he was highly conscious of energy in terms of cost. He was doing his best to economise on fuel use in an inefficient building, with expensive fuel, insufficient knowledge and (almost certainly) inadequate advice.

Another interviewee showed conscious competence primarily in terms of her orientation: she and her husband could face new issues because of their background and experiences, extending what they had learned in one aspect of their lives into another. This seemed to have contributed to her level of curiosity and ability to adapt her behaviour into recycling, when prompted by the environment group:

> *As we go about home improvements then we tend to do our own bit of research ... I don't know as other people would do that in the same way. It's probably just my husband's approach to things. Having that more scientific background ... I was a teacher ... on the science side ... I think what I have changed is, since joining* [LEG] *and living here, I've become more aware about recycling. More so than the energy side. And we make a conscious effort to recycle as much as we*

can ... which is what I didn't do before ... as far as the house and the energy side was concerned, I think that was possibly in place.

(L25)

Only two of those surveyed and interviewed emerged as possible candidates for the label of 'unconscious competence', and that was on the basis of the impression they gave of taking energy and/or environmental considerations into account entirely as a matter of course, whenever they acted or planned something. In no other sense did they seem 'unconscious'. It is also significant that both were among the very few villagers (only 17) who read their meters, checked and kept their fuel bills and had also asked for energy advice. One was a farmer who also ran a business in which he advised other farmers who were converting land or buildings to new uses. At the interview, he almost immediately launched into an account of his search for reliable information on energy efficiency – he had visited the Building Research Establishment only the day before – the innovative work done in building his family home, and how he had learned from a combination of experience and consulting others:

We decided to build [the conservatory for solar gain], *although we didn't know much about it ...*

I've probably learnt through trial and error... being a dairy farmer and rearing calves, we knew quite well that we wanted air movement. Because otherwise you get things like virus pneumonia ... And it's a sort of a follow-on, you realise the necessity for different things. Purely through trial and error through too many years! Whereas a lot of people wouldn't appreciate that. Even these Nottinghamshire people [on the Hockerton housing project] *were having problems with moulds, because they weren't moving the air well enough ...*

Somehow we need to work efficiently on heat exchanging. ... There seems to be very little information to help anybody on that ... somehow there is no list, no real method. You go to the local builder's merchants and they say 'No, we haven't heard of anything like that. No, it doesn't exist.' And yet you know that somewhere it must exist ... air movement is a very serious thing with livestock. This is why it's ingrained into me!

(L16)

He was accustomed to viewing energy as an integral part of life and was committed to monitoring it systematically, using historic feedback, as a way of managing his resources:

> I: I suppose you have quite a bit of wood on your land?
>
> *We do have a lot of surplus wood. In actual fact it doesn't really get used effectively. When we were working full-time on the farm, there would be times when you were tidying this up and wood was a secondary thing, as part of the job. Now there is nobody working full-time on the farm ... So it's very much an on-charge as oppose to a secondary availability...*
>
> *I take a monthly reading of our electricity use. And we monitor it against last year's use ... We keep records (a) because we want to know what we're using and (b) because we don't rely on the way people assume we've used as opposed to what we know we've used ...*

The interviewee had not been an enthusiastic supporter of the LEG because he had seen them as preservationist and unduly oppositional to countryside development and employment. By contrast, the other candidate for the title of 'unconscious competent' was more likely to see the negative impacts of new development, and her understanding of the term 'environment' was that:

> *It means different things. With the* [new, nearby] *factory thing, I don't see it but I know that it's more and more lorries trucking stuff up and down the country ... and it's got to be not good for the environment, all this huge amount of road traffic which we were promised would go on to the rail ... they're going to relax a lot of the rules, coming through villages during the night ... I'm for ever ringing up complaining about potholes. Our smaller roads are disintegrating ... we're quite concerned about speeding of cars.*
>
> (L23)

She too was in the habit of collecting fuel wood, and managed her household carefully in order to minimise waste. What marked her out from most other interviewees was her interest in new developments in building and design:

> *I think I've got more interested, because over the last 20 years there's been a lot more information about buildings and the way buildings are insulated. You do*

read a lot more now. My son has a Swedish girlfriend and she says the houses here are so cold! ... I see all these new estates going up here. There's no solar panels on any of them ... My daughter went to look at a property in South London, where there's an environmental estate going up...which is very interesting.

When asked about how it might be possible to reduce her domestic carbon emissions by 40%, she was one of the very few respondents to think in terms of renewable energy and fuel-switching as well as energy efficiency or frugality:

If we're going to burn coal it'd have to be a lot more efficient. So I think the wood-burning stove there would be an answer ... with a back boiler – the ones I've read about are amazingly efficient ... But we'd have to think about something other than oil ... If I were to think about going to electricity, I'd have to think of what the power stations are pushing out to give me that electricity. So we'd have to be thinking more about solar power. And if we had the whole roof tiled in solar tiles. That's something I think would probably be very good... We could be doing so much more...

In summary, the categories that can be derived from the 'conscious competence' model are only approximate and it is easier to identify people from the ends of the spectrum than from intermediate positions. It is particularly hard to establish the boundary between conscious incompetence and conscious competence. This should not be surprising: awareness of areas of ignorance is, after all, a part of competence. The most apparently energy-conscious were also those who showed the broadest general environmental consciousness.

5.6 Inclusion and engagement

Figure 5-3 shows another attempt to categorise the long-term residents of the village, this time in terms of how affected they were by the REAP competition and how energy-conscious (e-c) they claimed to be.

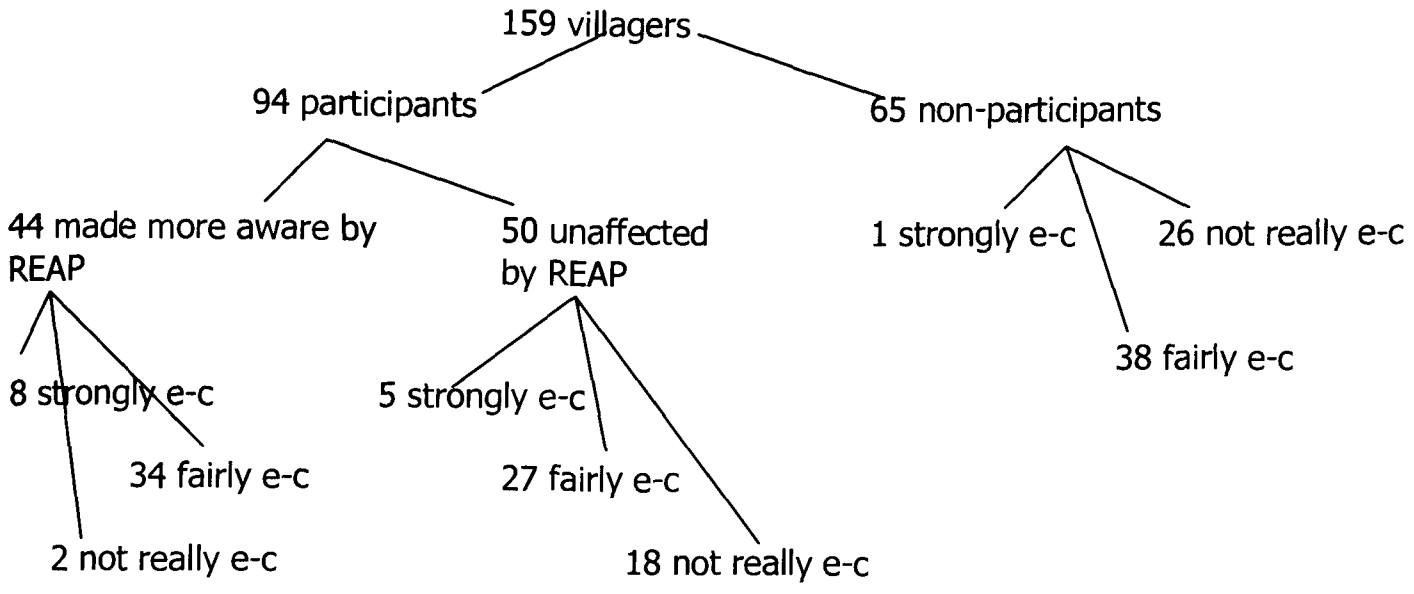


Figure 5-3: Participation and energy-consciousness in Launton

The survey shows a category of people who are not obviously interested in anything to do with energy, but this does not simply consist of non-participants in the competition; neither does participation necessarily imply self-assessed energy awareness. Some took part in the competition more for the sake of the village and because of personal contacts than because of any commitment to energy. Several interviewees mentioned the importance of the village organiser in motivating them to act, for example:

> *Once you've had your instructions from Pat Mitchell, you have to have a very good reason for not doing something! She's marvellous! She gets everybody ... she's lived in the village all her life ... her children went to school with my children.*
>
> (L5)

Others recognised the overlapping nature of interests in the village and the way in which the Environment Group (crucial to the success of REAP) connected with other peoples' concerns about non-energy matters:

> *I was talking to some people* [from LEG] *on New Year's Day, because they were concerned with the natural area that's going to be down here ... because they've had an ecological survey done ... I do know that we've got great crested newts, because I've had them in my garden ... this is why we're saying we don't want a load of houses* [built at the end of the road]*. There's also ... kingfishers feeding*

out of the ditch. So we are all very concerned ... People overlap the groups, so it [the environment] *does come up at different things.*

(L18 – not a member of LEG)

However, there was no significant association between belonging to one or more social groups in the village and taking part in the REAP competition. Loyalty to the village itself and acquaintance with the Village Organiser seemed to be more powerful factors in involving residents in the competition than belonging to subsets of village life, with the exception of the Environment Group. The REAP competition was very successful in terms of making an initial contact with a large number of households in Launton, principally because of an unusual degree of social cohesion and the active involvement of LEG.

But what of the people who did not participate in the competition, could not recall ever asking for energy advice and could not give any sources of information? 34 villagers fell into this category out of the 159 who lived in the village at the time of the competition. They could be classified as a residual group of 'hard to reach' householders. For the Woolwich clients, there was also a residual group for whom the Energy Rating Report appeared to change nothing. From the two surveys, it appears that between 15% and 21% of householders are 'hard to reach' by tried methods such as advertisements and freely available advice, and also by new initiatives such as the Home Energy Report and the REAP. The true figure will be higher, due to sampling bias.

These 'hard to reach' householders should not be written off as impossible to reach, though. Two of them were involved in DIY, for example, and might be open to

information accompanying their DIY materials. One was also a keen gardener who checked her consumption and had a definite sense of the continuity of natural processes. When asked about what 'energy conscious' meant to her, she answered:

> *Well, not so much to do with the heating or the oil or anything like that, but I do think that what you take out of the garden you want to put back in again.*
>
> I: I was saying energy-conscious; you're talking about environment ...
>
> *Well, it's all together. Because it's all swings and roundabouts, isn't it? Because where do you get your wood from, to put on your fire? They're all linked. And collecting your newspaper. You use your newspaper to light your fire, but otherwise it goes in the bin. So I don't see it as two separate things – sort of part and parcel...*
>
> (L102, fairly energy-conscious)

This woman's unwillingness to participate in REAP had stemmed more from a suspicion of the role of the LEG in community politics and from being extremely busy at the time of the competition, than from any lack of interest in energy and environment.

If those who read their meters and/or checked their fuel bills are also removed from the 'hard to reach' householders and recategorised as reachable via communications from their suppliers, the numbers fall to only 17 of the 159 long-term residents. What is more, some of those indicated other possible channels for learning: eight were involved in DIY, if only occasionally, and two had invested in several CFLs. Eleven were over 65 years old, which suggests that they were likely to use medical and social services more than most of the population and might be 'reachable' by health visitors or Meals on Wheels volunteers. By the time the records of all 17 individuals have been examined, very few appeared truly isolated.

On the face of it, then, it looks as though relatively few people from those surveyed would be really hard to make contact with, given the will to do so. Yet 15% of the Launton sample (35) said that they had no loft insulation and did not plan to install it – and few if any dwellings are ground-floor flats. Twelve out of those 35 indicated in the questionnaire (Q15b) that they might have problems with affordable warmth: over twice the proportion for the whole of the sample. As with the Woolwich survey, the signs are that those most in need of good energy advice are not asking for it or are not being reached by what is available.

5.7 Summary

A complex picture emerges from the Launton data of how householders construct meaning, take action and seek help. It can be summarised most usefully in terms of the four research questions set out at the close of Chapter 3.

First, what do people's understandings of themselves as energy-conscious or energy-aware mean, in terms of what they know, do, invest and plan? Three broad types of awareness can be distinguished from the findings. One is demonstrated by the respondents who considered themselves to be strongly energy-conscious and who could support that assessment in various ways. They typically monitored their consumption, considered themselves to be very careful in their energy usage, and had installed and planned more energy efficiency measures than those who did not consider themselves energy-conscious. This type of energy-awareness involved social interaction: those who claimed it were more likely than others to have asked for and used sources of

information and advice and to have discussed energy use with other members of their household.

The second mode of awareness that I identified[14] was essentially practical, and was seen in people with a 'hands on' approach to making changes in their homes, familiar with DIY. These householders were more likely to have made energy efficiency improvements than others, but their behaviour was less strongly associated with seeking advice, remembering information from other sources, being careful in their energy usage or monitoring it. Their learning was strengthened by the actions they took, but may have been held back by lack of reflection and input from others.

The third grouping consisted of those who were aware of one particular piece of explicit knowledge; they were familiar with the theory that burning fossil fuels was a major contributor to climate change. However, they did not necessarily consider themselves energy-conscious, act in ways that might be expected of an energy-conscious person or involve themselves in DIY. There was no association between recognition that burning fossil fuels was a highly significant contributor to accelerated climate change and other indicators of energy awareness or action. In fact, seeking out associations for this item of knowledge from the parameters on offer was almost entirely fruitless: it only appeared to be associated with belonging to a younger age group (aged 50 or less) and/or with having children. This finding does contribute to the sense that 'knowing' this information is different in kind from 'knowing' how to go about improving the home, or monitoring fuel usage.

---

[14] Although the respondents themselves did not necessarily consider themselves energy-conscious.

The picture is complicated by the overlapping of these groupings. However, the Launton survey and interviews do show how a householder's self-understanding of energy-awareness can be meaningful to the researcher in terms of actions, plans and interactions; how the researcher can 'find' a practical mode of energy awareness where the householder may not recognise it, and how a individual's awareness of an abstract piece of knowledge (causes of climate change) may have no apparent practical significance.

The second research question concerns the relative significance of informal learning about energy. The interviews indicated that formal learning had occupied a relatively small place in the memories of respondents: much of what they claimed to have learned had come to them through informal channels and only a third of energy efficiency measures appeared to have been installed as a consequence of formal advice. The Woolwich survey shows an even higher degree of importance of informal channels for learning about energy efficiency and taking action to improve it.

Half the REAP participants had showed a progression attributable to the competition, either from relative non-awareness to thinking about energy, or from relative awareness to taking more action than they would otherwise have done. There is some evidence that this type of progression also happens without deliberate intervention, though, partly as a consequence of informal transfers of information within the village or from other sources: in the years following REAP, non-participants were 'catching up' on participants in installing energy efficiency measures.

What infrastructural or social factors promoted learning? The lack of connection to the natural gas grid appeared to have promoted greater awareness of energy issues than would have been the case if villagers had been connected. As it was, they relied for the most part on more 'visible' heating fuels: solid fuel, oil or bottled gas. All of these give more noticeable feedback on consumption levels than natural gas. Residents' overall fuel bills also tended to be higher than would have been the case with natural gas. It is not possible to gauge how much the extra cost stimulated learning, but it did appear to be a factor in awareness of fuel consumption.

The REAP competition showed how it was possible to raise awareness of energy and to generate home audits by a social approach that appealed to village loyalty and familiarity with a well-known and trusted personality, backed up by an enthusiastic environmental group. It was most effective among that part of the village population that already tended to show some signs of energy awareness, however. What REAP appeared to have achieved was to have speeded up the learning processes of half the participants somewhat, over a period of two years.

The only indication of a social factor impeding learning was the stated disinclination of some villagers to take part in the REAP competition because of their suspicion of the workings of the Environmental Group, who were instrumental in coordinating the village entry. This does contain echoes of the debate about usage and ownership of the term 'environment' and its association with liberal middle-class values, as touched upon in Chapter 2.

Was there an identifiable sequence of processes in learning about energy in Launton, comparable with that set out in the conscious competence model? There was evidence that energy awareness, including willingness to ask for advice and openness to the possibility of installing solar water heating, was built up cumulatively with exposure to different sources of information and with the taking of action on installing energy efficiency measures. For some, energy monitoring appeared to be an important part of the basis on which their knowledge was built. It was usually a habit acquired through childhood experience or through taking responsibility for a household and its fuel bills. Monitoring was associated with action and willingness to learn. Again, there was no clear evidence of causation or sequence, but it appeared that monitoring, normally a long-standing habit, often preceded actions and developments in awareness.

The findings from Launton therefore point to the validity of the elements in the modified conscious competence model as set out in Figure 2-2, but not to the validity of the sequencing. (They also show how difficult it is to categorise people in terms of the model.) Awareness, action and feedback all emerged as useful terms, implicated in the development of energy literacy. Yet they did not have any simple linear relationship with each other, when an individual's overall development of energy literacy was traced. The findings point to a need to modify the original conscious competence model from its simple linear form to something more organic and complex when considering the growth of energy literacy; but they also leave the possibility that the original linear model may be useful when describing the acquisition of a *single* skill, such as the ability to identify the need for draughtproofing and to install it.

The ratio between what people had done to their homes in terms of energy-related alterations and the sum of all alterations was strikingly constant throughout the sample. This demonstrates how the practice of energy efficiency is rooted in a way of life as a whole. An apparent interest in energy efficiency may be a side-effect of other interests such as home improvement, the welfare of the village, or self-sufficiency, rather than a single issue in the mind of the householder. Thinking about energy tends to be rooted in other considerations. This theme is pursued in the following chapter.

6 WEST LOTHIAN: ADVICE WITH FEEDBACK

Energy advice is about people, not buildings. People can learn from the experience of saving energy with one appliance and apply the principles to other things in their life or household.

(Stephen Morrison, Co-ordinator, West Lothian Energy Advice Project, pers. comm., 1997)

An analysis of the West Lothian Council Energy Services advice programme, along with householders' accounts of their experiences of in-depth advice, demonstrates how advice is 'about people' and how householders can extend what they learn from energy advice to other aspects of their lives. This is essentially a statement in support of the possibilities of experiential learning as set out in Chapter 2. The client-led nature of the advice, the sources of awareness and the provision of feedback on consumption are examined as factors affecting learning. Social and structural influences on information, trust, confidence and ability to act are also considered.

6.1 West Lothian District

West Lothian District covers an area of 426km^2 to the west of Edinburgh and has a population of approximately 152,000. It has absorbed many newcomers since the 1960s, especially from Glasgow, and continues to do so. Livingston, in the east of the district, is a new and growing town with over 40,000 inhabitants (Hargrave, 1965; West Lothian Council, 2002b).

The District has a relatively young population, with health indicators close to the Scottish average and household income slightly higher than average (PHIS, 2001). However, the long-term residents have weathered a series of collapses of mining and heavy industry followed by waves of redevelopment; many have been unemployed at some point in their lives and, if in employment now, rely on low-paid and insecure jobs. The District contains pockets of serious deprivation, particularly in the south-west, and approximately two-thirds of the more complex energy advice enquiries come from householders who live in these areas (Lothian Anti Poverty Alliance, 2002; WLCES, 2001).

The *West Lothian Official Industrial Handbook* for 1965 proudly claims that 'the County Council's first consideration is the provision of attractive modern homes, as opposed to the mere provision of "living space"'. Unfortunately much of this provision used the industrial building techniques in vogue at the time, with little or no consideration given to energy efficiency. Examples were the 'steel houses' (metal dwellings covered only with a coat of render); homes built with concrete slabs that have gradually pulled apart from each other; and homes with walls of rendered asbestos that could be punched through by a woman's fist (George Trist, pers comm). The asbestos homes have now been demolished and the number of homes listed as 'Below Tolerable Standard' in the area is below 50 (Scottish Executive, 2000). However, there is still a considerable residue of housing where affordable warmth is difficult to achieve.

The 1991 census records 50% of households as living in accommodation owned by the local authority, Livingston Development Corporation or Scottish Homes, and the

proportion of tenant householders in the area is still high – around 40% (Scottish Office, 1995; George Trist, pers comm).

6.1.1 Local sources of energy advice

There were three main sources of domestic energy advice in the area at the time of this study: fuel suppliers, the Lothian and Edinburgh Energy Efficiency Advice Centre (EEAC) and West Lothian Council Energy Services (WLCES). WLCES reported dealing with 7,725 enquiries during 2001-02 – over 10% of the number of households in the district – making it by far the most significant provider of energy advice numerically. It was also the most significant provider in terms of personal contact: 1,933 of those enquiries led to the opening of case files detailing a series of contacts and casework, and 1,696 home visits were carried out (WLCES 2002). By contrast, the EEAC advised approximately 16,000 residents of West Lothian and five neighbouring local authority areas in the region during the year. It did not offer home visits (L&E EEAC, 2002, pers. comm.).

Scottish Power and Scottish Gas are the main fuel suppliers in the region. In 2001, Scottish Power advised only 957 customers on energy efficiency from the whole of its customer base (mostly in southern Scotland), and gave no information on efficiency to any of its indebted customers (Ofgem, 2002). It scored very poorly in a recent survey of the quality of energy supplier advice provision (New Perspectives/Taylor Nelson Sofres, 2002). There are no separate figures on energy efficiency advice for Scottish Gas, although they shared in the advising of nearly 23,000 British customers by British Gas in 2001. The quality of their advice was more highly rated (Ofgem, ibid; New Perspectives/TNS, ibid.).

6.1.2 Urban regeneration and the West Lothian Energy Advice Project

WLCES had its origins in 1994 as the West Lothian Energy Advice Project (WLEAP), an element in one of the Urban Programmes set up by the government to promote economic and social development in deprived areas of the UK. 75% of the funds for WLEAP came from central government and 25% from the District Council. The mission statement and aims of the Project were:

> *To initiate and administer activities likely to reduce fuel poverty levels in the Urban Programme areas of West Lothian[1]. This will be done by providing a proactive and responsive information and advice service, targeted at the residents of the designated areas.*

The project seeks to implement the following general aims:

- *improve access to information and advice and in particular raise awareness of energy related matters*
- *increase household disposable income through either maximising income, by ensuring maximum benefits take-up, or minimising expenditure, by reducing fuel bills.*
- *improve comfort levels in homes and therefore the health of the residents*
- *encourage landlords to adopt an effective policy on energy efficiency and fuel poverty*
- *promote the re-utilisation and conservation of resources'.*

(Initial plan for WLEAP, 1994)

These aims cover a wide span, from awareness-raising and poverty reduction to policy development and resource conservation. There was however a strong emphasis on the alleviation of fuel poverty and improvement of housing conditions, one that has persisted. Householders motivated by environmental considerations were likely to contact the regional EEAC rather than their more local advice service (George Trist, pers. comm.).

[1] A population of some 30,000 in 12.000 households. The unemployment rate was estimated at 15%, with over 30% of the population in fuel poverty and 40% in receipt of housing benefit.

It was anticipated that client-based work would arise from referrals or general promotional work. Objectives for the first year of operation included the production of leaflets and posters, an information pack, a mobile display unit, a set of promotional materials for talks and a set for training. Referral mechanisms were to be developed with 10 organisations or groups, 300 enquiries generated and 100 home visits made. There were to be three drop-in surgeries per week during the heating season (WLEAP initial plan, ibid.). The original vision was thus for an integrated scheme involving awareness-raising in co-operation with other organisations, information and advice, some of it in-home. In addition, a three-stage case recording scheme was set up which would provide information on

(a) the initial enquiry,

(b) how the enquiry was dealt with, including a report on the first home visit if applicable, and

(c) an in-depth home visit for purposes of monitoring and evaluation of the advice.

Implicit in this recording scheme is a degree of follow-up to all cases that involve more than provision of straightforward information. The basic pattern of reporting has been followed since the project began and is summarised in each Annual Report.

6.1.3 West Lothian Council Energy Services

After four years of operation, WLEAP was incorporated fully into the services provided by the District Council for the whole of West Lothian, as West Lothian Council Energy Services. It was relocated to the Council's 'Advice Shop' in Bathgate, described as 'a

practical way in which we can help people in West Lothian affected by low incomes and by fuel poverty' (West Lothian Council, 2002a). The Advice Shop employs over 20 staff working from the same premises in one generalist and five specialist teams: benefits, money, employment, housing and energy. This allows for easy referral of customers[2] between teams, and also for some sharing of expertise among advisers.

The Energy Advice team consisted of a senior energy adviser (George Trist), an energy advice officer (Pamela Gifford) and a part-time energy advice assistant (Janette Hunter). They were dealing with a steadily rising number of enquiries, from 1277 in 1994/95 to 7725 in 2001-02. While the majority of enquiries were relatively straightforward and dealt with over the phone, the bulk of the work was with the more complex cases.

From the outset, the importance of good communications was emphasised: politeness, prompt service, and reliability. Clarity was also stressed: the senior adviser, who has worked with the programme since the beginning, stated that

> *Plain English is the big deal ... I try to tell [other advisers], to use the philosophy that if your four-year old can't understand it, your customers won't understand it. And a lot of things I try out on my son ... if he canna grasp it I change it until he can.*
>
> (Interview, George Trist)

6.2 The interviewees

The aim was to observe the working of the programme and to interview advisers and a sample of those customers who had received advice and had files in which details of their contact with the advice service were recorded. In this way the two sources of

[2] The most commonly-used term for householders seeking help.

information would complement each other to build up a picture of the client's experiences and learning, along with what they and the adviser believed had been achieved. Three home visits and an awareness-raising visit to a hospital were also observed. Details of recruitment of the interviewees and the interview protocols are in Appendices 5 and 6. The interviews followed a semi-structured format.

The householders whose home visits were observed had agreed to the request that the adviser would be accompanied by a researcher. All interviewees had volunteered in answer to a request sent out by the service. Their contact had ranged from brief and straightforward to long and complex. Most of the interviewees' problems had been categorised on their case files as 'complex' (6) or 'in depth' (2), with two uncategorised but clearly falling into one or both of these categories. One case was recorded as 'challenging'; only one was considered to be 'straightforward'. The straightforward case had involved one home visit, two letters and 2 phonecalls (case notes, WL2), while a typical set of figures for a complex case was five home visits and letters plus fifteen phonecalls and two hours of casework to resolve. The most longstanding client of all had several files: the most recent, from 1998-2001, showed records of 17 home visits, four letters and 34 phone calls (case notes, WL3).

Nine interviewees were retired through age or disability and at least eight were limited in what they could do by ill-health. Half lived in two-storey terraced or semi-detached homes and the rest in flats or single-storey maisonettes. None had started life any further away than Kirkcaldy or Glasgow, and most had lived in West Lothian all their lives. Almost all described cramped, barely sanitary housing conditions in their

childhood. All had been Council tenants for most of their lives, though two had recently bought their homes under the right-to-buy scheme and one had had his tenancy transferred to a housing association.

A strikingly high proportion of the interviewees were the only adults in the household. All except three had been on their own or single parents at the point of asking for advice, and two of those three had been caring for a terminally ill partner at the time. The third had asked for advice at the prompting of his daughter, a member of staff at the Advice Shop, and it seems unlikely that he would have done so without such encouragement. The senior adviser at WLCES commented that he could probably count the number of home visits he had made to non-single householders since 1994 on his fingers and toes. This suggests that many difficulties stem not just from poverty – and single people are more likely to be poor (DWP 2002) – but from inability to solve, or even define, a problem because of the lack of someone to discuss it with.

None of the interviewees had a computer and there was little evidence in their homes that reading was an important means of gaining knowledge. Social contacts appeared to shape their awareness far more than published information; while television and radio may also have been influential at times, they are barely mentioned in the interviews.

No small group of volunteer interviewees can be taken as properly representative of a much larger population of householders in a given area. However, the advisers saw them as a fair reflection of the extent of their more intensive work and this was borne out by a random check of other customer records in the files.

6.3 Awareness

All interviewees were asked what had led them to ask for help from WLCES and how they had gone about it. Three aspects of their replies immediately stand out: the urgency of their problems, the importance of the social networks to which they belonged and the value of close communications between social service and other professionals. There was nothing speculative about their contact with the advice service. It was made because of pressing need and it was made possible because of the formal and informal structures for help and support that were available in the District.

6.3.1 Crisis

The commonest crisis was a fuel bill that could not be paid (eight of the interviewees, of which five involved billing mistakes by the supplier). Mrs D, an elderly widow, made contact with WLEAP because 'The Gas Board make mistakes by the square mile' and had sent her a bill for £284[3]: 'I was just demented'. She did not make contact herself, though: young friends phoned the Citizens' Advice Bureau on her behalf, which then put her in touch with WLEAP, and a friend was there to help when the energy adviser arrived for the first of many home visits (interview, WL3). This suggests an uneasiness and lack of confidence about contacting the authorities, although she had a very legitimate grievance and a good reason to ask for assistance.

The second most common motive for seeking help was a realisation that living conditions had become intolerable. It could take extraordinary hardship before

[3] They had read her meter in imperial rather than metric units, leading to a bill roughly three times as high as it should have been. This was a common mistake.

householder sought help, and it could also involve considerable periods during which they did not have the statutory support they were entitled to:

> *I just got* [gas central heating] *in when my husband died three years ago. And what a shame. He was frozen, you know. So I got a* [bottled] *gas fire and they told me I shouldnae be using it because of causing condensation. But I wasnae fussy about condensation when you had the man lying dying in front of you.*
>
> *...* [George Trist] *said there was a lot of funds that I'd be entitled to, which I didn't know about. So George sorted it all oot because it was going to cost me £1400 to get* [central heating] *myself. Yes. And there's no way I could have afforded it ... my husband had cancer ... with him being terminal, no-one told us about what we were entitled to, I think. Because I nursed my husband at home ... That was George that said I should have been entitled to so much money ... got that sorted out for me, too.*
>
> (WL9)

Another interviewee, also a widow, moved into her home with hardly any furniture following a year in a homeless unit. She had only partial sight and hearing, suffered from arthritis and several internal ailments and had been spending up to 19% of her income on fuel (case notes, WL12). Her account gives an indication of the delays and complex arrangements that can be involved in getting assistance, even when a tenant is in serious distress:

> *When I come in here at first, it was terrible. Had storage heaters and some of them didn't work and for two years in the wintertime it was freezing. There were no heaters in the hall. The one in the spare bedroom didn't work. The one in my room worked but there wasn't one in the toilet. It was really, really cold, like. And to heat up here* [living room] *you spent a fortune. Big big big bills...They* [the Council] *wanted me to pay over £3,000 to get gas central heating in and I said no. I said, 'Every house in this area has got gas central heating, with the Council, free'. I said, 'Why should I?' ... The woman that was in the house before didn't want central heating. I said, 'But that's not my fault. I can't afford to pay that'.*
>
> *... I think it was somebody like, the doctor, the social security, could see the storage heaters and they were disgusting and they were old things ... you don't expect people to live in that, you know ... She visited me and the next thing I knew they put in, and I got it through ... I think, charities thing I think it was,. They paid for it. George Trist helped me to get* [the central heating...] *The leave*

doctor and the social security, they got it. It took a long while, though. Well over a year...before I had the central heating.

(WL12)

Mr C (WL8), a young single father, contacted the Advice Shop because of a threat of legal proceedings by a debt collection agency. He was not aware that an energy advice service existed until after he had been referred to WLCES and been visited by them, although his difficulties included payments, high bills, damp and mould and the administrative confusion resulting from his having changed gas supplier (without realising it) in 1998. These multiple difficulties involved WLCES, a money adviser and the Council's housing officers, who were notified of the need to repair the home and to install a humidistat extractor and new radiator. The referral was triggered, though, by the urgent need to deal with Mr C's debt.

These accounts highlight the common experience of isolation, along with the administrative complexity and delays that are so often involved in arranging public or charitable funding. Awareness of this complexity may override awareness of the need to seek help, until the situation is desperate.

6.3.2 Reasons for asking for help

It is interesting to compare West Lothian householders' reasons for asking advice with those of a national sample of 113 recent customers of fuel supplier advice lines. The most recent WLCES annual reports give the following breakdown of 'presenting problems' that led to a case file being raised:

Table 6-1: Percentage of enquiries to WLCES relating to payment, appliances, building characteristics and other issues (case files raised)

Enquiry category	1999/2000	2000/2001	2001/2002
Paying for fuel (debt, disconnection and disputed bills)	30	16	10
Appliances (heating use, payment methods and faults)	18	33	16
Building (dampness, inadequate heating and insulation)	40	41	69*
Other (requests for video, leaflets, talks and training)	12	10	5

Source: WLCES annual reports, 2000-2002

*this much higher percentage relates to an initiative to insulate homes in the most deprived areas on a street-by-street basis, with over half of the installations accompanied by advice visits.

By contrast, the reasons given for contacting the energy efficiency helplines of the main suppliers show less concern with buildings (only 7% complained of cold, damp hard-to-heat homes) and more with controls and energy efficiency: a third of enquiries involved requests on energy efficiency and information on energy efficiency grants and free measures (New Perspectives/TNS, 2002). This is perhaps to be expected from the nature of the organisations contacted: suppliers would not necessarily be expected to know about, or to be able to act on, difficulties with the fabric of a building whereas a local authority and major landlord would. The challenge for a local authority is the wide range of the problems it is asked to deal with, but this does allow for a more holistic and effective approach, if the resources can be found to implement it.

The liberalisation of fuel supply has led to increasing numbers of requests for advice, with householders confused about how to choose between suppliers, having been cheated into signing a form to change supplier or attempting to deal with administrative

mistakes following a change. Most of these are dealt with by phone (George Trist, pers. comm.).

6.3.3 Householder awareness of the advice programme

Some effort goes specifically into raising awareness of the existence of the programme: advisers advertise from time to time in the Council newspaper, are involved in special events that are reported in the local media and give talks to groups. One such talk was observed in November 2000, when the senior adviser visited patients recovering from strokes in St John's Hospital, Livingston. He first showed them a 10-minute video made by WLEAP to illustrate how readily energy and money are wasted, and followed this by a short talk and discussion, covering the availability of grant-aided measures, the scope of the advice programme, the importance of checking the identity of callers, the merits and demerits of different methods of payment, and how to use a thermostat.

One of the home visits observed had resulted from such an awareness-raising talk, but the 12 interviewees showed a heavy reliance on personal connections before making contact with the advice programme. Only one interviewee had made contact with WLCES using the telephone directory, although the service had been widely publicised in the area since 1994. Non-energy staff at the Advice Shop had been involved in five referrals to the Energy Advice team, while other professionals – a doctor and the warden of a sheltered housing scheme – had referred two householders. Another four of those interviewed said that friends or family had played a part in their contacting WLCES. One commented that the availability of the service was still not well-known

enough, especially for people who would benefit from advice but had not reached crisis point:

> *I just don't feel it's advertised enough ... I don't feel people know enough about it. Because to lots of people, well ... they've never heard of it. Until a problem comes up. But they dinna understand that you can actually just call for advice on how to keep your bills down, how to run your central heating the most manageable for yourself, do all that.*
>
> (WL10)

6.4 Advice giving: home visits

While a considerable amount of advice is given over the telephone, home visits form a vital part of advice provision to the core clients of WLCES – those with problems complex enough to require case files. Home visits are advertised as a part of the Council's service to residents of the area (West Lothian Council 2002b), and the householders who receive home visits include those who pose the greatest challenge to the advisers, because of the severity or sheer number of their difficulties, legal and financial complications, or problems with communication and understanding.

In theory, home visits should be able to provide a means of giving advice that goes beyond dealing with the 'presenting problem' – something that fuel supplier advice lines are criticised for failing to do (New Perspectives/TNS, 2002). As they allow for observation of conditions in the home and dialogue with the householder, visits mean that a more complete form of assistance can be offered and that the shared direct experience of householder and adviser forms the basis for learning. Home visits therefore form an important part of the advice service as a whole, indicating the potential that can be reached when the most labour-intensive form of advice is applied.

A picture of what happens in the course of home visits was built up from the accounts of interviewees, from observation and from the case files. They also contained details of meter readings used for diagnosis of problems and for checking that savings were being achieved according to targets set with the householders.

The WLCES philosophy is that an adviser should *begin* by providing advice 'relevant only to the customer's initial query', but the opportunity of a home visit is often used to extend discussion and action beyond the limits of that query, once it has been resolved (Stephen Morrison, pers. comm.). As an example, although Mr C contacted the Advice Service initially because of a threat of legal proceedings by a debt collection agency, WLCES recorded in his case file that the adviser had measured the extent of damp in the house, was asking the Council housing office to take action and had sorted out the billing confusion caused by a switch to another electricity supplier for 10 months in 1998 (case notes, WL8).

All interviewees had had at least one home visit and five had had several. Most visits involved a combination of considering practical measures and teaching of skills such as meter-reading or more efficient use of appliances. One visit to a young woman led to the installation of a new heating system but also caused a major shift in awareness and behaviour:

> *... Somebody came out and see me. Talked about ways I could save on my bills and that. Things to do and to economise and, use your washing machine at certain times and things like that ... I've got asthma, so he helped me get the central heating in through charities and that* [to replace the storage heaters which gave out a lot of dust]... *And he contacted them all for me and arranged all that. Because I wasn't working at the time, I was a single parent.*
>
> I: What did you learn about that you didn't know before? New stuff...

Just about wasting all the things I had been doing with the electricity. You just take it for granted. You don't think, 'Oh, if I do it this way I'll save money' and it was amazing. Wee things like, your kettle, ken. Don't fill it up. Just put the amount of water in that you're going to be using. And it doesn't cost as much ... Oh, you just think, I'll put water in the kettle and put it on!

I: What else?

The washing machine – do it after a certain time at night. Because it's cheaper doing it at night than what it is during the day ... wee things like that, I'd never thought of it. Switching the light off as soon as you go out ... Keep your curtains closed, it keeps the heat in. It's amazing, just the wee bits and pieces.

(WL2)

The learning described above is what people sometimes pick up almost unconsciously from the adults around them in the course of growing up. Or not, as in this case. It is tacit knowledge, not the sort of learning that is readily picked up from impersonal sources such as leaflets (Heberlein, 1975; Brandon and Day, 1997). The presence of an adviser in the home, able to use the home and its appliances as teaching aids, was far more effective. The customer's reasons for trusting what she was told are partly explained in §6.6 below: she quickly had evidence that her changed behaviour was saving money.

6.4.1 Observation of home visits

Three home visits were observed in November 2000, each lasting approximately 20 minutes. Two of the householders were single mothers and the third was a widow. All three were typical of the WLCES clients with case files in being single adults and Council tenants, but they showed different levels of understanding and ability to cope with conditions and required different types of assistance.

The first apartment was cold, especially along the NW facing wall at the back where the two bedrooms and shower room were located. The householder, Mrs E, was paying £10 per week for both gas and electricity and was in debt. This was not the case for her neighbours in comparable houses, as she knew from talking with them, and she had contacted the advice service because it had helped her once in the past, when she lived elsewhere in the district. She usually turned the heating off during the day while her young son was at school. Cavity wall insulation had been installed but needed checking: it was possible that heat was being lost through a 'cold bridge' in the wall. The adviser thought that the other likely cause of trouble might be a small leak from a central heating pipe, enough to make the observed drop in the boiler pressure. In the course of the visit he discussed the boiler, the bills and possible solutions with the householder and later arranged for Council workers to come and check the wall.

The second home was structurally identical to the first but very warm - Mrs F came to the door in a short-sleeved blouse although the weather was cool and damp. She paid £10 per week for gas and electricity combined. Her main problem was that Scottish Power had sent her a letter stating that she was £20 in debt, but she estimated that the figure should be £40 and wanted help in sorting out the confusion. She had contacted WLCES because she had been a patient in hospital when the adviser had given a talk there. It was agreed that he would phone Scottish Power and find out what was happening, which he did within the hour. The explanation was that Mrs F had 'migrated' supplier (without her knowledge, probably) and had then come back to Scottish Power who would now issue a new payment book to her. While the adviser was in the house

there was also some discussion of the possibility of installing a bigger hot water tank, but she was told that the Council could not afford to do this.

The third client visited had a four-month-old baby and lived in a second-floor apartment with a flat roof, where she was struggling to keep warm. Although she claimed only to have been using a portable gas heater for the past week, the adviser noticed marks on the carpet that suggested she had been using one for much longer and he advised her not to do so, because of the condensation such heaters produce. He would do what he could to see that the Council insulated the roof (not eligible for a Warm Deal insulation grant), but it would take several months. They had a conversation about her bills that indicated that she could well have claimed a rebate from Scottish Gas over the summer (when in credit), which would soon lead to a nasty surprise when the first winter bill arrived.

The householders visited showed different levels of awareness of the nature of their difficulties and what could be done about them. The first appeared the most aware, and it may be significant that she had been visited on a previous occasion, when the advice service had helped her to change tariffs for her electric heating. The third was clearly used to criticism from Council officials, and this had to be understood and overcome:

> *I think a lot of tenants know that if a housing officer goes into the house and sees the condensation and sees the Calor gas heater, they'll specifically blame that heater. I wasn't blaming her for having the heater and she maybe took a little defensive there. You know, 'It's no my heater's fault'. I just tried to explain the ... fact that the excess moisture's making it harder with the heating and so forth ... There's also dimples all over the carpet where she's moved it, so it's been there longer than a week ... when you become an adviser in one of these cases, you also become a bit of a Sherlock Holmes. You start looking for things that people aren't telling you.*
>
> (George Trist)

All three visits demonstrate the efficacy of home visits in going beyond the 'presenting problem' in order to make a more complete diagnosis of what is wrong and what can be done: it would have been far more difficult to establish the physical conditions in the first home or to check the heating and hot water in the second without being on the premises, and impossible to detect the use of a portable gas heater in the third. What is more, the diagnosis is made in discussion with the householder, with the symptoms of the problem clearly visible. It is worth remembering that these visits took place in an area where the main electricity supplier has been criticised for running an energy efficiency helpline that asks very few questions of those who call in for help and therefore cannot have a realistic picture of callers and their situations (New Perspectives/TNS, op. cit.).

6.5 Action taken as a result of advice

None of the householders studied had sufficient income to cover the cost of energy efficiency measures, and most depended on the advice service to inform them about the grants and measures available. Mr N was unusual in that he had applied for gas central heating himself but then decided not to take up the grants available: 'It would have meant pulling the house to bits to put gas central heating in, as you can imagine. And just three or four months after surgery, I said ... [no]' (WL1). Interviewees' own action was largely limited to asking for help in the first place and making no-cost behavioural changes. The physical changes to the fabric of their homes and appliances seem to have been important in strengthening the credibility of any other advice they received, as argued by Green and Ventris (1983).

6.5.1 Improving the energy efficiency of building and appliances

Ten of the interviewees had had some physical efficiency measures installed following their contact with the advice service. Four had gas central heating installed as a direct consequence of contacting the energy advice service. Low-energy light bulbs were supplied to four customers and loft insulation to three, while draughtproofing and radiator panels had each gone to two and thermostatic radiator valves and a humidistat had each gone to one.

6.5.2 Improving timer and thermostat settings

The default timer settings were altered on behalf of two of the older customers (WL 3 and 9), so that they only changed them by using an override button. This may not have been an ideal solution from the point of view of understanding, but it saved them considerable sums of money and was an arrangement that they felt comfortable with. Table 6-3 in $6.8 shows the financial savings achieved in their homes.

6.5.3 Clearing up billing and tariff mistakes

The case notes and interviews demonstrated the importance of advocacy with the utilities and the Council. Mistakes on the part of the supplier comprised a surprisingly large part of the work of the advice service and could be time-consuming to deal with. As stated earlier, some 10-30% of enquiries in recent years stemmed from debt, disconnection and disputed bills. The size of some of the mistakes shows the shortcomings of the utilities in being unable to spot anomalies in consumption:

... when I was first going to Energy Advice and they were looking at billing and things they said 'You cannot possibly burn £400 worth of energy in three months. You cannot do that. You know, that would be impossible in a small flat' ... Well, I said to [the adviser]*, 'That's what it looks like.' And he said, 'That is what they're saying ...'*

I: And the company couldn't pick that up ... I suppose they don't know what the flat's like.

They wouldn't send a representative out.

(WL10)

In another instance, the lack of communication concerned the 'white meter' tariff for cheap rate electricity. The householder had great difficulty keeping warm with his storage heaters and the utility were not able to understand his problem and arrange for his heating to be boosted in the early evening in order to keep him warm in the later part of the day:

I couldn't understand how I had an electrical supply and I couldn't have warmth. And I was told, oh it didn't come on until 11.30 and it was done by outside and it was a signal sent from Radio Forth. And the wee man in the moon said that you had to...oh, the stories they expected me to believe! When common sense tells you that if you've electrical power coming into your house then it's not the hardest thing in the world to get heating from it.

(WL1)

He contacted WLCES and the situation improved, although it was still not ideal:

So the Advice Centre got me the booster. A guy came in, put a new meter in for me, what have you, and it comes on ... I sit and watch the telly a lot at night.

I: But you're still quite limited, are you?

Very limited with this.

I: You can't get it on before 7 o'clock in the evenings?

Can't get it on before 7, no ... so that's why I have that thing there ... That's a Calor gas thing. When you're unemployed, these things are expensive to run.

Mrs K (WL4), who had already lived in extreme poverty while nursing her husband without the Attendance Allowance she was entitled to, found herself with an unpayable electricity bill after his death and was unable to cope with the extra strain of sorting it out through the vagaries of the supplier call centre. The overcharge of almost £400 due to faulty meter readings was finally refunded to her after three months' work by her adviser and the supplier sent her a bouquet of flowers by way of apology. By this time her adviser was becoming something of a friend and had encouraged her to spend her Cold Weather Payment on new clothes as well as teaching her how to operate her storage heaters to best effect. Again, this case shows how an adviser is able to go well beyond the 'presenting problem' when dealing with a householder in her own home.

6.6 Feedback

Feedback is given initially on the effects of behavioural change[4], before it is possible to assess any changes due to installation of measures. It is based on the use of a 'consumption calculator' in the following procedure:

> *An initial fuel meter reading is taken when the client first contacts the project, prior to advice. WLCES then provide tailored advice, usually through a home visit within two days of contact. Following this, clients phone in weekly with readings for four weeks in order to check whether they are achieving savings and for further advice if needed. The first two readings establish the consumption pattern, using a spreadsheet with seasonal adjustment based on material used by Scottish Power. Initial testing found this to be accurate within 5%... It is possible to pick up clients who are falling behind their targets for reduction while the weekly meter readings are being taken, by checking against the pattern of use based on the first two readings. Readings are phoned in until the customer and adviser are satisfied that 'consumption is consistently within their (the customer's) means or target'.*

[4] The term 'behavioural change' covers changes in thermostat and timer settings as well as changes in everyday behaviour such as drawing curtains at dusk and filling kettles.

> *At this point the case is closed, apart from a follow-up call eight weeks later to check that the customer is satisfied and to take a final meter reading. Even with a straightforward case that only requires one home visit, there is a minimum of seven meter readings over at least 12 weeks. The advisers estimate that this gives sufficient time to establish behavioural change: 'If someone was going to return to their old inefficient habitual ways they would do so within three months. In our experience, if they have adopted a change in behaviour for over three months they have changed for at least a year'*
>
> (Green et al, 1998, quoting George Trist, pers. comm.)

The ability of the householder and adviser to track changes in consumption over a short period of time meant that behaviour changes alone could sometimes be seen to be effective at an early enough stage to encourage further action. For example, the young woman mentioned in §6.4 above, who had been told to contact the service because of her high fuel bills for electric storage heating and who ended up with a new gas central heating system, also made a number of behavioural changes. She stated that

> *I used cards* [PowerCards, ie prepayment] *for my electricity. And I wasn't putting in as many again. So I noticed the savings then ... I reduced it right down to, I think ... £20 then ... so I was saving about £5 a week just doing wee different things.*
>
> (WL2)

This was her own feedback, noted independently of the adviser. Her case file gives more details, showing a series of meter readings taken by her and phoned in to WLCES in order to establish first that her electricity consumption had gone down and then (after installation of central heating) that her gas consumption was at an acceptable level. These readings are reproduced as Table 6-2.

Table 6-2: Fuel consumption data from a case file, West Lothian

	Date	Rate 1	Rate 2	Gas
1	1/4/98	32959	78443	
2	16/4/98	33296	79275	
3	6/5/98	33579	80312	
4	27/5/98	33784	80959	
5	5/6/98	33579	80404	
6	10/6/98	34020	81499	
7	26/6/98	34226	81850	
8	3/8/98	34726	81255	
9	*28/10/99*	*00115**		*00001*
10	*16/11/99*	*00262*		*00245*
11	*26/1/00*	*00787*		*01356*

*Electric meter exchanged, gas heating installed.

Mrs K (WL4) had used feedback in an informal way. She described her electric fire as 'nice, but you watch the meter going round'. This had persuaded her that it was an expensive option and now she only used her storage heaters, with occasional boosts if she was getting cold.

In this client-led advice programme, feedback was an important means by which the client continued to take part in the process of learning. At the same time, the adviser was learning what did and did not work for a particular householder in a particular dwelling and was able to base estimates of energy and carbon dioxide savings on a firm footing.

6.7 Social and psychological factors affecting learning

If, as is argued throughout this thesis, experience is a central component in learning, it follows that the life experiences of the interviewees would colour the way in which they sought, understood and acted on advice. Three themes emerged as highly salient in the

course of the interviews: the experiences of tenancy, of facing multiple difficulties and of social contact and solidarity.

6.7.1 Tenancy

Reliance on the Council as landlord influenced the thinking of everyone interviewed to some degree: all had at some stage been Council tenants and two had been registered and housed as homeless for short periods. Developing the ability to use the services and programmes offered by the Council (sometimes in order to overcome inadequate Council provision) could be a crucial element in coping with life. One woman had been brought up in a 'steel house', tolerable in winter only because it had fireplaces in the bedrooms as well as in the living room. These offered a degree of autonomy in terms of the choice of fuel, something that was later denied her mother when the Council 'improved' the heating:

> *I liked the coal fires. And it lasted all night. We'd wake up in the morning and it'd still be going. And we used logs, because they used to fell the trees at Middleton ... the wood was free. We used to go up and put the wood in the boot of the car. ... it gave us fantastic hot water.*
>
> *And then in my mum's house, they put in new heating. One of these Rayburn fires ... still in the steel house ... worst heating we ever had. The house was even colder. It was expensive because we had to have special fuel. And my mum was widowed and couldn't really afford it. So a lot of the time we couldnae actually put the fire on. Because we just couldnae afford to use the fuel. And* [the glass door in the stove] *used to blow out and it used to burn the carpet. You couldn't have it on and then go out. It was terrifying.*
>
> (WL 10)

On leaving home as a young woman, she had moved into a Council flat where 'blow heating' of hot air through ducts at the base of the walls of each room reduced privacy and, in combination with the lack of insulation, gave seriously inadequate heating:

> *We had a dreadful problem there, with the wet on the windows. And we used to get up in the morning and the curtains would be absolutely drenched... the mould was unbelievable. We used to put towels along the windows at night and along the skirtings as well. And the towels would be soaking in the morning. ... This* [window] *there, when it was an old window, it actually got so mouldy that the glass and the sash at the bottom fell away from each other. And this was in the middle of winter, snow ... and it took them* [the Council] *four and a half months to sort that.*

These served as background experiences when she later had to deal with failures in her central heating boiler, leaking pipes, debt and the bills of £300-400 per quarter that eventually led to her seeking help. The sense of control that came with increased understanding and the support of various advisers made a dramatic impact.

Tenancy induced attitudes of frustration, resignation and gratitude towards the landlord in varying degrees and combinations. These were calmly expressed by Mrs A, an elderly widow who had relied on the Council all her life for housing of varying quality. When asked about her new windows, she commented:

> *The Council have been doing all the houses up. Before that, you were frightened the windows were going to come in, because the wood was all rotten. Really bad ... My son, he wanted to complain, go down and kick up a row about it, but I said 'No use doing that. You're not going to get anywhere with them, doing that.' But they came and put them ... took a long time but every year they were going to do it, then it was cancelled. Finally got it done.*
>
> (WL12)

Both owner-occupiers interviewed stated that they were glad to have bought their homes from the Council. One of the two homeowners interviewed twice expressed his contentment with his flat in terms of what he could do with it and what he could invest in it: he was now in charge in his own home and happy with the responsibility:

... I'm lucky in this respect. One o' the better flats ... it's a flat you can really do something with. Such as, well, given time, I suppose I'll get my bathroom all done as well. Get a new bathroom suite. I'll probably get new kitchen units put in. But that's all to the benefit of my son, anyway ... If you were to sell off the flat at this time, you'd get a vast vast profit on what you paid for it ... This flat would sell at about £35,000 at the present time.

(WL5)

However, both he and the other homeowner (WL6) clearly maintained links with the Council and saw it as an important factor in their lives, as when negotiating the installation of new windows and doors:

When I had heard about this from the neighbours and the people down here, they're all going to get double glazing and new doors ... I went to see the Council and I said 'Look, when the houses are done in Mansfield Court, I'm quite prepared to pay my share, if I can be put on the list' So I'll be getting that done probably, October ...

(WL5)

6.7.2 Multiple difficulties

At the time of seeking help, almost all the householders were dealing with physical and emotional difficulties that left little room for curiosity about the working of their heating systems or the extent to which their homes could be insulated. One (WL8) was dealing with a custody battle for his children in the aftermath of divorce; five had severe and disabling illness (WL1, 4, 6, 9 and 12) and four were coping with recent bereavement (WL4, 7, 9 and 11). WL10 faced a crisis brought on by poor housing, inadequate heating and a major misunderstanding between herself and her gas supplier; and WL2 had a young child to care for on her own in addition to asthma and alarmingly high bills. Only one of those interviewed (and one of the three observed on a home visit) appeared to have a straightforward problem. In both cases, the problem was one of erroneous billing

– far more manageable on its own than as part of a complex of problems, but still upsetting and baffling in the absence of expert help.

Multiple difficulties require a number of qualities in the adviser if the householder is to learn from the advice: an ability to inspire trust, listen carefully and understand the nature of the difficulties faced; ability to assess what can and cannot be done and to prioritise; knowledge of what other agencies exist to help; ability to act as advocate for the householder when necessary; and willingness to persist in finding solutions and keeping in contact. There are few short cuts in this type of advice work.

6.7.3 Social solidarity

Friends and neighbours held enormous significance for most interviewees and their absence or indifference was a serious deprivation: 'I never see my neighbours. I could be dead' (WL3). Friends and neighbours could make difficult living conditions tolerable, as demonstrated by Mrs A, who fondly remembered her years spent in a tower block – 'High flats. It was lovely. Lovely neighbours, we were all from Glasgow overspill, we were all going great' – before recounting the physical state of the flats:

> *We'd gas central heating in the flats, when I moved to the high flats. Yes ... but it was on blow... warm air come out.*
>
> I: What was that like?
>
> *Terrible. The place was ... fungus everywhere. Dampness. They used ... what the story goes is, they used a cheap material on plastering the walls and the fungus ... it wasna just damp, it was black everywhere ... They come up and they said, 'Oh, you have to put your heating up full'. I said, 'My heating's up full'. And they said, 'But you have to keep your windows open.' I said 'Don't talk silly. I can't do that.' I couldn't afford that. This is what we were told. And the condensation was really terrible, in the flats. Lovely view, a nice view. But ... yes, it was bad.*
>
> (WL12)

Another account of the role of neighbours during the hardship of the miners' strike in the 1984-85 gives a sense of the tensions when solidarity was breached, as well as the extent of dependence on friends:

> *... when they had the miners' strike and everything, people were going up there and digging for the coal in the ground. And the smell in West Lothian was absolutely disgusting. Because they were obviously turning up some gases. People were desperate for coal ... so I went to my sister-in-law. Her father was a miner. And they found it very difficult. And they actually broke the strike. Because families were suffering so much. I mean, friends against friends. ... Sharing a block of coal ... and everybody had the same idea, to get wood and things. Because everybody had coal fires. Without that we had no water, no heating, there was nothing. Nothing at all. So we're quite spoilt now, with central heating!*
>
> (WL10)

Central heating gave a measure of ease but had a social cost. In the old days, the coal was stored in a shed at the bottom of the garden and

> *... we all helped. And everyone had coal fires ...and you were no different to the rest of your neighbours. That was the place to meet when you were out getting the coal from the cellar. We had some great blethers out there.*
>
> (WL10)

All those interviewed appreciated the comfort of central heating and none were nostalgic for the housing conditions of their childhood, although some remembered fondly their sense of community and the ability to be content with small pleasures. It is not fanciful to conclude that the energy advice service restores a measure of community to the processes of fuel distribution and usage. These have become more distant and more difficult to understand over the lifetimes of nearly all of those interviewed, even as they have allowed for more comfort. If something goes wrong, it is difficult for many people to understand what the problem is, or to communicate with the utility, or to understand

the utility's response. Even if nothing is apparently wrong, the workings of central heating and water heating controls are a mystery to many if not most householders, even if they have 'officially' been given advice on how to operate their controls (e.g. Hill, 1991; CSE, 2000). There is not yet a sufficient body of 'folk wisdom' or collective tacit knowledge to compensate for this lack of knowledge through normal social contacts, and an energy advice service can play an important part in building up shared knowledge in a community, as well as in mediating between fuel suppliers and their customers.

6.8 Achievements

Data from the interviews and case notes show that five of the 12 interviewees had brought down their annual fuel costs to £300-500, while two were paying £500-700 and four were still paying relatively high sums of £700-900[5]. All four may well have had health reasons for using more fuel than average. There was no figure for the twelfth. Table 6-3 gives the approximate savings and estimated annual fuel costs for the twelve interviewees. Unless otherwise stated, the figures are derived from meter readings and the use of the consumption calculator.

[5] The average annual cost of domestic fuel in the UK in 2000-2001 was £619 per household, while that of the lowest gross income decile group was £447 (Downs, 2002). For Scotland, these figures would be slightly higher because of the colder weather.

Table 6-3: Savings and annual fuel costs for West Lothian householders following advice

Householder	Annual fuel cost saving (£)	Annual fuel cost saving (%)	Amount written off (£)	Estimated annual fuel cost (£)
WL1	No record		177	500-700
WL2	No record	Almost 50%*~		500-700
WL3	£400*			300-500
WL4	£156		395	?
WL5	No record		952	300-500
WL6	No record			700-900
WL7	250			300-500
WL8	160#			300-500
WL9	400			300-500
WL10	400			700-900
WL11	No record			700-900
WL12	200			700-900

*householder's estimate.
~ also estimated a saving of 20% immediately, through behavioural change – see §6.6.
#the householder was not sure himself whether he was saving money – probably because he was still paying off arrears.

From these figures, it can be seen that reductions of around 50% in fuel bills occurred in two and probably three cases, while very substantial savings were made by five others. Nine interviewees clearly had increased their levels of comfort as a result of advice, six of them dramatically so (WL 1, 2, 7, 9, 10, 12). The other three had felt themselves to be comfortable enough at the time of enquiry.

While interviewees were not specifically asked about their levels of mental as well as physical comfort, peace of mind emerged as an important theme in the course of the interviews. While there were identifiable gaps in the energy knowledge of most interviewees, all now knew that they could if necessary call upon WLCES again and some expressed their relief that this was so: 'If I ever have a problem I just phone him and he phones me back in 15 minutes. Sorted!' (WL1). Mrs A was now able to enjoy a

sense of triumph over disability and a disastrously cold flat, and to plan the decoration of her much improved home:

> *... we win, we win. We got the gas central heating in. I was in hospital when they came and put it in for me ... this is a nice house. There's a lot to be done yet, it's going to take me a while to get it in ... my grandson's coming tonight* [to decorate the hallway]. *I'm doing a marble effect ... I've got a lot of things to do.*
>
> (WL12)

6.9 What did householders learn?

6.9.1 Use of controls

One of the most important single skills that could be learned was the ability to use heating controls more effectively. For at least two decades it has been known that designers of controls do not produce systems that are readily understood by householders (e.g. Dale and Crawshaw, 1983). Observation of everyday use showed frequent use of the override, suggesting that people would prefer more direct control of a simple system to the more sophisticated systems favoured by engineers (Bartram et al., 1985). A survey carried out among local authority tenants in Stirling concluded that there was little point in providing 'improved' controls without advice and education: two-thirds of a sample of 150 tenants had not adjusted their controls since installation, in spite of having been given 'basic' instruction by the installer a year or more previously (Hill, 1991).

The evidence from West Lothian suggests that these conclusions are still valid. Even with relatively intensive attention from advice staff, most of the interviewees only had a partial understanding of their controls. One who had *not* had energy advice directly

related to her new heating system (because she had been in hospital when it was installed) explained her use of the timer and thermostat:

> *... it comes on maybe 3 o'clock in the morning. And when it comes on I switch it off because I don't need it, you know?*
>
> I: So it comes on automatically?
>
> *Automatically*
>
> I: When does it switch off?
>
> *Well, after an hour or two or that, then it switches itself off. But I switch it off before that. Except in the wintertime, it's on all the time.*
>
> (WL12)

Her understanding did not differ much from that of another elderly woman who had had many advice visits and who still uses her timer manually, as she does not want default settings. 'It used to come on at six, go off at ... it was on when I didn't need it. Water on when I hadn't pressed anything'. The adviser had decided at some point that it was best to arrange her timer for manual use, and she now presses the button three times for 'on' and once for 'off'. She also uses the room thermostat manually: the adviser has drawn in a red mark to show her the required temperature of about 22°C. Even so, she has not grasped how a thermostat operates: 'I put it high at first to heat up, then turn it down' (Interview, WL3). Mrs B (WL6) and Mrs L (WL7) both used their timers manually; one did not have a room thermostat and the other ignored it. There still seems to be something intrinsically difficult to understand about modern heating controls, perhaps especially if the owners have become used to solid fuel heating appliances or blow-vent heating.

Mrs K, though, had learned how to use the control plates on her storage heaters effectively enough to be comfortable for most of the day. She commented that most of her neighbours in the sheltered housing project had apartments 'like saunas' – their ability or wish to control their heating was doubtful (interview, WL4). Mr C (WL8) had learned how to use his timer in order to save fuel when he was out of the house for any length of time, although he had still to learn how to use the thermostat effectively (see 6.10.3 below), and Mrs J had reached an understanding of the principles of her system, when prompted, although the timer and room thermostat had been set by the adviser and she only (occasionally) alters the radiator thermostats herself:

I: Can you control the temperature all right?

Well, I don't have to ... I've got a wee one there [a TRV]

I: Do you use that?

Aye. Well, if it gets too warm I could put it down. And if it gets cooler, I could put it up. But then it comes on and off automatic, by itself. Which is a lot handier...

I: Do you have a thermostat? A timer?

Aye, I have a timer, in the cupboard in the kitchen.

I: How do you set it? I mean, do you have the heating on all night as well?

Oh well, the heating goes off with the temperature of the house. I don't have to touch it.

I: Yes, but does the heating come on during the night? I mean, some people set it so that ...

Oh, I've never touched it since I got it in.

I: So does the heating come on during the night sometimes?

I couldna tell you. Because I'm usually in my bed anyway! ...

I: We usually set ours so that it goes off at 10.30 and ...

Oh, wait a minute. The timer that's timed it, it goes off about 9 o'clock at night. And it comes on at 6 in the morning. Because that was the time that suited me.

(WL9)

The contribution of the adviser has to be tailored to the level of understanding and ability of the householder, and to the time available for teaching them.

6.9.2 Other behavioural change

Three people 'unlearned' their use of supplementary heating: in terms of experiential learning, they replaced 'theories in use' by 'theories in action'. They came to rely on their ability to control their central heating better (WL4, WL7, WL9): 'I understood that if I put the fire on it would be extortionate' (WL7). Mrs J (WL9) now used her electric fire for the 'glow' effect only.

While most of the interviewees had been instructed in use of appliances and given energy-saving tips, according to their case notes, it is likely that many of them would have considered the latter under the heading of 'common sense' and not worthy of mention. Only the youngest found them novel and interesting, as noted in §6.4 above. She was the one least likely to have been brought up with frugal habits.

6.9.3 The importance of insulation and draughtproofing

Several interviewees mentioned insulation and draughtproofing spontaneously, indicating that they were aware of it in a way that they had not been previously (WL2,

3, 7, 8, 9, 10). Only two (WL1 and 5) indicated that they had been aware of grants for insulation before contacting the advice service.

6.9.4 How to use readings

Using meter readings was a part of the process of advice, as explained above, but it was not usually considered necessary to continue doing so, not least because most paid for their fuel in advance and received regular feedback on their consumption in that way. However, two of the interviewees explained that they still read their meters occasionally in bad weather, to check that consumption was not rising too high (WL2, 7) and one would phone in his meter readings if he suspected a problem (WL1). Meters figured in the interviews as items with which the householders were now familiar in a way that they had not been prior to advice: tools in the process of convincing the suppliers that they had made a mistake, or in bringing down their fuel use.

6.9.5 General ability to cope

Perhaps the most positive learning outcome, viewed in the long term, was a sense of achievement and control. The lack of a sense of personal efficacy was identified in the early days of advice programmes as a reason why certain socio-economic groups did not acquire and use information on energy efficiency, feeling as they did that energy was largely outside their control. It was predicted that 'the key to this is ... personal contact and advice which is sensitive to the needs and situation of the particular household' (Gaskell and Pike, 1983). The nature and outcomes of advice given through WLCES endorse this.

The clearest illustration of a change in attitude of this type comes in the comments of Ms M:

> *I think that Energy Advice have given me the confidence to take control and say, 'Look, this is my heating, these are my bills, I'm paying them and I am going to take control here'. Because before Energy Advice came, I felt as if they* [British Gas, who had let themselves into the flat in her absence to install a prepayment meter] *were in control and I had no say ... I did feel on my own with the problem.*
>
> (WL10)

Asked whether the energy advisers had suggested low-energy lights to her, she makes it clear that she did not see it as her role simply to sit back and take what was offered. Instead, she had gone out to look for more CFLs, noticed their increased availability and used them in frequently-used light fittings:

Well, they [WLCES] *had actually said that the Council were going to do a programme. But they only gave us two ... I thought that they were so fantastic that I went out and bought more ... bathroom, kitchen, hall, the ones we use the most ...*

> I: How many do you have now?
>
> *I have three now because they are very expensive ... In fact, I had bought another two and I broke one on the road home ... Cheaper shops like Poundstretchers are doing them now.*
>
> (WL10)

Echoes of Ms M's sense of a better ability to cope are found in most of the interview transcripts. At the least, the respondents recognise that there is a source of useful advice and help nearby should they encounter difficulties in the future. At best, they now feel able to deal with some of the likely difficulties themselves.

6.9.6 Spreading awareness of energy advice

The householders passed the news of the advice service on to others as they had learned about it themselves: by word of mouth. Only one interviewee (WL6) said that she had not recommended the service to anyone, and three mentioned recommendations to specific people with particular reasons for needing energy advice: poor health, high costs for storage heaters and a neighbour's autistic child who would be safer with central heating than with electric bar fires. The rest said that they had recommended the service in more general terms to friends and relatives, at the bookie's, in the pub and at church. This was not always productive: Mr C commented that lots of people in the pub would complain about the state of their homes but did nothing about it, perhaps because 'they don't want to be upheavalled,' or because they had enough money to prevent it seeming a problem (WL8).

These personal recommendations can be seen as adding a new dimension to the modified conscious competence model: the learners raise the awareness of a new set of potential learners, in addition to being more aware themselves of new possibilities.

6.9.7 Limitations to learning

There was considerable variation among the dozen interviewees in what appeared to have been learned and likely ability to solve problems. Variations in householders' learning ability, partly related to their individual characteristics and partly to their circumstances, were combined with variable success in communicating on the part of the adviser. Sometimes an opportunity was missed simply because of absence: Mrs A (WL12) was not taught how to operate her new gas central heating by the advice

service or by the installer, because she was in hospital when it was installed. Instead she relied on a 'girlfriend' who had taught her how to use the timer – up to a point:

> *My girlfriend knew how to work it and she sorted it out for me. All I know is, you press the button and put it off, press the button and put it on! I'm a button-pusher.*

As described in §6.9.1 above, three of the householders had not learned how to use their timers, although they had devised workable methods for controlling their heating manually. Mrs B and her husband had been advised on heating use, appliance use, controls use and payment methods, but she said in the interview that she was unclear about the function of the room thermostat and kept the thermostatic radiator valves at a constant setting. She still could not read the meter, although her husband did so occasionally. The two CFLs they had been given were in the bedroom, as reading lights, while the donated jug kettle was kept, unused, as a 'spare'. Their adviser categorised the couple as 'challenging'. It may well be relevant, though, that these were the only householders interviewed who had not asked for advice on their own initiative, or because of a crisis, or both. Their daughter had done so on their behalf after they had expressed an interest in economising on fuel. It was hard to gauge the level of motivation from talking to only one of the two (Mr B was away at the time of the interview). Mrs B described the house as 'snug': the Council had insulated the loft and walls and they had installed double-glazing themselves on buying their home a few years ago. Their satisfaction precluded any strong wish to economise further and there was no suggestion of any 'environmental' motive to save energy.

Misunderstanding is inevitable from time to time – hence the need to follow up advice to check that it is fully understood and has been effective. During the interview with Mr C

(WL8), it was surprising to hear that during the winter he would leave the thermostat at 30°C and have the heating on all night, 'for the children'. He was sure that that was what he had been recommended to do by the adviser. The adviser said that he had advised Mr C to *start* with the thermostat at 30°C and work down until he was at a comfortable temperature – a point that was obviously missed. The adviser would try to retrieve the situation when he next saw Mr C in connection with the installation of draughtproofing.

A final limitation worth commenting on is that caused by failure to act on the part of the householder. Occasionally clients ask for help but then fail to cooperate with the adviser, even to a minimal degree, and lose out on the potential benefits of the advice. An example was a man (not interviewed) who was advised over a period of five months, was referred for insulation measures and had his fuel debt rescheduled, but failed to make the regular payments needed for his bottled gas supply and exhausted the willingness of supplier and adviser to make further arrangements for him. After over eight hours' work on his case and 29 recorded contacts, the adviser concluded that 'Mr S has been offered every possible solution to his problems and a lot of people have tried to help him. Unfortunately he is not willing to help himself' (WL case notes).

Some householders were too constrained by disability to learn much that they could transmit into action themselves. Relying on outside sources for funding, they also needed the energy advice service to act as their advocate with suppliers, make contact with other agencies for help and (occasionally) interpret their bills. The longest-standing client, Mrs D, sends all her fuel bills unopened to WLCES. Not trusting Scottish Gas any

more after a bad experience several years ago, and with failing eyesight and memory, she has established a long-lasting relationship with the energy advisers which is maintained by phone calls, the occasional home visit, and written correspondence including Christmas cards *('I say, Whatever you do, don't even think of giving up here. We need you. Don't ever leave!'* – Interview, WL3).

That this relationship continues is a testament to the service ethic of the programme and the goodwill of the advisers. But without any increase in staffing levels, the workload per adviser has risen considerably and maintaining such links with past clients may compromise their ability to deal with new clients as thoroughly as they would wish. If, as suggested in this chapter, the energy advice service is primarily an expression of social solidarity, the continuing assistance given to Mrs D makes perfect sense. If it were to become defined primarily as an agent for reducing carbon emissions, Mrs D would probably lose much of her support. Yet loss of the more pastoral aspects of the advice programme, and the personal contact, would almost certainly result in fewer of the word-of-mouth recommendations on which it relies so heavily for raising awareness. A move towards what might seem to be a more efficient use of time would not necessarily mean a more effective programme.

6.10 Summary: awareness, action and feedback in West Lothian

Energy has immense social significance in West Lothian, whose economy depended on shale and coal mining for over a century. Many residents have experienced the transition from belonging to a fuel-producing community to being a consumer in an uneasy and uncomprehending relationship with distant suppliers of gas and electricity. The advice

service run by the Council has brought back an element of solidarity and reassurance to the business of understanding and using energy. Advisers visit householders in their homes if necessary, discussing the nature of the problem with them and reaching an agreement on what action is to be taken by the householder, adviser and landlord (if applicable). The chief aim of the programme is to reduce fuel poverty in the area, but confidence-building and increased awareness of fuel-related issues and where to find help are significant outcomes of the in-depth advice that is offered. Advisers act where necessary as advocates for the householder with the fuel suppliers, housing officers and other officials.

The research in West Lothian did not involve questioning householders' understandings of themselves as energy-conscious or energy-aware, although some impressions of what forms their energy awareness took were derived from conversations about their circumstances and their experiences of the advice programme. Given the composition of the sample, it was not surprising that awareness of energy use was closely tied up with awareness of the cost of fuel, issues of comfort and the high incidence of errors by the fuel suppliers. There was a lack of trust of the suppliers, ambivalence about the role of the local authority as landlord, and appreciation of the assistance offered by the energy advisers. The householders relied on outside sources of funding for almost all investment in energy efficiency measures. In practice, this meant that they also relied on some assistance in gaining access to the funding.

Informal learning appeared most significant in terms of the importance of word-of-mouth recommendations of the advice programme. There was very little use of printed

information by the householders interviewed. They relied heavily on networks of family, friends and neighbours for their information on how best to use their energy or to gain access to help, and it was very noticeable that a high proportion of the advice service's caseload was made up of single people who had no-one at home to help them in dealing with their problems. Where there had been no informal education on how to use electricity efficiently in the home, as was the case with the young single mother referred to in §6.4, the energy adviser stepped in to provide it. The relatively informal style of advice, given face to face in the home, was an important factor in its acceptability and effectiveness. The teaching and learning involved in the advice-giving 'worked' for householders primarily because of the level of direct engagement, the trust this engendered, and the links with other advice providers, with the utilities and with a range of organisations from local social services to national charities. The advice was also extremely 'concrete and specific' (Condelli et al, 1984).

Social and infrastructural issues were highly noticeable in the course of the West Lothian fieldwork. The findings presented here bear out the conclusion of Sheldrick and Macgill (1988), that local energy initiatives to tackle areas of overlap between energy and other social issues have been able to achieve results that would be difficult or impossible to achieve using either micro- or macro-scale approaches. The advice service was accessible partly because it was so closely tied in with other social services, because they were all funded by the familiar local authority, and because there were multiple word-or-mouth pathways for referral among the many networks of residents and service providers. Moreover, these referrals typically did not only result in advice but in some

form of grant-aided action, which strengthened both the credibility of the service and the learning opportunities open to householders.

The infrastructure of energy supply was more problematic. Both Scottish Power and Scottish Gas had a record of offering inadequate advice and – more seriously – of causing widespread confusion and distress by erroneous billing. The role of advisers as advocates for householders, though admirable, should not have been necessary except in exceptional circumstances. It could be said that problems with suppliers often led to learning, by precipitating a crisis and the arrival on the scene of an energy adviser. But that is hardly a recommendation for poor communications between supplier and customer.

The West Lothian study shows a more readily identifiable sequence of learning processes than the Launton study. This is mainly because the West Lothian sample was more homogeneous and more fuel-poor, with fewer options open to householders than to their wealthier counterparts in Launton. It is easy to trace a progression from awareness of the existence of the advice programme, through a request for advice and the taking of action to the use of feedback in order to test whether a stated goal of affordable warmth has been reached. Beyond that, there were signs of the spreading of awareness: 'sideways', by informing others about the advice available, and 'upwards', by investing in energy-efficient lighting or by understanding something of the nature of a new energy problem and how to deal with it. The learning could be seen as a spiral with its roots in experience of specific needs combined with awareness of an agency that could give assistance. As in Launton, awareness, action and feedback were all

implicated in the development of energy literacy, but the relative scarcity of options open to the householders simplified the picture.

The evidence from West Lothian shows that people can learn from their experience and apply what they have learned to other areas of life, as proposed at the beginning of this chapter. The use of personal contact with a trusted individual, highly specific face-to-face advice and feedback are clearly factors in this learning. So is the motivation on the part of the householder to save money and increase comfort: the commitment to take the initial step of seeking advice. The West Lothian research, carried out among householders and advisers in 'ecological' conditions, demonstrates how feedback provides a firm basis from which to discuss energy: the meter readings translated 'invisible' energy into something understood in its own terms and also in terms of cost. None of the West Lothian householders (unlike those referred to in much of the research cited in chapter 3) set out to conserve energy for its own sake. Yet almost all of those interviewed had built up their tacit knowledge of energy-related aspects of life to a level where they could use energy more efficiently.

This client-focussed energy advice programme made little day-to-day reference to energy or carbon conservation. Yet it operates in a local authority framework where the reduction of carbon emissions is an increasingly pressing issue. The institutional demands made on advice programmes are examined in the following chapter, along with the ways in which advisers see their work in terms of learning, outcomes, constraints and opportunities.

7 ADVISERS AND INFRASTRUCTURES

A constructivist interpretation of learning processes has been described and then identified, in householders and in the workings of a local authority advice programme. The previous two chapters have shown how householders learn through social contact, through a wide variety of experiences and information sources, and through action. How much is this recognised by advisers? Through interviews and use of published information, this chapter examines advisers' understandings of what is involved in their work, along with the structural considerations for energy advice programmes. Their accounts are drawn from diverse experiences, but it is possible to pull out some common themes relating to awareness, action and feedback, and to see how the funding and evaluation requirements of each programme affect what is possible in terms of the quantity and quality of advice given.

7.1 The advice programmes: context

Five programmes were visited, in Calderdale and Kirklees (West Yorkshire), the city of Oxford, Thames Valley and West Lothian. Each programme has formal objectives and guidelines and is answerable in some way to its funders. These include local government and industrial sponsors, and the two EEACs visited are part-funded by central government via the Energy Saving Trust (EST). All are affected by the provisions of the Home Energy Conservation Act (HECA, 1995) and the Warm Homes and Energy Conservation Act (2000)

Table 7-1 shows the formal stated aims of each programme, and how these range from health-related targets to the marketing of energy efficient products. Broadly speaking, advisers in West Lothian and Oxford are the most focussed on relieving fuel poverty, while the Calderdale CHEAP project concentrates primarily on elderly people at risk of cold-related illness. The Kirklees and Thames Valley EEACs operate within the same general framework, as part of the national network of EEACs, but show different approaches that are related to local context and perceived possibilities. All programmes run and plan a variety of projects in order to widen their constituencies and funding bases, and these are referred to in some of the interview material.

Table 7-1: formal aims of the advice programmes studied

Advice programme	Stated aims
Calderdale (CHEAP[1])	To reduce cold related illness, excess winter deaths, admission rates to hospital, CO_2 emissions and poor living conditions. To prevent and alleviate cold-related illnesses by improving heating and insulation standards of people over the age of 60. (Background - Acheson Report on inequalities in health.)
Calderdale (other)	Other projects in progress/in planning stages, some in partnership with local EEAC, with health improvement, fuel switching and introduction of renewables as aims.
Kirklees, Calderdale and Wakefield EEAC (referred to as Kirklees EEAC)	To participate as a key element in the government's policy to reduce CO_2 emissions from households; to provide free, impartial energy advice to the general public to help them make energy-saving improvements, save money and reduce CO_2 emissions; reduction of greenhouse gas emissions; raising awareness of energy conservation and energy issues in the wider community; gaining max involvement of the public, the business community and public sector agencies in energy conservation and renewable energy; creation of local employment opportunities in energy conservation and renewable energy.
Oxford City Council	Oxford City Council provides advice and access to a range of grants and discount schemes for home energy efficiency, including insulation and heating systems. It has obligations under the HECA and also provides a part-time home energy adviser.
Thames Valley EEAC	The government has provided funding to the Energy Saving Trust to promote energy efficiency and help achieve government targets of reducing CO_2 emissions by 20 per cent by 2010. 'The objective of the EEACs is to educate people at the local level about energy efficiency, leading to behavioural change particularly in buying decisions. The centres seek to promote energy efficiency and to form links with other organisations to stimulate local action.'
West Lothian Council Energy Services	To improve access to information and advice and raise awareness of energy-related matters. To increase household disposable income by maximising income (benefits takeup) or minimising expenditure (fuel bills). To improve comfort levels in homes and therefore health. To encourage landlords to adopt an effective policy on energy efficiency and fuel poverty. To promote the reutilisation and conservation of resources. West Lothian Council is 'committed to social inclusion and to anti-poverty initiatives' (WLC Advice Shop Annual Report, 2001-02).

Sources: leaflets and websites related to each programme.

[1] Calderdale Health Energy Action Project

The formal objectives obviously affect how the energy advice is planned, carried out and evaluated. West Lothian Council Energy Services had the strongest mandate to operate as a social service, while Kirklees and Thames Valley EEACs were dedicated primarily to promoting energy efficiency and reducing carbon emissions, encouraging householders to invest their own money in measures. Kirklees, though, operated in a different way from Thames Valley because its clientele was different: EEAC staff had a limited amount of latitude in how they interpreted the general aims of their Centre and then went about raising funds, gaining partners and providing a service.

The advisers have their own sense of what their programmes could achieve, and the directions in which they would like them to go. For example, the Energy Conservation Officer (ECO) for Calderdale stated his view that 'There needs to be a whole revisiting of properties that aren't on mains gas', so that more could be done to offer bulk-purchased solar water heating panels. He also hoped to integrate Calderdale's own programme, CHEAP, with the Home Energy Efficiency Scheme (now known as Warm Front); to be able to offer greater cashbacks on efficiency measures for the local HEC*Action*[2] scheme; to spend about £150,000 per year on insulation for over-60s and to develop work on improved ventilation (interview, Andrew Cooper). In addition to extending his marketing of energy efficiency measures, the manager of the Thames Valley EEAC hoped to recruit a member of staff who would advise local authorities in the area on how best to meet

[2] HEC*Action* was launched by the Energy Saving Trust in 1996. The newly-designated Energy Conservation Authorities (ECAs) were invited to apply to the EST for funds to implement local schemes to improve energy efficiency in housing. HECAction was designed to stimulate activity in this sector and facilitate appropriate partnerships at the local level. (http://www.est.org.uk/local-authorities/est.html?local-authorities-hecaction.html)

their HECA obligations (interview, Bob Jackson). This would extend the type of service offered and forge closer links with local authorities who were often struggling, with a single part-time member of staff, to comply with HECA requirements.

The senior adviser with West Lothian Council had ambitions to diversify the work of the service, scaling it up from two and a half full-time advisers. Invited to think expansively, he commented that he would like to employ as many as ten, including:

> *... NHER [3] surveyors to do sample audits so that we can get better information on Council stock and private stock. We'd have people who were dedicated to deregulation* [advice] *... I would expect to see ... probably in the region of seven and a half thousand people* [per year, over 10% of households in the district[4]] ... *We'd also have talks, training ...* [visiting] *new tenants, getting in there before they get their first winter bill, before they start putting the heating on for 24 hours a day because they don't know how to use it ...*
>
> *What we're going to try to do is get into the estate agents so that* [they] *can say 'There you are, there's your key of your new house ... One thing you might want to think about is the energy use, how you use your heating and so forth. Here's somebody in West Lothian who can help you free of charge'...* [finally] *I would like a bus. It'd be good for roadshows and schools and shopping centres and it could tour round the district. We could have a welfare rights officer or a money adviser in there as well ... I don't think there's an issue that could come up that we couldn't deal with relatively quickly with a team that size.*
>
> (George Trist, West Lothian)

Even without such wide ambitions, managers have to formulate plans, negotiate with government, fuel suppliers and other potential funders, and collaborate with other organisations. They may evaluate their own work, or this may be taken care of by others, as when the EST evaluates the EEACs' quality of service and commissions market research on the outcomes of their advice. The advisers interviewed for this study

---

[3] National Home Energy Rating

[4] This is about the same as the number of enquiries made in 2001-02. However, the majority of these were dealt with briefly – not face to face, or in any depth.

talked not only about their day-to-day work but also about issues such as the state of the Warm Front scheme, the Fuel Poverty Forums where they meet with colleagues, relationships with government bodies and with local voluntary organisations such as Age Concern, the reporting requirements under the HECA and the economics of running their programmes. All these relationships and requirements affect what they are able to do and how they go about it.

The Home Energy Conservation Act provides a framework for an annual evaluation of progress in improving the energy efficiency of the nation's housing stock. The accuracy of progress reports under HECA is sometimes questionable (New Perspectives, 1999), but the continued obligation to produce them means that local authorities pay some attention to initiatives to improve the housing in their area, whether this is owner-occupied or rented. Under the 'McAllion option' in the Warm Homes Act, local authorities are also required (though not legally obliged) to report on their policies and achievements in reducing fuel poverty.

Reporting requirements are welcomed in the sense that they allow for some evaluation and may keep an advice service in being by focusing the attention of the local authority on the issue of energy conservation and motivating them to continue funding advice (interview, George Trist). But they can be problematic. The Thames Valley HECA Forum members – mostly energy conservation officers and EEAC staff – were critical of the system of reporting under HECA and corresponded with the (then) Department of the Environment, Transport and the Regions (DETR) to express their dissatisfaction. Their difficulty was that they were required to give quantitative estimates of their

achievements that were imprecise (and sometimes incredible), because of the lack of hard data. The local authority figures for improvements in domestic energy efficiency between 1996 and 2000 ranged from 0.20% in Nuneaton and Bedworth to 19.35% in Carrick, for example (DEFRA/DETR, 2001) – and there were no postcoded figures from fuel suppliers to supplement and support such estimates. At the same time as being asked to produce these figures, energy conservation officers (ECOs) were being told that they were not as important as 'good news' stories of best practice (correspondence between Thames Valley HECA Forum and Mike Summerskill, DETR). Attendees at the Forum resented the effort put into making returns that they knew to be of limited accuracy and that were in any case regarded as of secondary importance. They also saw DETR responses to their data as unreasonable and arbitrary. For example, one energy conservation officer submitted extremely similar returns in two consecutive years. The first of these was criticised heavily while the second was praised (Emma Thomas, Oxford Assistant ECO, pers. comm.). This sort of treatment was seen as demotivating and unhelpful.

As funding is normally short-term, planning tends to be project- rather than programme-oriented (Boardman and Darby, 2000, Chapter 3). Guidance to local authorities on designing HEC*Action* projects shows some of the consequences of a short-term view. For example, home visits are not proposed and, although face-to-face advice outside the home is recognised as valuable, it is made clear that it can be costly and depends heavily on the individual qualities of the adviser (EST, 1999). In this way, a type of advice that can be highly effective is sidelined in favour of more formulaic, standardised

models that require less experienced advisers, fewer well-trained advisers, and less support.

Long-term funding for energy advice programmes is hard to come by: advice still tends to be seen as a peripheral activity for local authorities that constantly have to review their spending on services. As a consequence, there is little in the way of secure employment for an energy adviser, let alone a career structure. The £160m+ per year generated since 2002-2003 through the fuel suppliers' Energy Efficiency Commitment (EEC) cannot be spent on advice (Boardman and Darby, 2000). The reason relates to evaluation: there is no agreement on how to credit energy suppliers with savings from advice, as they are credited with the installation of insulation or low-energy lighting[5]. The issues are still being researched and debated, for example by the Energy Advice Providers Group of the EST Energy Efficiency Partnership. In the meantime, the context for most advisers is one of shifting sources of funding, short-term plans and little in the way of training or career progression.

Given these conditions, advisers have to learn to work within a shifting network of agencies and funding arrangements, constantly looking for new sources of funds and thinking up new schemes that will attract support from sponsors. The Calderdale District Council ECO spoke of the need to 'continually reinvent ourselves' in order to keep the programme's work interesting, fresh, and newsworthy. This was in spite of an unusually stable arrangement with his regional health authority, which paid £100,000 per year for installation of efficiency measures in the homes of elderly people, in hopes of cutting the

[5] The accredited savings from installation of efficiency measures are normally estimates rather than metered savings.

winter occupancy of hospital beds. This allowed him a degree of flexibility in spending the money so that he could accommodate individual circumstances: for example, someone with chronic illness who lived away from the gas grid and was given oil-fired central heating to replace electric bar fires. His primary aim was to supplement and humanise the rigid provisions of much grant-aided home improvement. In carrying this out, the programme was able to match provision more closely with need, and to provide a higher standard of service than that given by many installers.

The manager of the Thames Valley EEAC depended on special projects for roughly half of his funding[6] and relished the challenge of setting them up. Advice could only be supplied to people living in his EEAC area, but the projects could operate anywhere where he had the necessary agreement; an insulation discount scheme in Wokingham, a condensing boiler scheme that covered a large area of south-east England, and grant-aided installation of efficiency measures for a local housing association. He was also in the process of applying for funding to build up referral networks with health visitors so that they could identify and refer people in need to the EEAC.

The Thames Valley manager found the uniformity imposed by the EEAC network frustrating in some respects. For example, the computer-generated home energy reports sent to customers[7] were 'not as user-friendly as I'd like. They're a bit lengthy ... I think they need to be a bit shorter and to the point'. (This view was shared by the Kirklees EEAC manager.) While he appreciated the EST wish to provide a common service

---

[6] Most of the remainder was supplied by the Energy Saving Trust and local authorities.
[7] Comparable with the 'information packs' sent to the Launton householders by the EEAC.

throughout the country and valued the efforts they made to monitor and improve standards of service, he would have preferred to be able to produce his own versions of home energy reports and to tie local initiatives into his system more than was possible at the time.

West Lothian Council Energy Services and the Oxford home energy adviser were unusual in being primarily funded by the local authority. The West Lothian service operated from the premises of the District Council-funded Advice Shop, a comprehensive welfare-related advice service, but it was also involved in some short-term projects funded or part-funded from elsewhere. The Oxford adviser operated from the Council's Environmental Health Department. Both were therefore integrated in a wider scheme of provision, which allowed them some interaction with colleagues whose primary concern was not energy efficiency. The colleagues picked up some knowledge of energy issues from working with the energy advisers, and were able to refer some of their clients for energy advice, while the energy advisers in turn could refer their clients for other welfare services when appropriate (George Trist, pers. comm.). All the advice programmes relied on networking with other agencies to some degree for their effectiveness. The Calderdale CHEAP project worked closely with Age Concern volunteers – some of whom had a City & Guilds training in energy awareness – who referred elderly householders to the home energy adviser, while staff at the newly-established Kirklees EEAC were busy giving talks to a variety of organisations in the area in order to build up a 'support network' of energy-aware professionals and citizens who could provide referrals (Andrew Cooper and Lisa du Lieu, interviews).

In summary, the programmes studied covered a range of approaches to energy advice, from marketing energy-efficient products to the provision of in-depth advice to the fuel poor. But they shared some common points of reference, particularly the HECA and Warm Homes Act, some common ways of working in partnership and some common constraints regarding funding and planning. The following section looks at how advisers view the nature of their work.

7.2 Advice-giving

The advisers differed in perceptions of how they should relate to national initiatives, project partners, funders, fuel suppliers and individual householders. A number of possible roles for the adviser emerged: teacher, troubleshooter, advocate, networker and marketer of energy efficiency. Each adviser would adopt more than one of these roles, but the emphasis varied quite markedly between individuals. So did the emphases on awareness, action and feedback.

7.2.1 Establishing relationships, defining problems, building awareness

All the advisers interviewed saw themselves as teachers to some extent. Not surprisingly, the advisers who carried out home visits had the strongest perception of themselves as teachers and stressed the primary importance of their relationship with householders. The home energy adviser for Oxford City Council stressed the need to take time to build up a relationship with his clients, even if it meant enduring a tirade of resentment and frustration with the Council. It was also vital to avoid being seen as a

killjoy, for example by suggesting that audio and video systems should be switched off. These often represent comfort, and an adviser who appears to threaten a way of life will not be listened to. Having established a rapport with the householder, he could then try to understand and articulate any energy-related problem, often only part of a complex of problems that threatened to overwhelm the household.

He saw personal contact, reaching the 'whole person', and changing peoples' thinking as the essence of his work. Accepting that some of his clients were unlikely to change their energy-using habits, he maintained a basic faith in his ability to bring about a change in awareness over time with most people. Many fuel-poor households with satellite TV and all manner of electrical consumer goods did not believe that they were using electricity:

'People don't see electricity as fuel. It's invisible. There is no knowledge base on fuel.'

He would deal with that by switching everything off and inviting them to watch the meter as various items were switched on, and using guessing games, asking them which appliance used the least electricity. He told the story of a woman who had told him she was not going to do anything he suggested, but who had then referred a neighbour to him two years later and told him that she was after all taking some action to have efficiency measures installed: *'A message from you may form part of a sequence that will <u>eventually</u> lead to action'* (John Green, interview, emphasis added).

One of the EEAC managers had a similar faith that awareness-raising messages could be effective, given time, but he spread his energies much more thinly:

> *You've got to do lots of different things. You can't say direct mail's the answer, or roadshows are the answer. So you do a little bit of everything and it does take a lot of time ... Even when things don't always work ... if they've raised awareness with one person, in a way that's worthwhile. .. if you have a great effect with a small group, it's often as good as a little bit of an effect with loads of people...*
>
> (Bob Jackson, Thames Valley)

Constructivism is implicit in both viewpoints. What the adviser says on his own may not be effective at the time. But in combination with many other messages and experiences, over which he has little or no control, his message may eventually make sense and lead to some action. If it has a 'great effect', there will be further consequences and the message may eventually be spread more widely by those who are newly convinced. Furthermore, it is worth trying many different methods of trying to convey the same sort of information, recognising that different people respond to different types of message.

It is striking that almost all of the West Lothian clients receiving in-depth advice lived on their own, and observation and interviews confirmed that an important part of what many learned from their adviser was how to define their problem – more difficult for them because there was normally no-one to discuss it with. The manager of the Kirklees EEAC commented that *'I think one of the ways of giving expert advice is to assess what they don't know'*. That is, she saw the importance of assessing what Vygotsky termed the zone of proximal development – the area of knowledge through which the adviser could guide the learner and which the learner could not manage unaided. Having produced a working definition of the problem, it was then possible to explore what could be done to help.

Only one adviser showed a reluctance to let the householder take the lead in defining the problem that required advice. The Kirklees adviser who was responsible for carrying out home visits[8] appeared to see a house very much in engineering terms, as a box that loses heat. He concentrated on conveying to householders what could be done to conserve heat within the fabric of the house, checking that they understood this message before leaving. But he acknowledged that what he wanted to say was not necessarily what they wanted to know.

If the adviser takes a more complex view of domestic energy use, s/he will widen the scope of questions in an attempt to define the problem. If home visits are possible, then observations can be made. If the adviser is limited to the telephone, then s/he clearly faces extra challenges that are not always easy to meet. The first task is to understand what the 'presenting' problem is, from the householder's own words. The second, which requires some sensitivity, may be to establish what is unsaid and to look behind the presenting problem to one that may be more severe. The Kirklees manager described how this could occur:

> *They will have mould and they'll have condensation and they'll have things in their house that they're quite embarrassed about. And when they first rang up, I wasn't experienced enough to twig that they want me to ask this question but they're waiting for me to bring it into the conversation. Today a lady rang up – a lone parent – and said that she'd got condensation on her windowsills and what she meant was, she'd got mould round her windowsills. So from that I asked, did she have it anywhere else? And from that I found out that it's all through the entire house and she had but was too embarrassed to tell me.*
>
> (Lisa du Lieu, Kirklees)

This sort of diagnosis is of course impossible when the advice is based on a home energy survey that has been processed by computer. For success, such advice depends

[8] This was an unusual arrangement for an EEAC.

heavily on a long sequence of conditions being met: categories in the survey form being appropriate to the home in question; the householder being able to understand and fill in the form; the computer software making sense of the information supplied and providing appropriate answers on the home energy report; and the householder understanding the report and being motivated to take action. It is easy to see why the Thames Valley EEAC manager regarded the Home Energy Survey as the beginning of a process rather than an end in itself:

> *Just the HES on its own doesn't create action ... people get this report and it just ends. It gives me that impression. Well, there you are. Off you go ... don't ring us again. I would much prefer that it encourages people to think ... 'this thing talks about cavity wall insulation' or whatever... to ring us back and to take it a step further. And for us to be able to deliver it a step further.*
>
> (Bob Jackson, Thames Valley)

By seeking out funding for work that recognised individual circumstances and could supplement relatively rigid schemes like HEES, the Calderdale ECO was able to fund a full-time experienced adviser to go into homes. He emphasised how communication skills themselves add to the flexibility and effectiveness that can be achieved in a good programme or project:

> *You need to look at the disadvantaged groups you've got out there and say ... how do you handle somebody who's got difficulties with language? Slow learner ... How many times do we think a HEES assessor is going to go out there and say 'Have you got a problem with your bill? All right, well, give it to me, I'll get in touch with your fuel utility, I'll have a word with them, I'll take it on.' They won't do it. They'll say 'Put a cupful of water in your kettle and don't use any more of that,'... or 'Close your curtains at dusk'. And there'll be a tick sheet and they'll go, 'Done that', and it's not personalised ...*
>
> (Andrew Cooper, Calderdale)

In circumstances like that, the householder will not even be able to present a problem unless s/he is forthright; s/he will be the passive recipient of the information passed on

from the assessor's 'tick sheet'. A comparably formulaic version of advice-giving contributed to the conclusion that the New Earswick advice project had been a disappointment (Walker and Oseland, 1998). A more fitting conclusion is that, for many people, such an approach barely allows for learning. Communication skills are not the icing on the 'advice cake'; they are a basic constituent of the cake. They are part of the tacit knowledge without which the adviser cannot convey anything useful to the householder.

Energy advice sometimes involves transforming awareness and demolishing misconceptions. It may be necessary to sort out the problems created by others, not least the fuel suppliers and installers. In a newly- competitive market, commented George Trist, suppliers might have been expected to try harder to be good to their customers:

> *But the general perception is they haven't. They've got worse ... very rarely do you have any kind of* [problem] *where the customer can go and sort it herself. Because of the hassle and the grief they get on the telephone ... when you go through the call centres now, it's so hard to get anything.*

A householder cannot count on learning anything useful from the supplier (a conclusion backed by New Perspectives/TNS, 2002) and, as shown in the previous chapter, the supplier may be the cause of distress and deprivation through erroneous billing or erroneous transfers between suppliers. Neither can s/he rely on a central heating installer to provide the knowledge needed for affordable comfort:

> *We have a thing called 'plumber setting', and it's if you go into a house after a plumber, who's ... just installed the heating system. The hot water tank thermostat will be at 90, boiler thermostat will be at Max. or 6 ...* [Plumbers have] *got to check everything before they go. 'So we'll test it at High. And we'll leave it at High. Put the heating on Constant, put the water on Constant and if it's too hot, Missis, turn it down. And if it's too cold, turn it up.' And they walk*

> *away. So you're in control. The tenant thinks they've got the one* [thermostat] *on the wall, it's an on-off switch, which leads to over-heating, under-heating, over-heating...*
>
> (George Trist, West Lothian)

Here is an example of how pernicious advice can be, coming from someone who has some technical expertise and sounds confident but is not trustworthy. Although such a plumber may be constantly in and out of the homes of fuel-poor people, it has been no part of his training to consider how to operate the systems he installs in a way that will give householders affordable warmth. The energy adviser's role is likely to include making good the damage caused by others who also, in their way, give energy advice. Yet an energy adviser has very little in the way of formal training. The basic qualification is the City and Guilds 6176 course in Energy Awareness, which is completed within a week. Some advisers may also hold qualifications as NHER surveyors or assessors, and a few more experienced advisers have gained an NVQ Level 2 certificate in energy advice. Useful as these qualifications are, the advisers made clear that they had learned most of what they knew from the experience of dealing with householders. In their view, an experienced and effective adviser is one with a body of accurate (explicit) knowledge about buildings, appliances, billing arrangements and insulation measures. But this is backed by a body of less communicable (tacit) knowledge that s/he has accumulated over time, on how to build trust, listen, convey information, judge the effectiveness of what has been achieved, network with others and look for promising opportunities for future work.

7.2.2 Action: visible outcomes

The Thames Valley manager, asked how he evaluated his work, answered straight away that

> *The main thing I look for is action. Everything else is by-the-by. ... Really, it's about numbers of boilers and it's about numbers of installations. And that's how I measure it. Partly because a lot of the project work I'm involved in measures that...*

This personal evaluation fitted with his overall motivation and commitment to his work:

> *I enjoy the project work. I love creating things. I don't have very good attention to detail, I don't have a very good long-term commitment to a lot of things, but what gets me up in the morning is to get new projects going and then constantly improve them ... that results, ultimately, in more people taking action.*
>
> (Bob Jackson, Thames Valley)

Action is clearly the most important element in evaluations of the work of almost all the programmes. It is relatively easy to record how much insulation has been installed, or how many condensing boilers and A-rated freezers have been sold. The HECA returns for each locality will contain an estimate of improvements in the energy efficiency of the housing stock, based on installation records, and the annual evaluations of the EEACs will contain figures for all the measures installed on advice.

Yet action does not necessarily happen as a direct consequence of a piece of advice, whether spoken or written. Some of the advisers spoke of what was necessary in order to make sure that advice relating to grant-aided measures was put into action:

> *We're not saying, there is a HEES grant available, ring this number. We're directly referring them* [by email] *and then getting the HEES surveyor out to see them. And we're hoping that it will provide better statistics – you, know, that more people will get the grants because we're not relying on them to make the running. ... ringing up about a HEES grant, it's very difficult, because you get put on this waiting list and you can be on the phone for about 15 minutes, just*

waiting to talk to somebody. And that can be very difficult if you're an elderly person, very confusing. That's why we're trying to make it as easy as possible.

(Angela Walsh, Calderdale)

To provide this 'accompaniment' – taking action on behalf of householders, while keeping them informed about what is happening – is not necessarily going to teach them much. But it is necessary if the available grants are to reach the most needy, and if the advice programme is to gain credibility and word-of-mouth recommendations.

EEAC advice consists mostly of prescriptions for action and has been criticised at times for an oversimplified approach. This was vigorously refuted, partly on the grounds that installing measures is not necessarily simple. One EEAC manager stressed the importance of accompanying the client through to the point where action was taken, and beyond if necessary. The sending out of a home energy report was only the beginning of a series of thought-processes on the part of the householder that might quickly fizzle out if there was no additional help or prompting through the various stages of making a decision and implementing it. However, funding arrangements could militate against staff time being used for follow-up:

I would much rather see EEACs being able, right through from raising the awareness to fitting the thing in the person's house. Obviously you have relationships with other people doing those specific roles, but you're involved and you're the key from start to finish. And at no point saying, I can't help you.

... It's not guesswork. We know that these people are buying condensing boilers. And they've been on the phone to us 6, 10 times, they've had the information, they've come back for more, they've requested information from installers and got their three quotes and come back to us to seek some more advice about that ... but lots of times they might be sent a pack and they just put it aside. They need reminding: 'You've had this information and what do you think? Do you want anything else from us? And if you do, tell us.' ... The pressure's on you. Because the more people you give advice to, the more funding you get. So there's not a lot of room. I'm not paid to follow people up. I'm not going to get

> *more money from the Trust or from partners to ring people up. But that's what I would like to do.*
>
> (Bob Jackson, Thames Valley)

One of the basic funding streams for the Centre was based on a £4 payment for each completed HES sent to the EST for processing. As a consequence, the benefits of the EEACs were spread more thinly than they might be, with many people (probably) making minor changes but few making more significant changes and many ignoring the written advice altogether. While this may have been acceptable for a short period of time, with any action thought to be better than none, it is hard to see the justification for sustaining it. If advice is worthwhile, it is worth funding it in such a way that it can be carried through to action more consistently.

7.2.3 Feedback and following up advice

Only the West Lothian programme had follow-up built into the structure of its daily work (though the Oxford adviser did use meter readings and bills to help when dealing with people in debt). Advisers at the other programmes were shown a sample file from West Lothian (see Appendix 7). Their responses were all favourable. One of the Kirklees staff exclaimed that

> *It's exceptional.* [Another staff member added that they would need about another four staff for that degree of thoroughness]... *We just couldn't do it with the staff we have. We all have difficulty doing our own jobs at the moment, don't we?*

A little later, though, their Manager added a comment on billing, showing that she did in fact use some information from bills when advising a householder by telephone,

although not in a systematic way. She also illustrated the level of ignorance among the fuel rich as to what 'normal' consumption levels might be:

> *I'll always ask, 'You've got a 3-bedroom semi and how much are your fuel bills?' And they'll say, 'Well, my gas bill is so much a quarter and my electricity bill is so much a quarter' and I'll think, Well, that sounds about average. But if it's, like £600 a quarter for electricity bills then I know there's something disastrously wrong. And they often maybe haven't realised that's a lot. The only people who do realise that they're spending an awful lot are the people on coal ... I've just been speaking to a gentleman yesterday who spends ... a year, just under £1750 on fuel. ... I was just amazed. So I've sent him all sorts of details on how you would possibly reduce that, and asked him if he's thought about changing to mains gas ...* [He said] *'Do you think that's a lot?' And I thought, Quite a considerable amount! The history of their billing is not something that I automatically bring up in conversation but it is something that I talk about.*
>
> (Lisa du Lieu, Kirklees)

Angela Walsh, the Calderdale home adviser, was funded to give in-depth advice but did not find much time for much follow-up or use of feedback. She saw this in terms of feedback for the programme (evaluation of effectiveness) as well as for the householder, commenting that

> *I think that this is the part that we stumble on ... Because I get the measures in place and then I don't have enough time to follow up ... we rely on people sending us little thank-you letters saying 'Oh, we're so much warmer now'. ... It's difficult to find out how much it has benefited people. Obviously, the direct way is whether the house is warmer, whether the bills have gone down or whether they're feeling healthier. And I think the fact that so many more people are being referred* [for advice and measures] *... Mrs So-and-so's had it done, so her neighbour wants it doing. I think that's the best way. Because obviously, you're not going to recommend something to somebody if you don't believe in it yourself.*

The Thames Valley advisers were impressed by the West Lothian system but, like the Kirklees staff, thought that it would be impossible to use feedback in any comparable way as part of their service. They did occasionally use bills as a means of helping their client, if the householder raised the issue:

[If] they have specific problems with high fuel bills ... we might start to enquire about their bills and usage and ask them to give us that information. I've had a lady recently ... they heat a conservatory and consequently are going to have enormous bills. And we had to look at that in order to give that person a confident answer about the bill when you heat your conservatory ... I think it's something we should naturally be building into our customer service.

(Bob Jackson, Thames Valley)

What emerged from this exercise was a sense of how useful feedback could be to advisers, not only to householders. It would clearly help them in their task of teaching. All the experienced advisers in fact used fuel bills to guide them in giving advice. The difficulty for them lay in not having the time or the structure in which to incorporate feedback easily, as a matter of course, whenever necessary.

7.3 The content and processes of advice

Content and process are intertwined: the way in which advice is offered helps to determine what the content will be. If home visits are possible, then the adviser and client between them can work towards a diagnosis of the problem, as shown in the observations of West Lothian home visits in $6.5.1. Between them, they work out the nature of the problem, possible solutions, priorities and how to implement them. At the other extreme, paper-based advice from an EEAC is determined by the assumptions built into the computer software that generates the advice, and by the questions asked of the householder in a standard Home Energy Survey. One interviewee claimed that paper-based advice is good only for people who know what they want in the first place (John Green, Oxford). This probably overstates the shortcomings of written, formulaic advice but it is accurate in identifying the main failings – a lack of diagnostic ability, specific to the household and the people who live there. Such advice will also work only for people

who are relatively literate and who are able to understand and act on the written recommendations of their own accord.

In between these two extremes comes the advice that is given over the phone, where the adviser must make guesses and assumptions about what will be appropriate advice because s/he is unable to assess the nature of the problem at first hand. These assumptions may not always be justified, as one adviser admitted when comparing his work with a previous post:

> *Compared with when I was down at Southampton, I've noticed that I've moved away from the use of behavioural-type measures a lot. We're in a more affluent area, people are more educated, and they're making common sense decisions... it's not happening as much.*
>
> I: They've got the potential to waste a lot more, maybe?!
>
> *Yes... just because it's common sense, doesn't mean that they do it.*
>
> (Bob Jackson, Thames Valley EEAC)

He saw advice on behaviour as particularly suited to the fuel poor and the less educated, thus highlighting the marketing focus of his work: there is little point in marketing measures to those who cannot pay for them. But in terms of achieving absolute reductions in energy use, there is a lot to be said for giving behavioural advice to the fuel rich. Whether this can be done effectively without seeing their homes remains to be tested.

The West Lothian advice was preoccupied with the relief of fuel poverty, with 'environmentally concerned' citizens more likely to approach the Lothians EEAC than WLCES for advice. None of the WLCES advisees mention environmental concerns as a

primary reason for seeking advice (George Trist, pers. comm.); and only around 3% of EEAC clients do so (NFO BJM 2002). However, the Calderdale service team were finding ways of extending their work into new areas, both geographically and socially, and in the process they were tapping different sources of concern and interest:

> *There's a project that was really quite successful ... where we had a mailshot to all householders within that parish area. The Hebden Bridge Alternative Technology Centre had a stall up there ... we'd invited everyone in the area together and we were doing fuel poverty, we were doing AT stuff at the same time... on a geographic basis, there's some people you might tackle from the fuel poverty perspective but you also want some people who are looking at AT... There's not enough of looking at it as a whole.*
>
> (Andrew Cooper, Calderdale)

The basic approach of almost all the advisers interviewed was constructivist: they were constantly considering how to build on previous experience and experiment with new forms of action or new partnerships. They were also keen to reflect on the significance of what they were aiming at and the methods they were using to achieve their aims. It was possible to identify connections between content and process, and to see the importance of social relationships in the giving of advice, whether these relationships were between householder and adviser or between different agencies.

The interviews were of course influenced by the questions asked (see Appendix 6), but it was striking how the advisers were more interested in discussing how they went about their work than what the aggregate, measurable impacts were. The short-term funding arrangements did not help in terms of investment in staff training or long-term planning, and they imposed severe constraints in many ways, but they could be said to have had some small positive influence in ensuring that the programmes did not stagnate and that both content and processes stayed under review. Energy advice is at an early stage of

development, and the testing of different approaches can therefore be useful. However, any positive effect is being cancelled by the impact of constant uncertainty about the future and lack of career structure that accompany short-term funding arrangements. The experience which provides an indispensable resource of tacit knowledge to an advice service is always in danger of being lost, as seasoned advisers move on to more attractive jobs elsewhere.

7.4 Learning from evaluation

The work of energy advisers is heavily influenced by what is considered worth evaluating, as this affects their funding very strongly. While the Home Energy Conservation Act and the McAllion Option have undoubtedly helped local authorities to maintain some energy advice work by focussing attention on the need to improve energy efficiency, reduce fuel poverty, and report on both, advisers still work with short-term funding and the constant need to justify their existence by pointing to quantifiable results. They essentially operate within a paradigm of 'starting from the end' – the targets that they must meet – rather than starting from the beginning – the state of knowledge and ability of the householders in their area.

Teachers in the school system recognise the tension between the theory of what they do – aiding the construction of knowledge and beginning with what the student knows – and the institutional requirement that they meet targets for examination results. They use formative as well as summative evaluation to bring together these two approaches to some extent, assessing students at frequent intervals and telling them how the work can be improved, in ways that recognise the distinctiveness of the individual (Ireson et

al., 1999). Yet energy advisers rarely have the luxury of repeated contact with an advisee in order to apply the same method and to bring a more education-based approach to bear. As a consequence, their ability to teach effectively and evaluate more comprehensively is limited.

Policymakers typically operate at some distance from advisers and householders and, where energy advice is concerned, they do not have much reliable data on which to base judgements. For the most part, they can only go on national domestic energy consumption statistics, estimates of savings achieved in local authority areas from the HECA returns – some of these unreliable – and estimates of savings achieved by the EEACs. These figures are supplemented by accounts of good practice and innovative partnership schemes in the 'good news stories' contained in the HECA returns.

As long as policy is based on this combination of estimates and anecdotal evidence, reflective learning from experience will be handicapped more than it need be. Two elements at least are lacking. One is the incorporation of feedback into advice right up the scale, from householder to adviser to programme-level to policymaker, so that carbon savings and the achievement of affordable warmth can be measured rather than estimated. The other is the retention and transmission of experience in advice, something that is achievable by providing longer-term funding and by developing career progression and training.

7.5 Summary

The advisers wished to teach effectively, working 'forward' in building on what their advisees knew and wanted to know, in order to increase awareness and generate action. At the same time, they were obliged to work 'backwards' from their targets for housing improvement, reduction of fuel poverty or reduction of carbon emissions, working out how best to achieve these targets. They recognised the importance of awareness and feedback but were funded on the basis of action and often had to plan for it in a series of short-term initiatives.

The advisers' understanding of the term 'awareness' was normally as a first step in a learning process: awareness of fuel use as a part of everyday activities; awareness that some theories-in-use concerning energy are misconceptions that need to be replaced; and awareness that energy efficiency can be improved through specific investments and changes in behaviour.

The interviewees said little about informal learning processes, apart from the reference to the harm that can be caused by ill-informed plumbers passing on their knowledge to householders. Yet they often work in networks with voluntary and other agencies, and a continuum between lay and expert energy knowledge is contained within these networks. There is little evaluation as yet of what non-energy specialists such as home helps, district nurses and social workers bring to the work of energy advice.

While the EEAC structure offers a way of reaching very large numbers of people within a short time, the funding, staffing and communication arrangements militate against

clients' learning unless they already have some idea of what information they need and are able to interpret what they are sent. EEAC clients may be fortunate enough to speak with an experienced adviser who can help them in more depth, in addition to receiving the standard paper-based treatment. However, at present the system does not favour retention of the more experienced advisers and this jeopardises the ability to build up a body of (individidual and shared) tacit knowledge.

Until actual metered savings are built into advice programme reporting, there will be no strong incentive to build feedback into advice, and effectiveness will suffer because the possibilities for learning will be inadequate. The structure of the West Lothian programme was the most conducive to learning, because of the option of home visits, follow-up advice and the use of feedback. This structure was possible because of the context of local authority funding of a service aimed primarily at the fuel poor, rather than mixed funding of what is essentially a marketing initiative for the fuel rich. To extend the West Lothian, Calderdale or Oxford approaches to the EEACs would clearly involve major changes in resourcing and outlook.

The Calderdale, Oxford and West Lothian advisers, with their more in-depth approach, aimed for something qualitatively different from the EEACs, which function primarily as marketers of energy efficiency. But EEAC staff too found themselves teaching, in dialogue with householders, in order to carry out their aims. They wanted more time in which to do so. They were constrained primarily by the funding arrangements which rewarded them for bringing in HESs and which allowed little time for talking to clients and following up progress.

What of the conscious competence model and the sequencing of learning? The elements of the model were certainly familiar to the advisers interviewed, and awareness-raising was seen as a necessity for all the programmes. It was manifested in a number of ways: making contact and engaging the householder's interest and trust; understanding what was said by the householder and eliciting what was left unsaid. It was an open question as to how long the seeds sown by awareness-raising activities lie dormant in the ground. Evaluation efforts were primarily concerned with assessing the action taken, although for the most part any figures for savings resulting from these actions are estimates, unsatisfactory on two counts: they are inaccurate, and neither householder nor adviser can learn from them properly. Feedback with follow-up to advice was seen as valuable by those advisers who were able to use it, and as desirable to the rest – a way of assisting the householder and also of evaluating the programme and increasing the chances of action. But it was not seen as essential by the EEAC manager who saw himself primarily as a marketer: his theme was that the householder should if possible be accompanied through a series of thought processes until the point at which action is taken. If action is the end-point and the indicator on which a programme is evaluated, then feedback may be thought of as an expensive extra dimension to advice. But if affordable warmth is the goal, or (more ambitiously) energy literacy and *continued* development of energy awareness and action, then feedback takes its place as a crucial part of learning.

8 DISCUSSION, SUMMARY AND CONCLUSIONS

This study began with an investigation into the uses of feedback in reducing domestic energy demand. It soon became clear that the first half of the initial research question, 'Does consumption feedback work, and how effective is it?' was largely answered. Feedback did 'work', in that it gave energy savings of the order of 10%. It also became clear that feedback was only part of a more complex learning process, and that the range of quantitative outcomes from feedback interventions could not be explained through any convenient algorithm. A behaviourist approach based on faith in environmental influences as the sole determinants of behaviour is, paradoxically, not going to be sufficient to explain or predict how behaviour comes to change. So the focus widened and the aim was enlarged: to develop a theoretical framework for understanding how people learn about their domestic energy use.

This has not been a straightforward exercise: it has involved using concepts that are difficult to pin down, as well as personal constructions of meaning that must be understood in context. Some of the findings are more generalisable to 'what could be' than to 'what is', because they come from purposive rather than from representative sampling. Yet concepts derived from the experiences of householders and advisers can be used to construct and explain a more convincing model than we have had so far of how people understand energy, how they learn about it in the context of daily life, and how energy literacy can be encouraged through advice programmes and other initiatives.

The 'conscious competence' model was used as a simple prototype from which to begin conceptualising the processes involved in developing energy literacy. What do

theory and empirical data have to say about this? It is time to pull together the strands of the inquiry. The research questions formulated at the end of Chapter 3 are discussed in turn before revisiting the initial model and developing it into something more comprehensive.

8.1 What does energy awareness mean?

Awareness was the most problematic and interesting concept in the analysis. Crucially, it was also the concept that distinguished the behaviourist from the constructivist approach to learning, involving individuals actively in learning processes rather than making environmental influences the sole determinants of their actions.

Can awareness stand alone as a 'first cause', or is it always associated with other factors? This can be addressed in simple terms by breaking awareness into components: awareness of specific entities or processes. For example, if someone does not know of the existence of floor insulation and then learns that such a thing exists, they have just become aware of it. This is a limited form of awareness, but experience integrates and stores these many limited awarenesses into a body of tacit knowledge. Tacit knowledge underlies what we do and how we learn. The theory of Polanyi shows that tacit knowledge, the stored integral of all the many awarenesses that we possess, determines what we see as relevant and interesting, and what explicit knowledge (or information) we are willing and able to absorb. It seems likely that a further aggregation of awareness can take place at the social level, to produce 'folk knowledge', and nothing in the findings from this study suggests otherwise. Awareness was clearly not only an individual phenomenon.

The material from householder interviews shows how energy is often seen as a vague abstraction, whereas the home is a more accessible and tangible concept. It is probable that the householder can build up a body of knowledge from particular experiences that will be as effective – or more effective – than learning abstractly and applying that learning in specific situations. People do make connections between what is at hand and what is less obvious: for example, the Launton woman who connected her efforts at composting in the garden with her ideas on energy conservation. Yet the Launton data show that the residents' likelihood of acting on knowledge of a direct connection between something close at hand (fuel use in the home) and a distant and hard-to-interpret aspect of the global environment (climate change) was very limited. For the time being, this knowledge could be categorised as explicit knowing that is not yet operationalised, in contrast to the tacit knowing that is related to experience and action. It is difficult to gauge tacit knowledge or energy awareness in any consistent fashion, given the many possible indicators. This research has shown, however, that those who considered themselves to be energy aware did usually have evidence to back the claim.

8.1.1 Raising awareness through advice programmes

A constructivist approach to teaching energy literacy begins with a search for indicators of awareness, in order to find what is available to build on. People seek energy advice for many reasons: because of a crisis, because they are concerned about their comfort, the state of their home, the size of their fuel bills, wastage of energy or (occasionally) because of wider environmental considerations. Each will have a set of 'structures of relevance' that can be discovered and used by anyone advising them, in order to communicate knowledge in a way that will make sense.

Determining the structures of relevance is related to finding the 'zone of proximal development' – the area in which the learner needs help from others.

Individual constructivist theory is not enough to produce or explain the development of awareness. We need each other in order to learn, because we all have zones of proximal development that we cannot negotiate on our own; we make sense of our knowledge from within a social sphere, whether that involves reading, using electronic media or conversing directly. Awareness can be raised through trusted sources only. Sometimes the source may be an observation or feedback from an action: the trusted evidence of the senses. But often it is another person, or a group of people.

When advisers spoke of 'raising awareness', they mostly seemed to refer to awareness of the possibility of conserving energy. Yet the evidence of what they achieved demonstrated that they were also able to raise awareness in a more general sense, connecting energy with financial, social and structural issues. They saw that teaching becomes effective by connecting with learners' structures of relevance and widening the sphere of what was relevant. Householders could become aware of the range of options open to them for heating their water – not all of them obvious – through seeking advice when their boiler needed replacing; or they could become aware of useful changes in behaviour while receiving advice on how to deal with an overestimated fuel bill, or when looking for a grant for insulation.

For advisers, developing their awareness involved reflecting on their experiences while at work, as well as acquiring knowledge from sources external to their programmes. Some acknowledged the tension between behaviourist approaches, in

which the emphasis was on measurable actions, and the more constructivist and interactive style of work that they would like to adopt as a means of teaching more thoroughly and increasing their job satisfaction. The West Lothian, Calderdale and Oxford advisers had devised methods that combined the strengths of both, and were able to do so because their terms of reference made it clear that they were providing a social as well as an energy conservation service. For West Lothian, the funding came primarily from a body that saw it as its function to provide comprehensive welfare advice to its electors, while in Calderdale the local health authority was willing to accept – without detailed evaluation – that better energy efficiency for the elderly would improve health and reduce the pressure on winter hospital beds, and to fund a home energy adviser on that basis. In both areas, the consequences of not providing the service were potentially serious, including severe distress and hypothermia.

The REAP competition in Oxfordshire was designed to raise awareness in a population that was mostly fuel-rich, and the Launton Village Organiser's comment showed that she had understood this awareness-raising to be a preliminary measure rather than a comprehensive programme: *'There was no follow-up. But I think that you have to leave something to the individual.'* Yet the findings demonstrate that this initiative worked best with those who *already* showed some signs of awareness, gained from experiences that included monitoring consumption, taking action and seeking information from 'outside' sources. It was less successful in engaging the interest of those who learned from practical, hands-on experience through DIY; or in engaging some of those who were most in need of advice, the fuel poor. This suggests that there is a dearth of learning material for those who 'learn by doing'; also that reaching the fuel poor requires careful consideration of all possible

networks of assistance. Even a 'preliminary' initiative such as awareness-raising has to connect with something pre-existing that is familiar and has positive associations. This would explain why those most likely to participate in the REAP competition were those who had already installed more energy-related measures than their fellow villagers. It also explains why the competition succeeded in engaging many residents in a village with strong community feeling and a well-known and trusted village organiser. But even this initiative did not reach everyone, and did not allow everyone to build on what they had learned. Some people need more accompaniment in their learning than is allowed for by the EEACs, and more than their family, friends and neighbours are able to supply.

In encouraging action, advice programmes are using a sound learning principle and contributing to the growth of tacit knowledge. The approach of the less intensive advice programmes, however, suffers from three weaknesses. The first lies in the difficulty of reaching some individuals who lack the tacit knowledge from which to make a beginning. The EEAC approach is most effective, paradoxically, with those who *already* know clearly what information they need and what their goals are. For those who do not, with a paper-based system, it is impossible to assess properly what a householder's situation is, what s/he needs and how s/he might make progress in energy efficiency or conservation, when the available tools are so standardised. A telephone conversation with an EEAC adviser allows an opportunity for dialogue, but it is still limited and heavily reliant on the communication skills of both householder and adviser.

A further weakness in the EEAC approach is that the system of funding penalises advisers for spending more than a minimal period of time with each person who

makes contact with the centre. The emphasis is on bringing in as many Home Energy Surveys as possible from the public, processing the forms, and sending out reports with recommendations. Any time spent discussing or following up advice detracts from the time available for these initial 'awareness-raising' contacts. As a consequence, a large part of the potential benefit of EEAC advice is being lost due to incomprehension or inability to make informed choices between options (assisted by the adviser). The interviews showed that those advisers who were not able to adopt interactive styles of working, follow up their advice and/or use feedback on consumption and comfort to check on effectiveness would welcome the opportunity to do so if funding and staffing allowed it. EEAC advisers rarely had enough time to discuss advice with clients and were scarcely ever able to carry out home visits[1], because funding was so strongly tied to quantity rather than quality, relying heavily on payments of £4 per completed HES. Pressure to keep up a flow of home energy surveys thus militates against offering more personal and interactive advice.

This situation could be improved if advice providers were able to draw on some of the £162m available annually from energy suppliers via the Energy Efficiency Commitment. For example, 10% of this sum could fund a home energy adviser in each of the (nearly 400) Energy Conservation Authorities in the UK. Two obstacles to such an arrangement are the refusal of Ofgem to accredit advice directly with savings in emissions and the unwillingness of suppliers to fund programmes that are not branded with their names (Dave Barnes and Brenda Boardman, pers. comms.). For the time being, it is unlikely to be feasible to provide in-home energy advice on a large scale, in terms of both finance and the necessary training of advisers. Other

[1] At the time of writing, the EEAC network are piloting home visits on a small scale in a few areas.

ways have to be found to improve the quality of learning and the quantity of energy efficiency or conservation actions taken.

The fuel-poverty-oriented advice programmes in particular show the importance of the affective aspects of learning in building awareness. They demonstrate the necessity of trust in the adviser and the damage caused by breakdown of trust in the supplier and other agencies. The labour-intensive and skill-intensive nature of effective advice to the fuel poor is evident, as is the importance of a constructivist approach to the work. This type of approach can be justified by its effectiveness in behaviourist terms – it clearly delivers good results in terms of savings and comfort when the adviser is experienced and knowledgeable. However, it cannot be conceptualised purely in these terms. Good advice not only raises awareness and produces action in a particular direction, such as increased energy efficiency: it connects the new awareness to other aspects of life and builds confidence and capability.

8.2 What is the significance of informal learning?

The survey evidence showed people typically acting more on information from informal sources (non-expert, non-structured) than from formal sources. For the population in general, unaffected by sampling bias, an even higher proportion of energy efficiency actions are unlikely to be prompted by formal energy advice. The importance of other possible sources of information and advice – such as conversations with neighbours, TV home improvement programmes and visits from heating engineers – is underrated. It is possible to imagine the kind of chain reaction that could happen if peoples' interest were to be engaged sufficiently for energy-

related issues to become the stuff of everyday conversation. The increasing interest in self-build homes and the growth in distributed generation both offer visible, tangible possibilities for learning that could be exploited more fully than they are at present.

Tacit knowledge is foundational, embedded in the theories and procedures on which we base our actions. It is oversimplifying to state that explicit knowledge is formally taught, by authorised experts, while tacit knowledge is informally 'caught'. The interviews and observation showed how a skilled adviser can teach procedures such as the operation of a thermostat or how to read a meter – procedures that act as the tacit basis for developing further knowledge and understanding. Conversely, householders can 'catch' explicit (relatively shallow) knowledge, from informal sources. The woman whose daughter told her about low-energy homes in south London is an example. Nonetheless, it remains broadly true that formal channels are best adapted to providing explicit knowledge; the characteristics of the learner and the informal channels that s/he uses then determine how this explicit knowledge is integrated into a wider body of knowledge. Some of these formal channels need developing beyond the stage of imparting information, so that advisers can also accompany the learner where necessary. The young West Lothian mother was being taught basic energy-saving procedures by an adviser that most of her parents' generation would probably have been taught by their elders in the course of daily life. If these informal channels become less effective, there is a loss of tacit knowledge in the whole population and energy-related behaviour becomes more wasteful as a consequence. Formal channels such as advice programmes need to allow for this.

The Launton data show that those who invested most in energy efficiency were those who did most to their homes in general: active, innovative and with the resources to carry out alterations. The ratio between energy-related alterations and total alterations in the home appeared to remains constant, regardless of apparent energy awareness and even the extent of DIY. This demonstrates the embeddedness of energy knowledge in far wider bodies of knowledge that have many informal characteristics.

Banks (1998) concluded that *'just as procedural knowledge ... will only mediate the attitude-behaviour link for those that sincerely wish to find ways of saving, feedback will only be effective for certain, perhaps poorer, groups.'* However, the Launton survey shows that use of feedback from monitoring has been part of a complex of factors leading to relatively high energy awareness in people who were, by and large, not fuel poor. Feedback is an important element in the development of procedural knowledge and it appears to work at all levels of income provided that the householder finds it salient. The Launton findings suggest that feedback is used in a wider variety of contexts than that of saving: a sense of control over outgoings, curiosity about consumption processes and curiosity about improvements to the structure and functioning of the home also figure in the responses. Feedback is thus used in a self-directed and essentially informal way, even when mediated by an energy supplier in the form of bills.

Behaviourist evaluation of interventions to make domestic energy consumption more efficient gives 'thin' evidence, however carefully carried out (e.g. Hutton et al., 1986; Walker and Oseland, 1998). We learn *whether*, not *why,* or even *how.* But if we want a rich picture of what is happening in homes, it makes more sense to talk to

householders about what they are learning from experience than to ask them over the phone whether they are shutting their curtains at night or planning to insulate their lofts. By doing this, and by including the informal with the formal, it becomes possible to see the emphases, what people pick up from the messages around them and what they ignore, what they think is possible and what is beyond them, and what they know about the impact of their actions. This study has shown something of the importance of such perceptions.

8.3 Infrastructure and social factors

A constructivist perspective allowed the social element in learning to emerge in a dynamic way, reflecting the interactions between learners, teachers and institutions. It was crucial to the success of the West Lothian advice programme that it operated within a framework of local-authority-funded welfare advice; some of its most valued work involved acting as intermediary between the individual householder and the remote fuel utilities, and former advisees were willing to recommend the service to their friends and neighbours. To give another example, social relations in Launton had a bearing on who did and did not take part in the 'energy-conscious village' competition. Loyalty to the village ensured that most of those approached were willing to take part, but there was a minority who were wary of the views of the Environment Group and who may not have taken part for that reason.

Just over two-thirds (71%) of EEAC clients nationally remembered their contact with the EEAC when surveyed 6 months to a year later, and only 40% of those who remembered contact also remembered receiving a home energy report/information pack (NFO BJM 2002). By contrast, 88% of the long-term residents of Launton who responded to the survey said that they could remember REAP, over five years later,

while 88% of the REAP participants said that they remembered receiving an information pack containing a home energy report. Even allowing for sampling bias, these are relatively high figures, especially considering the lapse of time between the competition and this research. An information pack does not, of course, provide verbal communication and it is possible that part of the increased memorability of the packs received by Launton residents is due to the social element in the competition and its 'discussability'. REAP seems to have achieved additionality mainly by bringing many new people into contact with the Oxfordshire EEAC – over half the population of the village, by contrast with 1-2% of the UK population per year[2] brought into contact with the national EEAC network.

All the advice programmes referred to were embedded in social networks of one sort or another, from partnerships with voluntary organisations such as Age Concern to operation as part of local government welfare provision in Oxford, Calderdale and West Lothian. These partnerships provided multiple routes of referral to energy advice and added to the advisers' sense of belonging to a purposeful network with openings for future work. There were however occasions when a partnership – for example, with an electricity supplier offering special deals to the fuel poor or with a manufacturer of condensing boilers – might compromise the credibility and trustworthiness of advice.

Evaluation is a central issue when considering the infrastructure of advice programmes. It is primarily quantitative, usually in terms of meeting carbon emission

[2] There the difference between REAP and the national programme seems to end, though. The proportion of advisees who installed one or more measures on advice from the information packs was not much greater for REAP participants than it was nationally: 56% and 44% respectively (ibid.). So the social element did not necessarily produce more action per advisee: it just generated more advisees.

or fuel poverty targets. The commonest measure for both is the number of energy efficiency measures installed in dwellings. Yet advisers spend much of their working lives teaching people, and they find themselves engaged in the constructivist processes of awareness raising and knowledge building whether or not they had been prepared for this when they undertook their training. The evaluation paradigm is normally behaviourist, working 'backwards' from targets to necessary actions, while the teaching paradigm, normally constructivist, works 'forwards' from householders and their experience of their homes. Ideally, this should allow for a meeting in the middle where awareness, action and feedback combine to produce a well-informed and capable population in energy-efficient homes. As taking action is an important part of being energy-aware, action should reinforce the whole process. Some of the interviews show how this synergy can come about. However, they also show how there are times when advice evaluation suffers from a preoccupation with quantity at the expense of developing understanding. There is also an over-reliance on estimated rather than measured savings in the evaluation of most advice programmes, meaning that an important learning opportunity for advisers and householders (from following up advice with the use of feedback on consumption changes) is being lost. When advisers operate under conditions of short-term funding, constantly having to justify their existence in quantitative terms, it is all too easy for the qualitative features that make advice effective to slip from view.

8.4 Awareness, action and feedback: developing the model

It could well be that only a few concepts are indispensable in trying to understand learning. This study has shown how individuals acquire knowledge in unique ways and take roundabout paths that require different, though overlapping, vocabularies to describe. But empirical data and the literature combine to point out the

importance of five concepts: awareness, action, feedback, tacit knowledge and social interaction. None of these five terms should be taken as static. Feedback and social interactions are continuing processes, for example, while tacit knowledge may change at any time in response to new information or following a new action or experience. New information (explicit knowledge) may be absorbed into a body of tacit knowledge, and then be applied in new contexts as time passes. For example, someone may be told that a condensing boiler is the most efficient type but may not act on that knowledge until s/he also knows that the old boiler will soon need replacing and that condensing boilers will be available at a discount for the next three months.

A series of reviews and studies has described and analysed the place of commitment in energy conservation, mostly reporting experiments in contrived conditions (e.g. Stern and Gardner, 1981; Dickerson, 1992; Flahaut et al, 2001). The West Lothian research, carried out among householders and advisers in real-life 'ecological' conditions, bears out the conclusions in the commitment theory literature that people who have taken one step in the direction of conservation or energy efficiency will take further steps, at any rate until they have reached a satisfactory level of comfort and affordability. This need not be stated in terms of commitment, though: learning theory is quite adequate to explain this finding.

The Launton data show that there are householders who have taken some energy-related action, in that they have installed efficiency measures, but who have not taken further steps, do not check their consumption and are not very energy-aware in their own assessment. This appears to be largely because the energy efficiency measures were installed as part of a wider set of home improvement measures; not

because of any special concern for energy conservation. Theoretically, the fact that the householders have already taken some action should mean that there is the basis for more, in terms of their stores of tacit knowledge that are available for building on; but this opportunity is lost if the *significance* of the action is lost on them. It could well be that this is the case. For example, they might have installed thermostatic radiator valves that they do not understand and that are never used; or they may never have noticed any fuel savings made as a result of insulating their walls. There is a need for more accessible information on the significance of practical measures; information that can be supplied to customers buying DIY materials or that can be passed on by installers when putting new equipment in place. However, it will go unremembered unless the householder's interest is engaged in the first place.

Feedback should be considered in at least two distinct ways. There is the use of feedback on the effects of action, whether that be installation of a measure or a change in behaviour; and there is the habitual use of feedback, usually referred to as monitoring of consumption. Monitoring is a form of knowing that supports further learning, though it is not sufficient unless householders also know something of the significance of their consumption (for example, in relation to norms for expenditure or environmental impact), and what to do in order to alter it. If the provision of feedback produces fuel savings, it has done so in conjunction with whatever else householders know about what to do to improve their efficiency or cut their consumption. Without it, there is little or no dynamism or progression in learning. The use of either type of feedback is a vital part of learning processes if householders are to develop their energy-related investments and change their behaviour to a significant extent.

The initial 'conscious competence' model, set out in Chapter 2, was amended in Chapter 3 to reflect the processes that appeared to be involved in different types of advice. Yet these variants do not acknowledge the body of tacit knowledge that underpins whatever the householder learns or the adviser teaches – they are essentially limited to the learning of specific competences by an individual within a given paradigm. In addition, the state of 'unconscious competence' is unnecessary in the model: conscious competence is of far more relevance and use. Second, there should not be an end-point to the model: even for fairly limited processes, it needs to *allow* for further learning at new levels of awareness although this will not always take place.

This research has uncovered empirical evidence of broader learning processes that supplement what is found in earlier models. These involve the sporadic and cumulative build-up of knowledge through experience, in which individuals acquire energy-related knowledge from a wide range of sources. They often acquire this interactively, and the way in which they construct knowledge – selecting and interpreting information – is heavily influenced by experience and the existing body of tacit knowledge. The conscious competence model is not adequate to deal with this. A model that reflects such processes must include tacit knowledge and social interaction along with the concepts of awareness, action and feedback. Action, interaction and feedback combine to raise awareness and expand the volume of tacit knowledge. A partial model for this fuller form of learning is shown in Figure 8-3. I have called it 'conscious capability' rather than 'conscious competence' because it leads *beyond* competence (in a specific skill) to capability (ability to adapt and apply what is learned in one situation to another) (Fraser and Greenhalgh, 2001).

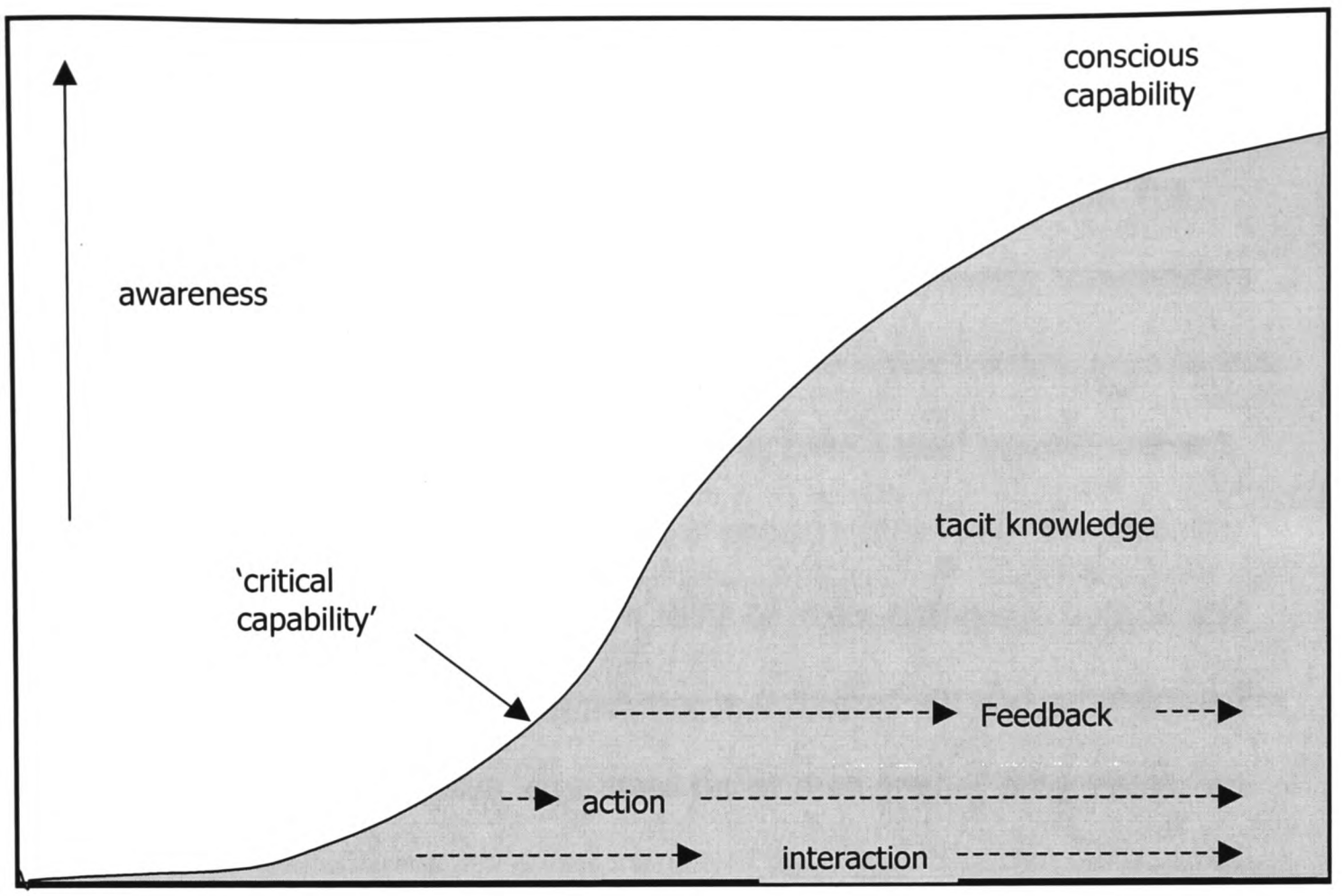


Figure 8-1: A 'conscious capability' model

In the new model, capability may be interpreted as the ability to use a substantial body of tacit knowledge: in this particular context, capability is energy literacy. The body of tacit knowledge is seen to expand as awareness increases. Our awareness determines what the structures of relevance will be from which we can make sense of new information; and that awareness will be different for each individual. It is a key part of an adviser's work to identify appropriate structures of relevance in order to give useful advice. But, more broadly, the model shows how the growth of tacit knowledge is dependent on continuing information, actions and the use of feedback. It also identifies a point of 'critical capability', beyond which learning becomes self-sustaining and the learner will be able to seek out and use whatever information s/he needs in order to build up the body of knowledge.

I introduced the model as 'partial' and am very aware of its limitations. The word 'interaction' does not do more than hint at the importance of social context in learning, for example. The model does not include such social elements as trust, ability to communicate and networks for information, advice and support. The material presented from interviews with both fuel-poor and fuel-rich householders demonstrates the importance of all these in making the whole learning process less sporadic and reliant on chance. All these elements form a third dimension that I have not succeeded in conveying on a sheet of paper. Neither does the capability model illustrate the possibility of paradigm shifts or major changes in outlook and behaviour: the curve of increased competence is smoothed-out and generalised. For some individuals, it might involve large steps rather than gradual progression.

However, the model does assist consideration of where and how an adviser can contribute best to learning: this is its main claim to usefulness. Where awareness is low, advice must be available that is intensive and interactive, in order to build the householder's understanding, ability and confidence towards the point of 'critical capability' beyond which s/he can sustain learning without such focussed support. This includes advising with the use of feedback, so that the householder learns to interpret his or her consumption. It may well also involve taking account of multiple aspects of the householder's life: the advice should make as much sense as possible in the context of his or her experience.

Where awareness is closer to the level of 'critical capability', the role of the adviser may be more limited but the need for accurate diagnosis is still crucial. The adviser must still be able to identify what the householder knows and does not know – to identify the zone of proximal development – and to advise carefully and accurately in

order to supply what is needed. Dialogue is still needed for effective advice. Only when the householder is above the level of critical capability does the role of an adviser dwindle to the process of understanding what the householder is requesting – information that may need to be specific, technical and reliable – and supplying it.

The higher reaches of the capability curve represent the ability of those with plentiful tacit knowledge that they can apply consciously to many aspects of their lives, even if many of their actions are as routine as they are appropriate.

I am trying to avoid over-categorisation of individuals into 'types' requiring different approaches: the conscious competence model is an open-ended precursor of the conscious capability model, not a tightly-defined alternative approach for people who are deemed unlikely to move far in developing their capabilities. But individuals' capacity to select, absorb, make sense of and use information does vary widely and a teaching approach that is good for one may be an unrealistic counsel of perfection for another. If the goal of a programme is primarily action, such as mass installation of cavity wall insulation, a simple model that will help insulate a thousand walls is more functional than a more sophisticated approach. I would suggest that the conscious competence model be seen as 'nested' within the conscious capability model. Competence is a fine outcome if the aim is to acquire a specific skill, install a particular measure or know where to go for help with a problem. Capability is needed to be able to assess the energy efficiency priorities in a house, envisage radical alternatives for the use of renewable energy in the home, or develop an effective way of thinking about and planning the development of a community energy programme. Capability implies competence, or a set of competencies.

Consideration of capability and competence helps in resolving the question as to whether a general aim should be more complex (double-loop) learning, in which the situation within which the problem emerged is problematised; or single-loop learning, in which the problem is solved without further consideration? (Argyris and Schon, 1974). Success in the latter might be of more value than failure in the former, especially if it makes the householder receptive to further learning. This question may seem to be wandering beyond the realms of energy advice, but it is still valid. Energy advice forms part of a long-term effort to achieve, not only energy savings and affordable warmth, but a radical change in the way in which we think about and use energy so that it becomes sustainable. Sustainability is not a steady state, though. In energy terms, it *'can be understood as a continuous learning process that occurs when a given society acquires the necessary knowledge to reduce its energy consumption ... without diminishing its quality of life or creating new social inequalities'* (Tabara et al., 1999: 1). This surely includes double-loop learning, and advice should therefore aim to *allow* for it where possible. For advisers, competence in their work is a valuable goal in itself; but double-loop learning means being able to reflect on their experiences of giving advice and being able to learn from the experiences of others. There is a social element here that can be met using gatherings such as the HECA Forums.

8.5 Summary and conclusions

The aim of this work was to develop a theoretical framework for understanding how people learn about their energy use, and a start has been made. The paradigm shift from behaviourism to constructivism has created room for much richer accounts of how people come to think and act as they do. Looking into the 'black box' of the household has uncovered connections between what happens inside and outside,

and some of the ways in which energy-related processes are understood and used by different individuals. Looking inside energy advice programmes has also given a more detailed understanding of the way in which advisers learn from their work.

The conclusions are influenced by the selection of topics for enquiry, sampling strategy, contexts in which questions were asked, choice of data for analysis and methods of analysis. They are based on my interpretation of the literature and the experiences communicated by the people who contributed in some way to the study; and that interpretation in turn is influenced by my experience of the subject matter and of life in general. A researcher's learning is as situated as any other.

The first conclusion is that changes in the conceptualisation and use of energy are more readily explained in terms of a constructivist than a behaviourist paradigm. Learning is not only active, social and situated: it is cumulative. This has not been sufficiently recognised in studies of energy and behaviour. There is a mismatch between the problem-solving and broadly behaviourist approach adopted by the bulk of demand management strategies and the constructivist approach that informs most educational theory. The review of research into energy and behaviour demonstrated how a constructivist approach was lacking in much of the work carried out to date. Constructivism offers an avenue for research that makes sense in its own right and that can also complement the dominant behaviourist approach to demand-side energy issues. Of three components studied here – awareness, action and feedback – two overlap between the two paradigms. Only awareness belongs solely to the constructivist paradigm, yet awareness is crucial to understanding behaviour.

Second, the theory and findings gathered here have shown that processes can be set in motion that alter the relationship between home and householder in such a way that quantitative changes (in energy use and indicators of comfort) are accompanied by qualitative changes (in understanding, confidence, and ability to control). These processes involve two types of knowledge, explicit and tacit. Tacit knowledge is the foundation on which all learning is constructed and which is drawn upon when considering home improvements and energy-related behaviour. The empirical work has shown how the most effective advice is that in which tacit knowledge is *engaged* with and used in the building of awareness through action and the judicious use of feedback and other information. Engagement normally implies some sort of dialogue in which it is possible to identify structure of relevance and a 'zone of proximal development' through which the adviser can help the householder. Simply providing explicit knowledge is useful only to those who have passed the level of 'critical capability', in that they know what they are looking for and have the resources to continue by themselves. The development of tacit knowledge is an aspect of learning missed by most energy studies.

Third, the 'embeddedness' of energy in the contexts of home, locality, culture and personal relationships means that it should not be considered in isolation from these. It also seems clear that householders' awareness of energy is rarely strong enough to override other considerations in life. In order to achieve more environmentally-sensitive energy usage, there is a need to focus more closely on two factors: understanding what knowledge is familiar to the householder and how it can be developed, and improving the 'visibility' and comprehensibility of energy supply and consumption. Both these will build up tacit knowledge, individually and collectively.

Some practical issues follow from these conclusions. EEACs and fuel suppliers should not give paper-based advice alone to anyone who has not yet reached 'critical capability', but should arrange for more thorough and interactive advice, referring to local agencies if necessary. As a first step, they should do more to identify the fuel poor – those with highest priority – and to see to it that they are offered advice that is personal to them, not formulaic. Networking with health, social service, housing and heating 'front line' workers who go into people's homes gives energy advisers more 'reach' and makes it easier to identify and help socially isolated householders. More effort should be made to identify capability levels in potential advisees, through allowing advisers more time with each and more sparing use of paper-based advice. The aim should be to give formulaic advice only to those able to make use of it.

Follow-up with feedback appears the best single way to combine monitoring and teaching and to extend the effectiveness of advice programmes. This implies more resources to pay for additional adviser time and more training of advisers in communication skills, but the indications are that they would be well-invested. If EEAC funding were less dependent on the numbers of Home Energy Surveys processed and if more effort were put into training and career development, the quality of advice could be raised, energy savings could be maintained or increased, and advisers could have more job satisfaction. The most promising single additional source of funding is the £160m+ of Energy Efficiency Commitment money from energy suppliers, which could release funds for advice if the regulator were to be convinced that it was acceptable to accredit advice with savings.

The Home Energy Conservation Act is a reporting requirement that is designed to plot annual changes in the energy efficiency of the entire housing stock. The HECA

returns from local authorities, combining data on energy conservation and on the relief of fuel poverty, are under-used as a means of raising the standard of advice. As it covers the whole country, HECA-based evaluation should be the main single focus for all advice evaluation, bringing together advice programmes of all types and allowing them to learn from each other. There is a case for including qualitative indicators of effectiveness, such as the training of advisers to a given standard, or the findings from a small annual survey of randomly-selected householders to check on what they have learned and carried out during the year that is relevant to their energy use.

There were indications among the Launton householders that there is a gap in provision of information for those householders who are capable and knowledgeable about energy: those above the critical level of capability. There is room for development of specialist material, such as that from the Building Research Establishment, into more accessible forms, and room for development of more social means of learning about it. In Launton, for example, some of the interviewees might well in time form a group to explore and implement low-impact distributed generation for their homes. The Environment Group could provide a starting point for such a group.

For the population as a whole, there is a need to develop an infrastructure for learning about energy from daily life, using aids such as smart meters, informative billing with feedback[3], and energy-related labelling of building materials. There is a clear need to build on enthusiasm for DIY by training DIY wholesale and retail staff in energy issues, as well as promoting DIY materials on the basis of their energy

[3] Now mandatory in Norway and used in many areas of North America.

efficiency and environmental impact. Comprehensive energy rating of homes and home audits on selling or letting dwellings should be further developed, with great attention paid to accuracy and to comprehensibility. Surveyors or advisers should also be made available to discuss the meaning of ratings and audits to the householder.

These recommendations are summarised in Table 8-1.

Table 8-1: Recommendations

Recommendation	**Agency**
Clearer identification of fuel poor as priority group for energy advice	Energy advice programmes in conjunction with 'front line' workers
Training of advisers beyond C&G level, including training in communication skills	Energy Efficiency Partnership for Homes(Energy Advice Working Group)
More time allowed for diagnosis of energy problems and follow-up to advice	Energy advice programmes, EST, local and national government
Development of a career structure for energy advice, in order to retain experienced advisers	Energy Advice Working Group; Local Government Association
Make HECA-based evaluation the focus for all advice evaluation, qualitative as well as quantitative	National government, DEFRA
Develop high-quality authoritative information on domestic energy for householders	Building Research Establishment
Fund energy advice by well-trained advisers as part of the Energy Efficiency Commitment	Ofgem, Energy Saving Trust, Energy suppliers
Continue to develop the use of 'smart meters' with the emphasis on user-friendliness to the householder	Ofgem, metering companies/ metering subsidiaries of suppliers
Test informative billing in the UK with historic and/or comparative feedback on a large scale	Ofgem, suppliers
Develop training of plumbers and installers in energy efficiency	Trade bodies, e.g. CORGI. Training colleges
Develop training of DIY staff in energy efficiency and conservation	DIY chains.
Develop labelling of DIY materials according to energy efficiency	DIY chains. Trading Standards Authority
Develop easily comprehensible energy auditing of homes further (mandatory when they change hands)	DEFRA, National Energy Services, mortgage providers, Royal Institute of Chartered Surveyors

There is potential for much further research into domestic energy use within a constructivist paradigm. I propose three broad research themes. The first concerns the development of tacit knowledge and the embeddedness of energy in everyday

life. This is a huge field of inquiry, which can be broken into questions such as, how do adults build their knowledge of energy, from a young age? What types of social support and interactions help most in encouraging people to use renewable sources of energy? What are the main informal sources of information on energy and how are they integrated at household or community level? How do 'smart homes', smart meters, informative bills and visible use of renewable energy affect awareness and stores of tacit knowledge? What impact do community-owned distributed generation schemes have on the development of knowledge on consumption? What impact is self-building having on energy awareness and on the quality of completed homes?

A second fruitful area for research concerns the way in which individuals learn through informal contact, action and hands-on experience, and the way in which energy efficiency improvements are achieved in the course of home improvements generally. There is a need to uncover ways of using DIY materials, information and advertising far more comprehensively in the interests of energy efficiency and conservation, and to train DIY industry personnel to recognise the energy dimensions of their work and the products they are marketing. This research has shown how ineffective or counter-productive plumbers and heating installers can be in transmitting messages about energy use; there is a need to research and develop better training for these and other 'front line' workers who go into people's homes and could potentially teach their occupants how to use their energy more wisely.

A third line of research concerns the development of energy advice programmes. What happens when follow-up with feedback is built into an existing advice programme? If advice programmes diversify into preparing the ground for distributed generation, what new skills are needed? What are the best ways of providing

effective single-loop advice that will show results, along with plenty of potential for continued double-loop learning by advisee and adviser? What are the most effective training methods for new advisers?

Finally, a word about energy and environmental awareness. The term 'environment' is thoroughly problematic. I have tried throughout to treat it with caution and to substitute for it when I could, but it has been used in two main ways. In educational terms, it stands for everything 'outside' the individual; and in less specialised usage, for the 'natural' environment. It is a difficult term for researcher and respondents, with many indications that all are aware of the moral, political and ethical loading attached to the word. The lack of association between recognition of climate change mechanisms and carbon-emission-reducing actions was striking. People may do the 'right things' in reducing their carbon emissions without apparently knowing about fossil fuel combustion as a factor in climate change; and they may do the 'wrong things' while being fully aware of the role of fossil fuels in increased carbon dioxide levels in the atmosphere. But energy use is such an integral part of everyday life that there is a huge potential for learning to make the appropriate associations between action and impact. There were many instances where respondents made connections between energy and environment, and where they showed a sense of moral obligation towards an environment beyond their immediate experience. This is surely something on which to build. What is at stake in the development of energy literacy is not simply whether practical efficiency measures are installed, valuable though they may be. It is whether people are equipped to adapt to a fast-changing situation in which the quantities and sources of the energy they use become more and more critical for the future of their societies and for the future of the biosphere.

REFERENCES

4CE project (2003) *Consumer Choice and Carbon Consciousness for Electricity.* Report on Phase 2, Stockholm Environment Institute

Anderson, D (1995) Roundtable on energy efficiency and the economists – an assessment. *Annual Review of Energy and the Environment,* **20**: 562-573

Argyris C and Schon D (1974) *Theory in practice: increasing professional effectiveness.* Jossey-Bass, San Francisco

Arvola A, Uutela A and Anttila U (1994) Billing feedback as a means of encouraging conservation of electricity in households: a field experiment in Helsinki. *Energy and the consumer,* Finnish Ministry of Trade and Industry

Aune M (2001) *Energy technology and everyday life – the domestication of Ebox in Norwegian households.* Proceedings, European Council for an Energy-Efficient Economy 2001, Vol 2: 5-16

ASE (2002) http://www.ase.org/about/efficiency.htm,2002. Alliance to Save Energy, Washington DC, USA

Bagshaw M (1982) Domestic energy conservation and the consumer. *Jnl of Consumer Studies and Home Economics* **6** :183-190

Banks N (1998) Cultural values and the adoption of energy efficient technologies. Unpublished DPhil thesis, University of Oxford.

Banks N (2001) *Socio-technical landscapes and the sad case of the condensing boiler.* Proceedings, 2nd International Conference on Energy Efficiency in Household Appliances and Lighting. Italian Association of Energy Economists/ EC-SAVE programme

Barbour RS (2001) Checklists for improving rigour in qualitative research: a case of the tail wagging the dog? *British Medical Journal* **322** :1115-1117

Bartram D, Crawshaw CM, Williams DI, Crawshaw AJE and Lindley PA (1985) *The use of heating controls.* Research report, Ergonomics Research Group, University of Hull, UK

Becker HS (1998) *Tricks of the trade: how to think about your research while you're doing it.* University of Chicago Press, London

Bennett, N. & Dunne, E. (1994) How children learn - implications for practice, in Moon, B. & Shelton Mayes, A. (eds) *Teaching and Learning in the Secondary School*, Chapter 6. Routledge, London

Bengtson, K (1997) Can better utility bills save energy? *Home energy,* May/June 1997

Berk RA and Shulman D (1995) Public perceptions of global warming. *Climatic change* **29**: 1-33

Berrang L (2001) Sick of climate change? A study of public perception of climate change and health in the UK. Unpublished MSc thesis, Environmental Change Institute, University of Oxford

Bittle RG, Valesano RM and Thaler GM (1979) The effects of daily feedback on residential electricity usage as a function of usage level and type of feedback information. *Journal of environmental systems* **9**: 275-289

Birka Teknik & Miljo (1999) Att kopa el i livsmedelsaffaren. Stockholm Energi/Familjebostader

Black JS, Stern P and Elworth JT (1985) Personal and contextual influences on household energy adaptations *Journal of Applied Psychology* **70** (1): 3-21

Boardman B (1991) *Fuel poverty: from cold homes to affordable warmth.* Belhaven Press, UK

Boardman B, Bullock S and McLaren D (1999) *Equity and the environment; guidelines for green and socially just government.* Catalyst/Friends of the Earth, London

Boardman B and Darby S (2000) *Effective Advice: energy efficiency and the disadvantaged.* A report for the Electricity Association Fuel Poverty Task Force. Environmental Change Institute, University of Oxford

Boardman B (2001) *Creating a carbon market.* Proceedings, 2nd International Conference on Energy Efficiency in Household Appliances and Lighting. Italian Association of Energy Economists/ EC-SAVE programme. Edited by Bertoldi, Ricci, de Almeida. Springer. ISBN: 3-540-41482-7

Boardman B and Lane K (2001) *Domestic energy consumption and the effectiveness of energy efficiency.* Briefing note to DEFRA/DTI, Market Transformation Programme

Boardman B and Fawcett T (2002) *Competition for the poor. Liberalisation of electricity supply and fuel poverty: lessons from Great Britain for Northern Ireland.* Environmental Change Institute, University of Oxford

Bourdieu P (1998) *Practical reason.* Blackwell, UK

Brandon G & Lewis A (1999) *Reducing Household Energy Consumption: a Qualitative and Quantitative Field Study*, Journal of Environmental Psychology **19**: 75-85

Brookfield SD (1990) *The skilled teacher: on technique, trust and responsiveness in the classroom.* Jossey-Bass Inc., San Francisco

BSA (2000) British Sociological Association statement of ethical practice. http://www.britsoc.org.uk/ethgu2.htm

Bruner J (1987) *Actual minds, possible worlds.* Harvard University Press, Cambridge, Massachusetts

Bruner J (1996) *The culture of education.* Harvard University Press, Cambridge, Massachusetts

Burgess J, Harrison CM and Filius P (1998) Environmental communication and the cultural politics of environmental citizenship. *Environment and Planning A* **30**:1445-1460.

Bynner J and Parsons S (1997) *It doesn't get any better: the impact of poor basic skills on the lives of 37 year olds.* The Basic Skills Agency, London

Capel, S., Leaske, M., & Turner, T. (1995) *Learning to Teach in the Secondary School.* Routledge, London

Capener P (1997) *Understanding the role young people can play in promoting energy efficient behaviour within their own home.* Study undertaken for the Energy Saving Trust by the Centre for Sustainable Energy, Bristol, UK

Carson R (1962) *Silent Spring.* Houghton Mifflin, Boston, Mass/ Penguin

Chaiklin S and Lave J (1993) *Understanding practice: perspectives on activity and context.* Cambridge University Press, UK

Chapman J (2002) *The real barriers to energy efficiency.* National Home Energy Rating conference, Milton Keynes, May 2002. Presentation, pers comm

Chapman J, Scannell B, Cutland N and Griffiths N (1999) HECA monitoring strategies: complying with the requirements of the Home Energy Conservation Act. Good Practice Guide, National Energy Services, Milton Keynes, UK

Christie I and Jarvis L (2001) How green are our values? In *BSA 18th report: public policy, social ties*, eds Park A, Curtice J, Thomson K, Jarvis L and Bromley C. SAGE, London

Clark G (1989) Stylized facts and close dialogue: methodology in economic geography. *Annals of the Association of American Geographers* **88** (1): 73-87

COI (2000) Are you doing your bit? Development of the UK's campaign to stimulate public action to protect the environment (March 1998-Oct 2000). UK Central Office of Information

Coltrane S, Archer D and Aronson E (1986) The social-psychological foundations of successful energy conservation programmes. *Energy Policy* April 1986, :133-148.

Condelli L, Archer D, Aronson E, Curbow B, McLeod B, Pettigrew TF, White LT and Yeates S (1984) Improving utility conservation programs: outcomes, interventions and evaluations. *Energy* 9 (6): 485-494

Cone JD and Hayes SC (1984) *Environmental problems/behavioural solutions.* Cambridge University Press, UK

Cook I and Crang M (1995) *Doing ethnographies.* Concepts and techniques in modern geography 58, Institute of British Geographers

Cooper, I (1994) Identifying policy objectives. In *Domestic energy and affordable warmth,* Report no. 30 of the Watt Committee on Energy

Costanzo M, Archer D, Aronson E and Pettigrew T (1986) Energy conservation behaviour: the difficult path from information to action. *American Psychologist* **41** (5): 521-528

Cracknell R and Morgan B (1999) *European Parliamentary Elections – 1979 to 1994.* House of Commons Research Paper 99/57
http://www.parliament.uk/commons/lib/research/rp99/rp99-057.pdf

Craig CS and McCann JM (1978) Assessing communication effects on energy conservation. *Journal of consumer research* **5:** 82-89

CSE (2000) New HEES pilot evaluation. Centre for Sustainable Energy, Bristol, UK

Curtis T (1992-93) Greenhouse Programme: report on the heating advice project carried out on the Packington and Market Estates 1991/92 and 1992/93. Energy Information Centre, Islington Council

HCA Dale and CM Crawshaw (1983) Some characteristics of the human controller of domestic heating. *Building Services Engineering Research and Technology* **4** (1): 17-21

Dammers AH (2001) *Lifestyle: a parable of sharing, 2nd edition.* Jon Carpenter, Charlbury, UK

Darby S (1999) *Energy advice – what is it worth?* Proceedings, European Council for an Energy-Efficient Economy, III.05

Darby S (2001) *Making it obvious: designing feedback into energy consumption.* Proceedings, 2nd International Conference on Energy Efficiency in Household Appliances and Lighting. Italian Association of Energy Economists/ EC-SAVE programme. Edited by Bertoldi, Ricci, de Almeida. Springer. ISBN: 3-540-41482-7

DEFRA/DETR (2001) Reporting data on HECA implementation www.defra.gov.uk/environment/energy/ heca95/pdf/heca_data2001.pdf

DEFRA (2002) *Guidance notes to assist in completing the sixth progress report (2002) for the Home Energy Conservation Act 1995.* Department for Environment, Food and Rural Affairs, UK

Denzin NK (1994) The art and politics of interpretation. In *Handbook of qualitative research,* eds Denzin NK and Lincoln YS. Sage Publications Inc, Thousand Oaks, California

De Young (1993) Changing behaviour and making it stick: the conceptualistion and management of conservation behaviour. *Environment and behaviour* **25** (4): 485-505

Dickerson CA, Thibodeau R, Aronson E and Miller D (1992) using cognitive dissonance to encourage water conservation. *Journal of Applied Social Psychology* **22** (11)

Dietz T and Stern PC (2002) Exploring new tools for environmental protection. Chapter 1 of *New tools for environmental protection: education, information and voluntary measures.* Committee on the Human Dimensions of Global Change. T Dietz and PC Stern, eds. Division of Behavioural and Social Sciences and Education. Washington DC: National Academy Press

Dobson JK and Griffin JDA (1992) *Conservation effect of immediate electricity cost feedback on residential consumption behaviour.* Proceedings, American Council for an Energy-Efficient Economy, 1992: 10.33 – 10.35

Down D (ed) (2002) *Family Spending: a report on the 2000-2001 Family Expenditure Survey.* The Stationery Office, London

DTI (2001) *Digest of UK Energy Statistics.* UK Department of Trade and Industry. The Stationery Office, London

DTI (2001b) *The UK Fuel Poverty Strategy.* The Stationery Office, London
http://www.dti.gov.uk/energy/consumers/fuel_poverty/strategy.shtml

DTI (2002) Energy - its impact on the environment and society. UK Department of Trade and Industry, The Stationery Office, London

DTI (2003) *Our energy future – creating a low carbon economy.* The Stationery Office, London, Cm 5761

DWP (2002) Table 6.3: (BHC) Composition of low-income groups of pensioners by characteristics of family or household, including the self-employed. Source: FRS 2000/01... http://www.dwp.gov.uk/asd/hbai/hbai2001/pdfs/ch3tabs/tab3_5.xls. UK Department of Work and Pensions

Dwyer WO, Leeming FC, Cobern MK, Porter BE and Jackson JM (1993) Critical review of behavioural interventions to preserve the environment: research since 1980. *Environment and behaviour* 25 (3): 275-321

Eden SE (1993) Individual environmental responsibility and its role in public environmentalism. *Environment and Planning A* **25**: 1743-1758

Eden SE (1996) Public participation in environmental policy: considering scientific, counter-scientific and non-scientific contributions. *Public Understand. Sci.* **5**, 183-204

Eden SE (1998) Environmental issues: knowledge, uncertainty and the environment. *Progress in human geography* **22** (3), 425-432.

EEO (1988) *Energy advice to tenants: the role of energy advice to tenants as a means of optimising the effects of refurbishment and thermal upgrading.* Energy Efficiency Demonstration Scheme, expanded project profile R&D 56

Egan C (1999) *How customers interpret and use comparative displays of their home energy use.* Proceedings, European Council for an Energy-Efficient Economy, 1999. Panel III, 19

Egan C, Kempton W, Eide A, Lord D and Payne C (1996) *How customers interpret and use comparative graphics of their energy use*. Proceedings, American Council for an Energy-Efficient Economy: 8.39 - 8.45

Ellis P and Gaskell G (1978) *A review of social research on the individual energy consumer.* Unpublished manuscript, London School of Economics Dept. of Social Psychology

ENDS (2002) The energy review – make or break time for sustainable energy. *ENDS Report* 325, February 2002: 19-23.

EST (1999) HEC*Action guidance module: advice and training.* Energy Saving Trust, London

EST (2001) *Energy efficiency guide for community projects.* Energy Saving Trust, London

Eyles J (1988) Interpreting the geographical world: qualitative approaches in geographical research. In Eyles J and Smith DM, eds (1988) *Qualitative methods in human geography.* Blackwells, Oxford, UK

Farhar BC (1992) *Public perceptions and preferences on energy policy.* Proceedings, American Council for an Energy-Efficient Economy, 1992, 10.47-10.60.

Fawcett T, Lane K and Boardman B (2000) *Lower carbon futures.* Environmental Change Institute, University of Oxford

Fawcett T, Hurst A and Boardman B (2002) *Carbon UK.* Environmental Change Institute, University of Oxford

Fielding N and Fielding JL (1986) *Linking data.* Sage, Beverley Hills, California

Fien J, ed (1993) *Environmental education: a pathway to sustainability.* Deakin University Press, Geelong, Australia

Fishbein M and Ajzen I (1975) *Belief, attitude, intention and behaviour: an introduction to theory and research.* Addison Wesley, Reading, Massachusetts

Flahaut D, Graillat J-M, Beauvois J-L and Joule R-V (2001) *Energy savings by applying the commitment theory.* Proceedings, European Council for an Energy-Efficient Economy, 2001 Vol 1: 342-351

Foddy W (1993) *Constructing questions for interviews and questionnaires.* Cambridge University Press, UK

Foster P (1996) Observational research. In *Data collection and analysis*, eds Sapsford R and Jupp V. Open University/Sage, London

Fraser SW and Greenhalgh T (2001) Coping with complexity: educating for capability. *British Medical Journal* **323**: 799-803.

Fuchs DA and Arentsen MJ (2002) Green electricity in the market place: the policy challenge. *Energy Policy* **30**: 525-538

Gallup/Strutt and Parker (2002) *Energy efficient homes: a survey of people's attitudes to energy efficient housing.* Strutt and Parker, Chelmsford, UK

GAP (1998) *Action at home: a catalyst for change.* A Global Action Plan evaluation report of the Environment Agency North West Action at Home programme. Global Action Plan, London

GAP (2003) *Annual report and accounts 2001-2002.* Global Action Plan, London

Garay J and Lindholm P (1995) *Statistics on the energy bill: better control for the customer.* International Energy Program Evaluation Conference, Chicago, August 22-25, 1995

Gaskell G, Ellis P and Pike R (1982) *The energy literate consumer: the effects of consumption feedback and information on beliefs, knowledge and behaviour.* Dept of Social Psychology, LSE, London

Gaskell G and Pike R (1983) *Conceptual and methodological issues in social research on residential energy use.* Proceedings of a conference on social research on the use of energy in buildings, ed Bruce Stafford. Conference and seminar papers no 7, Centre for Urban and Regional Studies, University of Birmingham, UK

Giddens A (1991) *Modernity and self-identity: self and society in the late modern age.* Polity Press, Cambridge, UK.

Gigliotti GM (1992) Environmental attitudes: 20 years of change? *Journal of Environmental Education* **24** (1): 15-26

Goldsmith E, Allen R, Allaby M, Davoll J and Lawrence S (1972) A blueprint for survival. *The Ecologist* **2** (1), January 1972

Gonzalez MH, Aronson E and Costanzo MA (1988) Using social cognition and persuasion to promote energy conservation: a quasi-experiment. *Journal of Applied Psychology* **18** (12): 1049-1066

Government of Australia (2002) *Your home, your future, your lifestyle. A consumer guide.* http://www.greenhouse.gov.au/yourhome/index.htm. Commonwealth Government of Australia, in conjunction with design and construction industries.

Green J and Ventris N (1983) *Attitudes to energy use in a housing action area - methodological issues.* Proceedings of a conference on social research on the use of energy in buildings, ed Bruce Stafford. Conference and seminar papers no.7, Centre for Urban and Regional Studies, University of Birmingham

Green J, Darby S, Maby C and Boardman B (1998) *Advice into Action.* EAGA Charitable Trust

Greer H, Jonkers R, Smits A, Goerts C, Papadopolou K and Begley S (2000) *The guide to change energy related behaviour.* SAVE. Aeneas technical publishers, The Netherlands

Grierson, E (1998) *'Energy savers' in a Nottinghamshire infant school. From the classroom to the community.* MSc thesis, University of Nottingham

Gurevitz R (2000) Affective approaches to environmental education: going beyond the imagined worlds of childhood? *Ethics, place and environment* **3** (3): 253-268

Guy S and Marvin S (1999) Understanding sustainable cities: competing urban futures. *European urban and regional studies* **6** (3)

Guy S and Shove E (1993) Leaping the barriers: sociology, offices and the environment. BSA Risk and Environment Study Group meeting, December 1993

Hackett B and Lutzenhiser L (1991) Social structures and economic conduct: interpreting variations in household energy consumption. *Sociological Forum* **6** (3): 449-470

Hajer MA (1997) *The politics of environmental discourse.* Clarendon Press, Oxford

Hargrave A (1965) West Lothian looks to the future. *The West Lothian Official Industrial Handbook,* West Lothian County Council

Harrigan M (1992) *Evaluating the benefits of comprehensive energy management for low-income payment-troubled customers: final report on the Niagara Mohawk Power Partnerships pilot.* Alliance to Save Energy, Washington DC

Harrigan M, Kempton W and Ramakrishna V (1995) *Empowering customer energy choices; a review of interaction and feedback in energy efficiency programs.* Alliance to Save Energy, Washington DC

Hase S and Kenyon C (2000) From andragogy to heutagogy
http://ultibase.rmit.edu.au/Articles/dec00/hase2.htm

Heberlein TA (1975) Conservation information; the energy crisis and electricity conservation in an apartment complex. *Energy systems and policy* **1:** 105-117

Home Energy Conservation Act (1995) The Stationery Office, London

HEC*Action* (1999) *Guidance module: advice and training.* Energy Saving Trust, London

Hedges, A (1991) *Attitudes to energy conservation in the home: report on a qualitative study.* HMSO, London

Heinemann (1997) *New Modular Science for GCSE.* Heinemann, London

Henderson G, Tillerson K and Blaustein E (2001) *Building energy labelling in existing buildings.* Proceedings, European Council for an Energy-Efficient Economy 2001, Vol 2: 97-106

Henryson J, Hakansson T and Pyrko J (2000) Energy efficiency in buildings through information – Swedish perspective. *Energy Policy* **28**: 169-180

Herbert S (2000) For ethnography. *Progress in human geography* **24** (4):550-568

Hill, RM (1991) *Energy efficient control of heating systems in local authority households.* Stirling Heatsave Ltd.

Hinchliffe, S (1996) Helping the earth begins at home: the social construction of socio-environmental responsibilities. *Global Environmental Change* **6** no 1, : 53-62

Hirst E, Berry L and Soderstrom J (1981) Review of home energy audit programs. *Energy* **6**, 621-630

Hodgson A and Kambouri M (1999) Adults as lifelong learners: the role of pedagogy in the new policy context. In Mortimore P (ed) *Understanding pedagogy and its impact on learning.* Paul Chapman Publishing Ltd, London

Holt J (1970) *The underachieving school.* Penguin, London.

Home Energy Conservation Act (1995) The Stationery Office, London

Honore J and Elle M (2001) *The learning house.* Proceedings, European Council for an Energy-Efficient Economy, Vol 1: 380-391

Howell WS (1982) *The empathic communicator.* Waveland Press, Inc, Prospect Heights, Illinois

Hutton, RB and McNeill, DL (1981) The value of incentives in stimulating energy conservation. *Journal of Consumer Research* **8**, 291-298, December 1981

Hutton RB, Mauser GA, Filiatrault P and Ahtola OT (1986) Effects of cost-related feedback on consumer knowledge and consumption behaviour: a field experimental approach. *Journal of Consumer Research* **13**: 327-336

Ireson J, Mortimore P and Hallam S (1999) The common strands of pedagogy and their implications. In Mortimore P (ed) *Understanding pedagogy and its impact on learning.* Paul Chapman Publishing Ltd, London

Irwin A, Simmons P and Walker G (1999) Faulty environments and risk reasoning: the local understanding of industrial hazards. *Environment and Planning A*: 1311-1326

IPCC (2001) *IPCC Third Assessment Report: Climate Change 2001.* Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change: summary for policymakers

Iyer M, Kempton W and Payne C (1998) *Comparison groups as a tool for evaluating energy efficiency programs: an analysis of Energy Star billing comparison groups.* Proceedings, American Council for an Energy-Efficient Economy: 8.179 - 8.192

Jacobs M (1996) *The politics of the real world: meeting the new century.* Written and edited for the Real World Coalition. Earthscan, London

Johnston M and Jowell R (2001) How robust is British civil society? In *British Social Attitudes: the 18th Report. Public policy, social ties,* eds Park A, Curtice J, Thomson K, Jarvis L and Bromley C. Sage, London

Joyce D and Kosmina L (1996) *Ballantay Road Energy advice/research project.* Heatwise Glasgow

Kacsynski PA (2001) Analytic and heuristic processing influences on adolescent reasoning and decision-making. *Child development* **72** (3): 844-861.

Kantola SJ, Syme GJ and Campbell NA (1984) Cognitive dissonance and energy conservation. *Journal of Applied Psychology* **69**: 416-421.

Karp DG (1996) Values and their effect on pro-environmental behaviour. *Environment and behaviour* 28 (1): 111-133

Kasulis JJ, Huettner DA and Dikeman NJ (1981) The feasibility of changing electricity consumption patterns. *Journal of Consumer Research* **8**, 279-290, December 1981

Katzev RD and Johnson TR (1987) *Promoting energy conservation: an analysis of behavioural research.* Westview Press, Inc, Boulder, Colorado

Kearney A (1994) Understanding global climatic change: a cognitive aspect on communicating through stories. *Climatic change* **27** (4), 419-441

Kearney A and Kaplan S (1997) Towards a methodology for the measurement of knowledge structures of ordinary people. *Environment and behavior* **29** (5), 579-617

Kempton W (1993) Will public environmental concern lead to action on global warming? *Annual review of Energy and the Environment* **18**, 217-45

Kempton W (1995) *Improving residential customer service through better utility bills.* E-Source strategic memo SM-95-1, August 1995

Kempton W and Montgomery L (1982) Folk quantification of energy. *Energy* **7**, 817

Kempton W and Layne LL (1994) The consumer's energy analysis environment. *Energy Policy* **22** (10), 857-866

Kempton W, Boster JS and Hartley JA (1995) *Environmental Values in American Culture* .MIT Press, Cambridge Massachusetts

Kennedy RD (1999) Viewpoint – can an investment in AMR be justified? *Metering international* 3, 1999

Kirkpatrick, D L (1985) *How to manage change effectively: approaches, methods and case examples.* Jossey-Bass, San Francisco

Kolb DA (1984) *Experiential Learning: experience as the source of learning and development.* Prentice-Hall, Inc, Englewood Cliffs, New Jersey

Lave J (1993) The practice of learning. In *Understanding practice: perspectives on activity and context,* eds S Chaiklin and J Lave, Cambridge University Press, UK

Layne LL, Kempton W, Behrens A, Diamond RC. Fels MF and Reynolds C (1988) *Design criteria for a consumer energy report: a pilot field study.* PU/CEES Report no 220, Princeton University

Leach G, Lewis, C, van Buren A, Roning F and Foley G (1979) *A low energy strategy for the UK.* IIED Science Reviews, London

Lenzen M (1997) *Individual responsibility and climate change.* Proceedings, International Academic Conference on Environmental Justice, University of Melbourne, 1-3 October 1997

Lenzen M and Murray J (2001a) The role of equity and lifestyles in education about climate change: experiences from a large-scale teacher development program. *Canadian Journal of Environmental Education*, 6, Spring 2001

Lenzen M, Dey C and Murray J (2001b) *Teaching equity and sustainability in the context of climate change - a personal approach.* Proceedings, Showcase of

Excellence in Teaching: Scholarly Inquiry in Teaching and Learning. 28 September 2001

Leonard-Barton, D (1981) Voluntary simplicity lifestyles and energy conservation. *Journal of Consumer Research* **8**, December 1981, 243-251

Lindblom CE and Cohen DK (1979) *Usable knowledge: social science and social problem solving.* Yale University Press

Lindseth, LR (2001) Evaluation of the energy efficiency check in Norway. Proceedings of the ECEEE Summer Study, June 2001, Mandelieu, France. Vol 1, 105-115

Lindseth LR (2003) Learning by having fun. Proceedings of the ECEEE Summer Study, June 2003, St Raphael, France. Paper 6.202

Lofstedt RE (1992) Lay perspectives concerning global climate change in Sweden. *Energy and Environment* **3** (2), 161-175.

Lofstedt RE (1993) Lay perspectives concerning global climate change in Vienna, Austria. *Energy and Environment* **4** (2), 140-154

Lofstedt RE (1995) Why are public perception studies on the environment ignored? *Global Environmental Change* **5** (2): 83-85

Lord D et al (1996) *Energy Star billing: innovative billing options for the residential sector.* Proceedings of the ACEEE summer study, 2.137

Lothian Anti Poverty Alliance (2002)

http://www.lapa.org.uk/Poverty/Statistics/West%20Lothian%20statistics.htm

Low C (2003) Educational psychology and the nature of e-learning. Training Journal Focus, January 2003

Lowe I (1996) Greenhouse gas mitigation: policy options. *Energy Conservation and Management* **37** *(6-8),* 741-746

Lundstrom, E (1980) *Energy consumption in single-family houses - influence of the occupants.* Royal Institute of Technology, Stockholm, Sweden

Lutzenhiser L (1993) Social and behavioural aspects of energy use. *Annual Review of Energy and Environment* **18**, 247-289

Lutzenhiser L (2002) Marketing household energy conservation: the message and the reality. In *New tools for environmental protection: education, information and voluntary measures.* Committee on the Human Dimensions of Global Change. T Dietz and PC Stern, eds. Division of Behavioural and Social Sciences and Education. Washington DC: National Academy Press

LVAPG (1995) *Launton Village Appraisal 1993.* Published by the Launton Village Appraisal Planning Group, Oxon, UK

Mansouri I and Newborough M (1999) *Dynamics of energy use in UK households: end-use monitoring of electric cookers.* Proceedings, European Council for an Energy-Efficient Economy, 1999. Panel III, 08

Marshall G (2001) The psychology of denial: our failure to act against climate change. *The Ecologist,* September 2001

Maslow A (1987) *Motivation and personality.* Harper and Row, New York

McCalley LT (2000b) *Electronic feedback thermostat: literature review and conceptual analysis.* Report, Dept of Technology Management, Technische Universiteit Eindhoven/ NOVEM, October 2000

MacConnachie M and Eonnet Y (1999) Smart-cards - a key tool for utilities. *Metering International* 3, 1999

Macgnachten P and Jacobs M (1997) Public identification with sustainable development: investigating cultural barriers to participation. *Global Environmental Change* **7** (1), 5-24

Mansouri I and Newborough M (1999) *Dynamics of energy use in UK households: end-use monitoring of electric cookers.* Proceedings, European Council for an Energy-Efficient Economy, 1999. Panel III, 08

Marvin S and Guy S (1997) Creating myths rather than sustainability; the transition fallacies of the new localism. *Local environment* **2** (3)

Maslow A (1987) *Motivation and personality.* Harper and Row, New York

Mason, J (1996) *Qualitative researching*. Sage publications

Meadows DH, Meadows DL, Randers J and Behrens WW (1972) *The limits to growth: a report for the Club of Rome's project on the predicament of mankind.* Pan, London

Meyers S (1987) Energy consumption and structure of the US residential sector: changes between 1970 and 1985. *Annual Review of Energy* **12:** 81-97

Meyers S and Schipper L (1984) Energy in American homes: changes and perspectives. *Energy* **9** (6) : 495-504a

Milne, G and Boardman, B (1997) *Making cold homes warmer:* the *effect of energy efficiency improvements in low-income homes.* EAGA Charitable Trust

MORI (2002) *Science and the environment: a survey of public opinion.* Survey carried out for the Scientific Alliance, UK

Morris M and Schagen I (1995) *Green attitudes or learned responses?* Global Environmental Education, July 1995. Published in Dec 1996 by the National Foundation for Educational Research

Morrison EM (1994) *SCARF energy advice service evaluation report.* SCARF, Aberdeen, UK

Mudyn, K and Ryzak, Z (1997) *Systematic and psychological barriers to reducing energy consumption.* Proceedings, European Council for an Energy-Efficient Economy, 1997. Panel 4 - ID 134

Mullaly C (1998) Home energy use behaviour: a necessary component of successful local government home energy conservation (LGHEC) programs. *Energy Policy* **26** (14), 1041-1052

NEMS market research (2000) Energy advice providers survey for Energy Saving Trust. February/ April 2000

New Perspectives/BMRB (1996a*) Local Energy Advice Centres: final report on the 1993-1996 pilot programme.* Volume 1 - introduction and Findings. New Pespectives, Woodbridge, Suffolk

New Perspectives/BMRB (1996b) *The Energy Efficiency Report - a review of home energy efficiency in Britain and peoples' attitudes to improving it.* New Perspectives, Woodbridge, Suffolk

New Perspectives (1999) *Energy efficiency of owner occupied homes - differences between apparent and actual improvement rates through different monitoring methods.* Personal communication from Robin Sadler and Gill Digby, based on EEACs research carried out for the Energy Saving Trust, 1993-97.

New Perspectives/BMRB (2002*) Benefits of energy advice: report on a survey.* Report to the Energy Advice Providers Group, Energy Saving Trust, London

New Perspectives/Taylor Nelson Sofres (2002) *Report on the quality of energy efficiency advice provided by gas and electricity suppliers.* Ofgem, June 2002

NFO BJM (2002) *The 2000/2001 Energy Efficiency Advice Centre Survey UK Report.* Prepared for COI Communications, London

Nielsen L (1993) How to get the birds in the bush into your hand: results from a Danish research project on electricity savings. *Energy Policy* November 1993: 1133-1143

Novem (2001) outline of characteristics of energy efficiency campaigns http://www.novem.org/behaviour-research/campaigns/

OFGEM (2002) *Social Action Plan Annual Review.* OFGEM, March 2002

OFGEM (2002b) Energy Efficiency Commitment 2002-2005. Techical guidance manual Issue 2. http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/125_oct2002.pdf

Optima Energy Services (1989) *Neighbourhood heating advisors*: final report of a research project undertaken by Optima Energy Services in association with British Gas. November 1989

Oxfordshire EEAC (1996) Rural Energy Action Project, final report. Oxfordshire Energy Efficiency Advice Centre

Palmberg IE and Kuru J (2000) Outdoor activities as a basis for environmental responsibility. *Journal of environmental education* **31** (4), 32-36

Palmborg C (1986) Social habits and energy consumption in single-family homes. *Energy* **11** (7), 643-650.

Palmer MH, Lloyd ME and Lloyd KE (1977) An experimental analysis of electricity conservation procedures. *Journal of Applied Behaviour Analysis* **10**, 665-672

Pedersen, LH (1999) *Is energy consumption beyond the limit of reflexivity?* Proceedings, European Council for an Energy-Efficient Economy, 1999, 3.23

PESD (1998) *Education for sustainable development in the schools sector.* Panel for Education for Sustainable Development, Council for Environmental Education, London

Peters J S, Seiden K, Baggett S and Morander L (1998) *Changing consumer attitudes to energy efficiency: midterm results from an advertising campaign.* Proceedings, American Council for an Energy-Efficient Economy, 1998

Peters J S, Seiden K, Baggett S and Morander L (1998) *Changing consumer attitudes to energy efficiency: midterm results from an advertising campaign.* Proceedings, American Council for an Energy-Efficient Economy, 1998

PHIS (2001) www.show.scot.nhs.uk/phis/constituencyprofiles Public Health Institute of Scotland

Piaget J (1929) *The child's conception of the world.* Translated by J and A Tomlinson. 1951 reprint, Littlefield Adams Quality Paperbacks, ISBN 0-8226-0213-X

Piaget J (1972) *Psychology and epistemology: towards a theory of knowledge.* Allen Lane, The Penguin Press, London

Pimentel G, Zaltzman C, Leonelli PA, Principe CA, Geller H and Souza RC (1998) *Consumer attitudes towards electricity conservation in Brazil.* Proceedings, American Council for an Energy-Efficient Economy, 8.279-8.287

PIU (2002) *The energy review.* Cabinet Office Performance and Innovation Unit. The Stationery Office, London. http://www.piu.gov.uk/2002/energy/report/

Pohl C and Gisler P (2003) Barrier and opportunities in realising sustainable energy concepts - an analysis of two Swiss case studies. *Energy Policy* **31**: 175-183

Polanyi M (1969) *Knowing and being.* Routledge and Kegan Paul, London

Ranta T (1996) Exploring market segments for household energy conservation campaigns. In *Research program on consumer habits and energy conservation,* LINKKI. Helsinki

RCEP (2000) *Energy – the changing climate.* Royal Commission on Environmental Pollution 22nd report

Robottom I and Hart P, eds (1993) *Research in environmental education: engaging the debate.* Deakin University Press, Geelong

St George, R (1991) *Enfoline Report 1990/91.* Report to the Energy Efficiency Office on Bristol Energy Centre's ENFOLINE Telephone Enquiry Service 1990/91. Bristol Energy Centre

Salmon J (2000) Are we building environmental literacy? *Journal of Environmental Education* **31** (4): 4-10

Schipper L (1987) Energy conservation policies in the OECD: did they make a difference? *Energy Policy* December 1987: 538-548.

Schipper L, Bartlett S, Hawk D and Vine E (1989) Linking life-styles and energy use: a matter of time? *Annual Review of Energy* **14**: 273-320

Schon DA (1983) *The reflective practitioner.* Hardback, 1983, Maurice Temple Smith Ltd, London; paperback, 1991, Avebury, The Academic Publishing Group, Aldershot, UK

Schumacher EF (1973) *Small is beautiful: a study of economics as if people mattered.* Blond and Briggs Ltd, London

Scottish Executive (2000) *Housing trends in Scotland: quarter ending 31 March 2000.* Statistical Bulletin HSG/2000/7, Scottish Executive Publications, October 2000

Scottish Office (1995) *The New Councils.* The Scottish Office Statistical Report, a publication of the UK Government Statistical Service

Schofield JW (1993) Increasing the generalizability of qualitative research. In *Social research: philosophy, politics and practice,* ed. M Hammersley. Sage, London

Schon DA (1983) *The reflective practitioner.* Hardback, 1983, Maurice Temple Smith Ltd, London; paperback, 1991, Avebury, The Academic Publishing Group, Aldershot, UK

Schultz PW (2002) Knowledge, information and household recycling. Chapter 4 of *New tools for environmental protection: education, information and voluntary measures.* Committee on the Human Dimensions of Global Change. T Dietz and PC Stern, eds. Division of Behavioural and Social Sciences and Education. Washington DC: National Academy Press

Sheldrick B and Macgill S (1988) Local energy conservation initiatives in the UK: their nature and achievements. *Energy Policy,* December 1988

Shove E (1997) Energy Knowledges. Proceedings, European Council for an Energy-Efficient Economy, 1997. Panel IV

SIP (2000) http://www.sellerspack.com/. Sellers Information Pack Ltd.

Skinner BF (1974) *About behaviourism.* Jonathan Cape, London

Sluce A J A and Tong D (1987) *Energy efficient refurbishment of Victorian terraced housing: a demonstration for Merseyside Improved Houses, Liverpool.* BRECSU Energy Studies, Final Report no ED 227/209

Smyth JC (1996) Environmental values and education. In *Values in education and education in values*, eds Halstead JM and Taylor MJ. Falmer Press

RH Socolow (1978) The Twin Rivers program on energy conservation in housing: highlights and conclusions. *Energy and Buildings* **1** (3): 207-242

Sonderegger RC (1978) Movers and stayers: the resident's contribution to variation across houses in energy consumption for space heating. *Energy and Buildings* **1** (3): 313-324

Spaargaren G (1999) *Theorising sustainable lifestyles and domestic consumption patterns in between deterministic and voluntaristic models of social change.* European Science Foundation workshops on consumption, everyday life and sustainability, University of Lancaster

Staats HJ and Harland P (1995) *The EcoTeam program in the Netherlands. Study 4: longitudinal study on the effects of the EcoTeam Program on environmental behavior and its psychological backgrounds.* Centre for Energy and Environmental Research, Faculty of Social and Behavioural Sciences, Leiden University

Stavenhagen M (1993) Decolonialising applied social sciences. In *Social research: philosophy, politics and practice,* ed. Hammersley M. Sage Publications Ltd., London

Stephenson R (1996) Environmental education and the general public. Chapter 11 of *Environmental issues in education*, eds Harris G and Blackwell C. Arena/Ashgate publishing, Aldershot, UK

Stern PC (1992) What psychology knows about energy conservation. *American psychologist* **47** (10): 1224-1232

Stern, PC and Gardner, GT (1981) Psychological research and energy policy. *American psychologist* **36:** *329-342*

Stern PC and Aronson E eds (1984) *Energy use: the human dimension.* WH Freeman and company, New York

Sternberg RJ, Forsythe GB, Hedlund J, Horvath JA, Wagner RK, Williams WM, Snook SA and Grigorenko EL (2000) *Practical intelligence in everyday life.* Cambridge University Press

Strang V (1996) Environmental values and the EU Energy Label; report to the Department of the Environment. Environmental Change Unit, University of Oxford

Strauss A and Corbin J (1990) *Basics of qualitative research: grounded theory procedures and techniques.* Sage, Thousand Oaks, California

Swart J and Pye A (2002) *Conceptualising organisational knowledge as collective tacit knowledge: a model of redescription.* 3rd European conference on organisational knowledge, learning and capabilities, Athens

Tabara D, Darier E, Gerger A, Kasemir B and Schule R (1999) *Knowledge for sustainability: reflexive learning and mass communication on Global Environmental Change*. Paper based on research carried out under the ULYSSES project, financed by DG XII of the European Commission.

Taylor B (1997) Green in Word ... In *British Social Attitudes, the 14th report:* 111-135

Thomas R (1999) *Housing and Household Amenities – Commentary*. For the Question Bank, http://qb.soc.surrey.ac.uk/nav/fr_home.htm

Tilbury D (1997) Environmental education and development education: teaching geography for a sustainable world. In Tilbury D and Williams M (eds) *Teaching and learning geography,* Chapter 11. London, Routledge

Tuttle S (1978) Guest editorial, *Energy and Buildings* **1** (3): 201-202

Urge-Vorsatz D and Hauff J (2001) Drivers of market transformation: analysis of the Hungarian lighting success story. *Energy Policy* **29**: 801-810

Valente TW and Schuster DV (2002) Public health perspective for communicating environmental issues. In *New tools for environmental protection: education, information and voluntary measures*. Committee on the Human Dimensions of Global Change. T Dietz and PC Stern, eds. Division of Behavioural and Social Sciences and Education. Washington DC: National Academy Press

Van Houwelingen, JH and van Raaij, WF (1989) The effect of goal-setting and daily electronic feedback on in-home energy use. *Journal of consumer research* **16**: 98-105

Vine EL (1994) the human dimension of program evaluation. *Energy* **19** (2), 165-178

Von Glasersfeld, E (1995) *Radical constructivism: a way of knowing and learning.* The Falmer Press, London

Wadsworth BJ (1996) *Piaget's theory of cognitive and affective development.* 5th edition, Longman, White Plains, New York

Walker, P (1993) Feedback for ecological equilibrium. *Town & Country Planning,* October 1993.

Walker, P (1996*) Ecofeedback* New Economics Foundation, London

Walker J and Oseland N (1998) *Energy advice to tenants - does it work?* New Earswick energy advice demonstration project. Joseph Rowntree Foundation

Walmsley DJ and Lewis GJ (1993) *People and environment: behavioural approaches in human geography.* 2nd edition. Longman, Harlow, Essex

Warm Homes and Energy Conservation Act (2000) The Stationery Office, London

Watkins C and Mortimore P (1999) Pedagogy: what do we know? In Mortimore P (ed.) *Understanding pedagogy and its impact on learning.* Paul Chapman Publishing Ltd, London

Wicks M (1978) *Old and cold: hypothermia and social policy.* Heinemann, London

Weber L (1999) *Beyond energy conservation: energy-relevant decisions within office buildings.* Proceedings, European Council for an Energy-Efficient Economy, 1999. Panel III, 3

Wertsch JV (1985) *Vygotsky and the social formation of mind.* Harvard University Press, Cambridge, Mass. and London

West Lothian Council (2002a) *Advice Shop Annual Report.* West Lothian Council

West Lothian Council (2002b) http://www.westlothian.gov.uk/who_we_are/

West Lothian County Council (1965) *The West Lothian Official Industrial Handbook,* West Lothian County Council

Whitington B (2001) The energetic community. *Energy Action* 83, March 2001: 18-19

Wiener N (1961) *Cybernetics: or control and communication in the animal and the machine.* Second edition. MIT Press, New York

Wilhite H (2001) *What can energy efficiency policy learn from thinking about sex?* Proceedings, European Council for an Energy-Efficient Economy 2001 Vol. 1 331-341

Wilhite H and Ling R (1992) *The person behind the meter; an ethnographic analysis of residential energy consumption in Oslo, Norway.* Proceedings, American Council for an Energy-Efficient Economy, 1992, 10.177-10.185

Wilhite H and Lutzenhiser L (1997) *Social loading and sustainable consumption.* Proceedings, European Council for an Energy-Efficient Economy, 1997. Panel 4 - ID27

Wilhite H, Hoivik A and Olsen J-G (1999) *Advances in the use of consumption feedback information in energy billing: the experiences of a Norwegian energy utility.* Proceedings, European Council for an Energy-Efficient Economy, 1999. Panel III, 02

Wilk, R (1999) *Towards a useful multigenic theory of consumption.* Proceedings, European Council for an Energy-Efficient Economy, 1999. Panel III, 15

Williams DI (1983) *Understanding people's understanding of energy use in buildings.* Proceedings of a conference on social research on the use of energy in buildings, ed Bruce Stafford. Conference and seminar papers no 7, Centre for Urban and Regional Studies, University of Birmingham, UK

Williams DI, Crawshaw AJE and Crawshaw CM (1985) Energy efficiency and the domestic consumer. *The Journal of Interdisciplinary Economics* **1**: 19-27

Williams D I and Crawshaw CM (1988) Behaviour relevant to heating in low income households. Report BRE/109/1/2, December 1988. Building Research Establishment

Winkler, RA and Winett, R (1982) Behavioural interventions in resource management: a systems approach based on behavioural economics. *American Psychologist* **37**, 421-435.

Winett RA and Neale MS (1979) Psychological framework for energy conservation in buildings: strategies, outcomes, directions. *Energy and Buildings* **2**, 101-116

Winett, RA, Hatcher, JW, Fort, TR, Leckliter, IN, Love, SQ, Riley, AW and Fishback, JA (1982) The effects of videotape modelling and daily feedback on residential electricity conservation, home temperature and humidity, perceived comfort and clothing worn: summer and winter. *Journal of Applied Behaviour Analysis* 15, 381-402.

Winward J, Schiellerup P and Boardman B (1998) *Cool Labels: the first three years of the European Energy Label.* Energy and Environment Programme, Environmental Change Unit, University of Oxford

Witherspoon S (1994) The greening of Britain: romance and rationality. In *British Social Attitudes*, 11th Report, ed R Jowell. SCPR, London

WLCES (1999-2002) *Annual Reports, Energy Advice.* West Lothian Council Energy Services

WLEAP (1994-2002) Annual reports. West Lothian Energy Advice Project

WLEAP (1997) *Energy advice: what's it all about?* West Lothian Energy Advice Project

Wortmann K and Schuster K (1999) *The behavioural approach to energy conservation: an opportunity still not taken by energy policy.* Proceedings, European Council for an Energy-Efficient Economy, 1999. Panel III, 17.

Yates S and Aronson E (1983) A social-psychological perspective on energy conservation in residential buildings. *American Psychologist* **38**: 435-444.

GLOSSARY OF ABBREVIATIONS, ACRONYMS AND TERMS

CFL	compact fluorescent lamp (low-energy light bulb)
CHEAP	Calderdale Health Energy Action Project
CWI	cavity wall insulation
DEFRA	the UK Government Department for Environment, Food and Rural Affairs
DG	double glazing
ECO	Energy Conservation Officer
EEC	The Energy Efficiency Commitment. Paid for by a levy on each customer, this is money that fuel suppliers are obliged to spend on raising the level of domestic energy efficiency. Under the EEC, DEFRA has set an energy saving for domestic suppliers with 15,000 customers or more to achieve combined savings of 62TWh between 2002 and 2005 by encouraging or assisting customers to install energy efficiency measures in homes. The Commitment is intended to achieve carbon savings under the UK Climate Change Programme. It also has a social dimension, requiring at least half of the energy savings to be made in households receiving income-related benefits or tax credits (Ofgem, 2002b).
EEAC	Energy Efficiency Advice Centre – part of a 'network of centres across the UK providing free, impartial and locally relevant energy efficiency advice to householders and small businesses' (UK Energy White Paper, 2003).
EST	Energy Saving Trust
GAP	Global Action Plan
HECA	The Home Energy Conservation Act
HES	Home Energy Survey. An energy efficiency audit form to be completed by the householder and sent in to an EEAC for processing by computer. (Sometimes known as a Home Energy Check.)
L&E EEAC	Lothian and Edinburgh Energy Efficiency Advice Centre
LEG	Launton Environment Group
LI	loft insulation
LPG	Liquid Petroleum Gas
NHER	National Home Energy Rating

NR	no response
OED	Oxford English Dictionary
PTEM	physical-technical-economic model (of domestic energy use)
TRV	thermostatic radiator valve
Warm Front	The UK Government's main grant-funded programme for tackling fuel Poverty, formerly known as HEES (the Home Energy Efficiency Scheme). This provides packages of insulation measures to those on income-related benefit. For those over 60 on income-related benefits, grants are also available for central heating in the main living area of the home.
WLCES	West Lothian Council Energy Services

AWARENESS, ACTION AND FEEDBACK IN DOMESTIC ENERGY USE

Sarah Darby

Mansfield College, Oxford

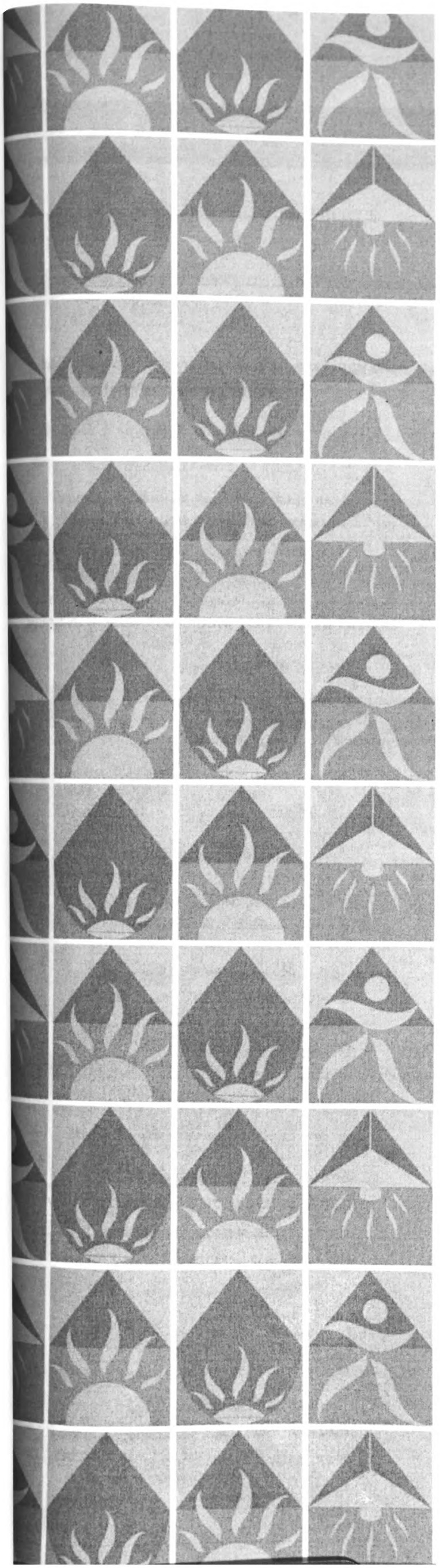
APPENDICES

Thesis submitted in accordance with regulations for the degree of Doctor of Philosophy

in the University of Oxford, Trinity Term 2003

APPENDIX 1: EEAC HOME ENERGY CHECK, LAUNTON SCORESHEET SUMMARY AND EKINS HOME ENERGY REPORT

This appendix shows the home audit form that most of the Launton householders taking part in the REAP would have filled in. This is followed by the Launton scoresheet summary and a copy of the Home Energy Report sent to mortgage-holders with Woolwich plc by Ekins Surveyors, following their mortgage surveys.



ENERGY EFFICIENCY™

Home Energy Survey

Please find the time to fill out this ***simple to answer*** *form with details about your home and forward it to the Energy Efficiency Advice Centre listed on the back page. We will enter the information into an expert computer system that will produce a list of possible measures that could save £100 or more per year off the cost of heating, lighting and providing hot water for your home. The suggestions will be sent to you in a few days.*

All advice is free and impartial. All data will be treated in the strictest confidence.
No information will be passed on for selling purposes.

ENERGY EFFICIENCY ADVICE CENTRES

Questionnaire

Don't worry if you can't answer all the questions.

NAME: (Mr/Mrs/Ms/Miss)..... **ADDRESS:**.....

.....

POSTCODE: ..... **TELEPHONE:** (Home): ..... **(Work):** .....

1 **Do you own your own home or are you living in rented accommodation ?**

- ☐ Buying on a mortgage
- ☐ Own

renting from:

- ☐ Local Authority
- ☐ Private Landlord
- ☐ Housing Association
- ☐ Other .....
- ☐ Don't know

2 **You may be entitled to an insulation grant if you**

Are aged 60 or over

- ☐ Yes
- ☐ No

or claiming benefit?

- ☐ Yes
- ☐ No

3 **What type of house do you live in?**

- ☐ Detached
- ☐ Semi-detached
- ☐ End of terrace
- ☐ Mid-terrace
- ☐ Mid-terrace with unheated connecting passage
- ☐ Flat
- ☐ Maisonette
- ☐ Bungalow
- ☐ Other/Don't know .....

4 **When was your home built?**

- ☐ Since 1995
- ☐ 1990 - 1995
- ☐ 1982 - 1990
- ☐ 1977 - 1981
- ☐ 1966 - 1976
- ☐ 1950 -1965
- ☐ 1930 - 1949
- ☐ 1900 - 1929
- ☐ Before 1900
- ☐ Don't know

5 **Do you have any rooms in the loft (Such as loft conversions or dormer rooms) ?**

☐ Yes (number.....) ☐ No ☐ Don't know

6 **How many storeys does your home have? (Do not count unheated cellars)**

.....

7 **How many of the following rooms does your home have? Please indicate numbers in boxes.**

- ☐ Living & dining rooms
- ☐ Bedrooms
- ☐ Kitchen(s)
- ☐ Bathroom(s)
- ☐ WC(s)
- ☐ Hall & stairs
- ☐ Other rooms

8 **If you live in a flat or maisonette, what type of building is it in ?**

- ☐ Tower Block (six or more storeys)
- ☐ Custom Block (five or less storeys)
- ☐ Above Shop, Office etc.
- ☐ Divided house
- ☐ Other type

And where in the property do you live?

- ☐ Ground floor (or basement)
- ☐ Above ground with unheated space below
- ☐ Part of my home is over an unheated space
- ☐ My home is over another property/heated space/shop

Is there a roof directly above your flat?

- ☐ Yes the flat has a pitched roof
- ☐ Yes the flat has a flat roof
- ☐ Part of the flat has a roof directly above it
- ☐ No the flat is below another property/heated space

9 **What type of walls do you have ?**

- ☐ Cavity
- ☐ Solid
- ☐ Mixed Cavity & Solid
- ☐ Timber frame
- ☐ Don't know

10 **Has any extra wall insulation been added since your home was built ?**

- ☐ No
- ☐ Internal: thin polystyrene roll
- ☐ Internal: less than 25mm (1 inch)
- ☐ Internal: 25mm (1 inch)
- ☐ Internal: 50mm or more
- ☐ External: 25mm (1 inch)
- ☐ External: 50mm or more
- ☐ Cavity Wall: 50mm (2 inches)
- ☐ Cavity Wall: 75mm (3 inches)
- ☐ Yes, but don't know how much
- ☐ Don't know

11 **Do you have a loft ?**

☐ Yes ☐ No ☐ Don't know

If so, do you have loft insulation?

☐ Yes ☐ No ☐ Don't know

If yes please state thickness. .....

12 **Do you have floor insulation ?**

☐ Yes ☐ No ☐ Don't know

If yes please state thickness. .....

13 **Do you have any secondary or double glazing ?**

☐ Yes ☐ No ☐ Don't know

If so what proportion of total glazing ?

.....

14 **If you have double glazing, what type do you have ?**

- ☐ Sealed unit double glazing (replacement type)
- ☐ Fixed secondary glazing
- ☐ Temporary Secondary glazing
- ☐ Triple glazing
- ☐ Double glazed with "Low E" coating
- ☐ Don't know

15 **What type of window frames do you have ?**

- ☐ Wood
- ☐ uPVC
- ☐ Aluminiun
- ☐ Steel
- ☐ Don't know

16 **Are your external doors and windows draught proofed ?**

If so, please estimate what proportion.

- ☐ None
- ☐ Less than 25%
- ☐ 25% (a few)
- ☐ 50% (around half)
- ☐ 75% (most)
- ☐ 100% (all)
- ☐ Don't know

17 **What type of heating system do you have ? If you use more than one, please choose the one you use most:**

System

- ☐ Boiler & radiators
- ☐ Warm Air system
- ☐ Room heaters
- ☐ Storage heaters
- ☐ Other system
- ☐ Don't know

Main fuel for heating

- ☐ Natural Gas
- ☐ LPG (bulk)
- ☐ Bottled Gas
- ☐ Oil
- ☐ Smokeless (processed)
- ☐ Anthracite
- ☐ Wood
- ☐ On peak electricity
- ☐ Economy 7 off peak
- ☐ Other off peak electricity
- ☐ Economy 7 and on peak
- ☐ House coal
- ☐ Peat
- ☐ Don't know

Do you have any of the following?

- ☐ Foil behind some radiators
- ☐ Foil behind every radiator
- ☐ None/Don't know
- ☐ Shelves above some radiators
- ☐ Shelves above every radiator
- ☐ None/Don't know

18 **How old is your heating system ?**

- ☐ Less than 5 years old
- ☐ 5 to 10 years old
- ☐ over 10 years old
- ☐ Don't know

19 **What type of heating controls do you have ? (tick which applies)**

- ☐ No controls
- ☐ Timer/Programmer only
- ☐ Room Thermostat
- ☐ Room Thermostat and Timer/Programmer
- ☐ Thermostatic Radiator Valves and Programmer
- ☐ Room Thermostat/Timer/Programmer/TRVs
- ☐ Thermostatic Radiator Valves & Boiler Manager
- ☐ Manual Charge Controls on Storage Heaters
- ☐ Automatic Charge Control on Storage Heaters
- ☐ Other (please specify)

- ☐ Don't know

'TRVs' are Thermostatic Radiator Valves

20 **How is your hot water provided?**

- ☐ Central Heating system
- ☐ Dual immersion (on and off peak)
- ☐ Single immersion (off-peak or Economy 7)
- ☐ Single immersion (on-peak)
- ☐ Instant Electric
- ☐ Gas combi boiler/instantaneous

Kitchen Range (AGA, Rayburn):

☐ Gas ☐ Oil ☐ Solid Fuel

- ☐ Don't know

21 **Do you have water tank insulation? If so what type and thickness ?**

- ☐ No insulation
- ☐ 1 inch (25mm) or less spray foam
- ☐ 2 inches(50mm) or more spray foam
- ☐ 1 inch thick jacket (25mm)
- ☐ 2 inches thick jacket (50mm)
- ☐ 3 inches thick jacket (75mm)
- ☐ More than 3 inches thick (80mm) jacket
- ☐ Not applicable /No hot water tank
- ☐ Don't know

22 **Do you have any pipe insulation on the pipes between your boiler and your hot water tank?**

☐ Yes ☐ Not applicable/No tank
☐ No ☐ Don't know

23 **What hot water control do you have? (tick one)**

- ☐ No control except on/off switch
- ☐ Programmer/Timer only
- ☐ Tank thermostat only
- ☐ Thermostat and timer
- ☐ Not applicable
- ☐ Don't know

24 **Do you have any low energy lights (Compact Fluorescent Lamps [CFLs])**

☐ No ☐ One ☐ Some
☐ Mostly ☐ Don't know

25 **If we were to make suggestions about energy efficiency measures for your home, would you prefer us to include low cost measures only (£50 or less)** ☐ **or not to limit measures in terms of cost** ☐

26 **Who might you use to carry out any improvements?**

- ☐ DIY (easy jobs only)
- ☐ DIY (easy and harder jobs)
- ☐ Contractors or Builders
- ☐ Don't know

27 **Which of the following would you like advice or information on ? Please tick.**

☐ Domestic Appliances ☐ CO_2 Emissions
☐ Cooker / Cooking ☐ Condensation Control
☐ Solar Water Heating ☐ Handy Hints
☐ Energy Labelling ☐ Greener Motoring

28 **Have you already decided to install any particular energy efficiency measures ? If so which ones ?**

Would you still like any advice on these?

Where did you find out about us ?

Thank you for completing this questionnaire, please return it to the address below

We can then make an evaluation of your energy usage and any possible savings we may identify for you.

The information you provide will be entered on our computer, the system is registered under the Data Protection Act and all the information will be treated in the strictest confidence.

If this Questionnaire does not apply to yourself please pass it on to someone who could benefit from our advice.

The network of Energy Efficiency Advice Centres is administered on behalf of the Energy Saving Trust by The National Energy Foundation, a registered charity no. 298951. Telephone 01908 501908.

Our standards of performance are monitored by BMRB International, who may wish to contact you in a few months to check whether you found our service useful.

Printed by Polyprint of Bedford (01234) 213885

Appendix 5

Actual savings achieved by winning village through REAP in 1996 (£ and CO_2)

(Calculated from the 52 Household score sheets returned)

Energy Saving Measure	£ saving p.a.	CO_2 savings p.a. (kgs)	No. measures installed	£ saved p.a.	CO_2 saved (kg
Timer/programmer	20-25	250-320	3	60-75	750-960
Water heater timer	20-25	250-320	1	20-25	250-320
Radiator shelves	5-10	60-125	1	5-10	60-125
Radiator foil	5-10	60-125	11	55-110	660-1375
Secondary Glazing	25-30	190-320	2	50-60	380-640
Low E Double Glazing	30-40	250-450	1	30-40	500-900
Loft Insulation	35-45	750-880	8	280-360	6000-7040
Thermostatic Radiator Valves (TRV's)	10-20	125-250	6	60-120	750-1500
Hot water cylinder thermostat	10-20	125-250	3	30-60	375-750
CFL's (per bulb)	10-15	125-175	48	480-720	6000-8400
Condensing Boiler	100-120	1250-1700	0	0	0
Double Glazing	25-30	190-320	5	125-150	950-1600
Cavity Wall Insulation	75-100	750-880	3	225-300	2250-2640
Draughtproofing	15-25	125-250	11	165-275	1375-2750
Hot water tank jacket	10-15	125-190	3	30-45	375-570
Room Thermostat	10-20	125-190	1	10-20	125-250
Changing behaviour i.e. only using heating & lighting when required	75-130	875-1345	52	3,900-6,760	45,500-69,940
GRAND TOTAL				**£5,525-9,130 p.a.**	**66,300-99,760 CO_2 p.a.**

Energy Rating Report

For

4 Sample Street, Sampletown SW19 2HS

Home Energy Rating: 30 to 40

Estimated Fuel Costs: £745

(includes heating, lighting and all appliances)

This property already has the following Energy Efficiency features installed:

H/W cylinder insulation

The best improvement options for this property are:

	Aproximate cost	Annual Saving	Payback (years)
Low energy lights	£80	£15	5.3
Condensing boiler	£1,500	£120	12.5

Date of issue: 06 October 1999

The Government has given National Energy Services Ltd authorisation to issue SAP home energy ratings using the Government's Standard Assessment Procedure
© National Energy Services Ltd

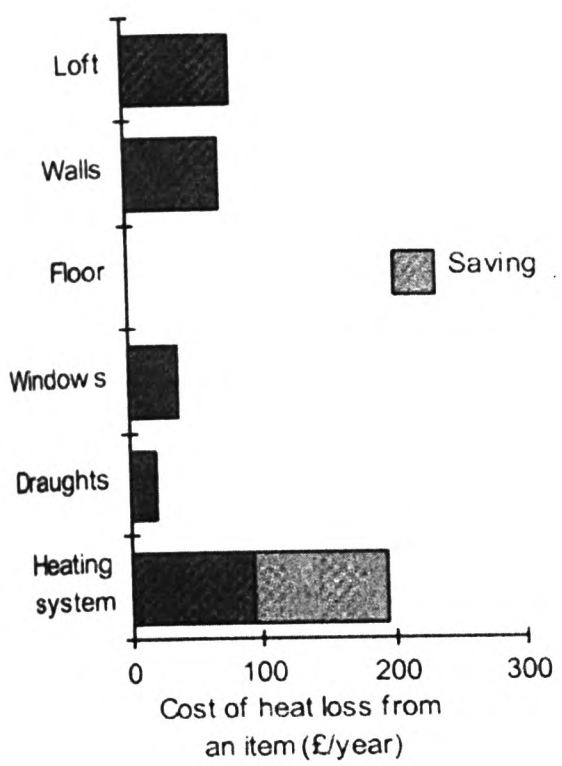
Serial Number 338877

Reference XA333333/000

See attached notes for explanation of ratings, costs and savings

EKINS
SURVEYORS

Estimated fuel costs



In order to calculate the fuel running costs for a house, an assumption has to be made about how many people live in it and how they use the house. The calculation in this case has been based on "standard occupancy" which is a bit like the "standard driving cycle" used for evaluating miles per gallon figures for cars. No one uses a house exactly like the standard occupancy, but it is a good average and provides a basis for comparing one house with another. The standard occupancy assumes the living room is heated to 21°C (70°F) for nine hours a day and all the rest of the house is heated to 18°C (64°C) for the same length of time.

The chart shows the cost of the heat lost through the walls, roof, floor and windows of this house and the losses associated with draughts and the heating system. The full length of each bar is the cost of the loss as the house is now. The light areas show the savings that would result from applying the improvement measures. If any insulation measure is applied less heating is needed, so the loss associated with the heating system decreases.

Energy Rating

An energy rating for a house is like a miles-per-gallon figure for a car. The better the energy rating the more energy efficient the house is and the smaller the total fuel bills. Energy ratings are on a scale from 1-100 with 100 being superb energy performance. Houses of this type typically have ratings between 25 and 55; this one has a rating of between 30 and 40. If you installed the recommended improvements the rating would increase to between 40 and 50. The energy ratings in this report are only approximate since the survey did not cover all the energy details of the property.

Improvement Options

The energy report includes the best improvement options for this house. The costs shown for the options are only approximate. The savings shown assume standard occupancy (see Estimated Fuel Costs) and will be greater if you heat the house more than average and less if you heat the house less than average.

EKINS SURVEYORS

Condensing boiler

This option is best taken up when the present boiler requires repair or replacement. Condensing boilers have a much higher efficiency than other types of boiler. Since they require a drain you are recommended only to use a plumber familiar with their installation. For details of cashback scheme call 0800 512 012.

Cost £1,500 **Saving: £120/yr** **Payback: 12.5 yrs**

Low energy lights

These cost a lot more than ordinary incandescent lamps but last a lot longer (typically five times longer) and use a lot less electricity (about a fifth). Use these lamps in hallways, the kitchen, lounge and other places where lights are left on the most. Cannot be used with dimmer switches, and may not fit some lampshades/light fittings.

Cost £80 **Saving: £15/yr** **Payback: 5.3 yrs**

Breakdown of running costs

The estimated annual running cost for this property can be broken down approximately as follows:

Space heating	£415
Water heating	£90
Cooking	£30
Lights and appliances	£140
Standing charges	£70
Total cost	£745

APPENDIX 2: SURVEY QUESTIONNAIRE AND INTERVIEW PROTOCOL FOR LAUNTON

The Launton survey

This was delivered to every household in Launton village – 460 in all. This was achieved by the willingness of the local environment group to deliver questionnaires to every home. It yielded 232 responses, all usable.

Very few questions were left unanswered. The quality of the survey responses was high and closely consistent with what was observed during the interviews, though a few more efficiency measures were noted in interviewees' homes than had been recorded in the survey, and someone who claimed to have installed a condensing boiler turned out to have a standard boiler instead.

The data were entered into an Access database. During the analysis, χ^2 tests were carried out manually and Mann-Whitney U tests with the aid of an SPSS package.

The Launton interviews

The Village Organiser was interviewed in June 2001, in order to find out some introductory information about the village and the conduct of the REAP competition. 58 respondents to the survey said that they were willing to be interviewed and 18 were selected, on criteria given in $5.1.2 of Chapter 5. These interviews took place from January to March 2002, in the homes of the interviewees. They lasted from thirty minutes to an hour.

The interview protocol is given below, as used for those who had taken part in the REAP competition. It was modified slightly for those who had not done so. Most of the interviews were recorded on minidisk and then transcribed. For three interviewees who preferred not to be recorded, notes were taken. General impressions of the home and the main points of the interview were noted on paper for each session, as backup in case there was a problem with the recording equipment. (Half of one recording was lost because the microphone battery failed).

Extracts from the interview material were entered into an Access database, using a combination of open coding (taking codes directly from the material) and more directive coding (using concepts from the literature review).

Environmental Change Institute
University of Oxford



Launton Village Survey

I very much hope that you will take part in this survey, which is going to all residents of Launton and is supported by the Launton Environment Group.

We chose your village because Launton residents won the 'Energy Conscious Village of the Year' competitions in 1995 and 1996 - but we are interested in the responses of *all* the people who live in Launton, whether or not they took part in the competitions.

The survey concerns your home – any changes you may have made in it over the years, your plans for it and your arrangements for heating it and using electricity. The findings will be used in a study of home energy use, aimed at improving the quality of home energy advice programmes.

The questionnaire will take about 15-20 minutes to complete and I hope that you find it interesting. If possible, it should be filled in by the person who does the most thinking about heating the home, making alterations, paying the fuel bills etc. But it's not essential. If you can't answer a question, or it doesn't apply to you, just move on to the next one. Please return the completed survey to me in the enclosed stamped addressed envelope.

The answers you give will be treated in confidence, in accordance with the Data Protection Act, and will be anonymous.

Who we are
The study is being carried out by the Energy and Environment Programme at the Environmental Change Institute, University of Oxford. Our website is http://www.eci.ox.ac.uk. If you would like any further information, please contact me on 01865 – 281206.

Thank you

Sarah Darby
Environmental Change Institute
5 South Parks Rd
Oxford, OX1 3UB.

Part A: Your home

1. Do you own or rent your home?

Own ☐ 1 Rent ☐ 2

2. How long have you lived here?

0-2 years ☐ 1
2-5 years ☐ 2
6-10 years ☐ 3
over 10 years ☐ 4

3. What sort of heating was there when you first remember seeing your home? Please tick **all** that apply:

Oil central heating ☐ 1
Coal or wood fires/stoves ☐ 2
Electric fires ☐ 3
Electric central heating ☐ 4
Electric storage heaters ☐ 5
Other (please state)..... ☐ 6

4. What sort of heating do you have now? Please tick **all** that apply:

Oil central heating ☐ 1
Coal or wood fires/stoves ☐ 2
Electric fires ☐ 3
Electric central heating ☐ 4
Electric storage heaters ☐ 5
Other (please state)..... ☐ 6

5. What does it cost you each year (approximately) to pay for electricity and heating fuel combined?

Less than £300 ☐ 1
£300-500 ☐ 2
£500-700 ☐ 3
£700-900 ☐ 4
£900+ ☐ 5
Not sure ☐ 6

6. How do you pay for your electricity?

Monthly direct debit ☐ 1
Quarterly direct debit ☐ 2
Quarterly, by cash or cheque ☐ 3
Prepayment meter ☐ 4
Other (please state)..... ☐ 5
Not sure ☐ 6

7. Do you spend time on DIY or making things for your home?

Yes, a lot	☐1
I/we do occasionally	☐2
Rarely/never	☐3

8. How many adults (age 16+) and children normally live in your home?

(a)	One adult	☐1	(b)	no children ☐1
	Two adults	☐2		one child ☐2
	Three or more adults	☐3		two children ☐3
				three or more children ☐4

9. When you first saw your home, did you find any of the following? Please tick **all** that apply:

(a)	Loft insulation	☐
(b)	Cavity wall insulation	☐
(c)	Most or all windows double-glazed	☐
(d)	A few windows double-glazed	☐
(e)	A thermostat to control the central heating	☐
(f)	A timer to control the central heating	☐
(g)	Thermostatic valves on central heating radiators	☐
(h)	A hot water tank	☐
(i)	An insulating jacket on the hot-water tank	☐
(j)	Solar water heating panel (s)	☐
(k)	Low-energy lightbulbs	☐

Part B: alterations and plans

10. Have you any low-energy lightbulbs in your home?

None	☐1
1-2	☐2
3-5	☐3
6-10	☐4
10+	☐5

11. Have you made any alterations to your home, or has your landlord made any alterations? Please tick **all** boxes that apply and **put a ring around any carried out since January 1995** (or during the last few years, if you cannot remember the exact time):

(a)	Loft extension	☐
(b)	Conservatory	☐
(c)	Draughtproofing doors and/or windows	☐
(d)	Replacing most or all of the windows with double glazing	☐
(e)	Replacing one or a few windows with double glazing	☐
(f)	New bathroom/major changes to bathroom	☐
(g)	New kitchen/major changes to kitchen	☐
(h)	Loft insulation (or additional loft insulation)	☐
(i)	Cavity wall insulation	☐
(j)	New central heating system	☐
(k)	New boiler (condensing)	☐
(l)	New boiler (standard or 'combi')	☐
(m)	Central heating thermostat	☐
(n)	Central heating timer	☐
(o)	Thermostatic radiator valves	☐
(p)	Hot water tank insulation jacket	☐
(q)	Instant water heating (removal of the hot water tank)	☐
(s)	Solar water heating panel(s)	☐
(t)	Other (please state)	☐

12. This list concerns your plans for the next two years and 'in your dreams' - if you had unlimited money. Please tick **all** boxes that apply:

	Next 2 years	***'in my dreams'***
(a) Loft extension	☐1	☐2
(b) Conservatory	☐1	☐2
(c) Draughtproofing doors and/or windows	☐1	☐2
(d) Replacing most or all of the windows with double glazing	☐1	☐2
(e) Replacing one or a few windows with double glazing.....	☐1	☐2
(f) New bathroom/major changes to bathroom.....	☐1	☐2
(g) New kitchen/major changes to kitchen	☐1	☐2
(h) Loft insulation (or additional loft insulation)	☐1	☐2
(i) Cavity wall insulation	☐1	☐2
(j) New central heating system	☐1	☐2
(k) New boiler (condensing)	☐1	☐2
(l) New boiler (standard or 'combi')	☐1	☐2
(m) Central heating thermostat	☐1	☐2
(n) Central heating timer	☐1	☐2
(o) Thermostatic radiator valves	☐1	☐2
(p) Hot water tank insulation jacket	☐1	☐2
(q) Instant water heating (removal of the hot water tank)	☐1	☐2
(s) Solar water heating panel(s)	☐1	☐2
(t) Other (please state).....	☐1	☐2

.....

Part C: Your views

In this section we are asking you to tell us something about your views on how you use fuel in your home. This is not an exam – there are no wrong answers. Just tick the statements that come closest to your meaning.

13. How satisfied are you with your heating and water heating?

Very satisfied	☐1
Fairly satisfied	☐2
Not very satisfied	☐3
Very dissatisfied	☐4

(Please explain if dissatisfied).....

.....

14. How easy is it to control the temperature in your home?

Very easy	☐1
Fairly easy	☐2
Quite difficult	☐3
Very difficult	☐4

15. Here are some statements about fuel use in your home (electricity and whatever fuel you use for heating). Please tick **whichever box comes closest to what you think**:

(a) I don't generally think about how much electricity and heating fuel I/we use

strongly agree	☐1
agree	☐2
neither agree nor disagree	☐3
disagree	☐4
strongly disagree	☐5

(b) I wish I/we could afford to use more fuel for heating, lighting, hot water and appliances – it would make life more comfortable

strongly agree	☐1
agree	☐2
neither agree nor disagree	☐3
disagree	☐4
strongly disagree	☐5

(c) I/we try to use fuel for heating, lighting, hot water and appliances as carefully as possible

strongly agree	☐1
agree	☐2
neither agree nor disagree	☐3
disagree	☐4
strongly disagree	☐5

16. Do you have discussions or arguments about how warm your home should be, or about how much the lights/TV/immersion heater etc should be switched on?

Yes, often	☐1
Occasionally	☐2
No	☐3

17. Please tick if you have done any of the following over the last few years:

(a)	Changed electricity supplier	☐
(b)	Bought 'green' electricity	☐
(c)	Read your meter(s) regularly	☐
(d)	Checked your fuel/electricity bills	☐
(e)	Kept your fuel/electricity bills	☐
(f)	Asked for advice about heating/electricity/insulation/appliances	☐
(g)	None of these	☐

18. Have you ever had information or advice that helped you to save electricity or other fuel, or that made your home more comfortable, from any of the following? Please tick **all** that apply:

(a)	Electricity supplier	☐
(b)	Oil or other fuel supplier	☐
(c)	A friend/neighbour/family member	☐
(d)	The Energy Label, when I bought a fridge/freezer/washing machine	☐
(e)	A heating engineer or installer	☐
(f)	An energy adviser, in your own home – face to face	☐
(g)	An energy adviser, by phone or not in your home	☐
(h)	A TV programme or advertisement	☐
(i)	Someone/something else, eg district nurse, magazine article	☐

(please state).....

(j)	None of the above	☐

19. If you have had helpful advice or information from any of the above, what was it?

.....

.....

.....

20. Most scientists agree that increased levels of carbon dioxide in the atmosphere are contributing to climate change. What would you say is the **main** cause – worldwide - of the increase in carbon dioxide in recent times? Please tick **one**.

Destruction of forests	☐1
Burning coal, oil or gas, and electricity from these, eg in buildings and cars	☐2
Industrial pollution	☐3
Volcanoes erupting	☐4
Other (please state).....	☐5
Not sure	☐6

Part D: You and the village – and the Energy-Conscious Village Competition

21. Do you take part in any village activities or socialising – sports club, WI, pub, church etc? If so, please list them below:

.....

.....

.....

.....

22. In 1995 and 1996 Launton took part in – and won – a competition for the title of Oxfordshire **'Energy Conscious Village of the Year'**. Do you remember the competition?

Yes – I took part once	☐1
Yes – I took part twice	☐2
Yes – I heard about it but didn't take part	☐3
No – I was here at the time but don't remember	☐4
No – I wasn't here at the time	☐5

23. If you took part, you may remember filling in a 'Home Energy Survey' and then receiving an information pack which told you about things you could do to save energy. Did you do any of these things?

Yes, I did several (please state what they were)..... ☐1

.....

.....

.....

Yes, I did one or two (please state what they were)..... ☐2

.....

I received the pack but didn't do anything suggested	☐3
I didn't receive a pack	☐4

24. What did you think of the information pack? Please tick **all** boxes that apply:

(a)	The pack was useful	☐
(b)	I learned from the pack that I could claim an insulation grant	☐
(c)	I would have liked more information and explanation	☐
(d)	The pack was too long and complicated	☐
(e)	I would have liked to talk to the person who sent it	☐
(f)	I phoned up and asked for further advice	☐
(g)	The pack was interesting, but I couldn't afford the recommendations	☐
(h)	The pack didn't interest me	☐
(i)	I can't remember anything about it	☐
(j)	I didn't receive a pack	☐
(l)	Any other comment or suggestions	☐

.....

25. If you carried out anything suggested in the pack, what happened as a result? (eg, are you more comfortable, did you get a grant, have your fuel bills gone down, did anything go wrong?)

.....

.....

.....

26. Would you describe yourself as 'energy-conscious'?

No, definitely not	☐1
No, not really	☐2
Yes, I'm fairly energy-conscious	☐3
Yes, I'm strongly energy-conscious	☐4

27. If you would describe yourself as fairly or strongly energy-conscious, did the competition help to make you that way? Please tick **one**

Yes, it started me thinking	☐1
Yes, I'd already thought about it but I did more as a result of the competition	☐2
The competition made no difference	☐3
I don't remember the competition	☐4
I'm not energy-conscious	☐5

Part E: Finally, three questions about yourself...

28. Please tick the box if you are...

Female ☐1 Male ☐2

29. Which age group do you belong to?

18-30	☐1
31-50	☐2
51-65	☐3
65+	☐4

30. What is the highest educational qualification that you have gained?

No formal qualifications	☐1
GCSE/ SCE/ GCE 'O'-level	☐2
'A'-level / Scottish Higher Certificate	☐3
Vocational qualification, eg OND/ HND/ C&G/ NVQ /GSVQ	☐4
Degree	☐5
Postgraduate diploma or higher degree	☐6
Other (please state).....	☐7

.....

Thank you very much for your help with this survey. Your answers will be treated as anonymous.

When we have looked at the results of the survey, we would like to interview some of the respondents in order to get a fuller picture than is possible from a questionnaire. Would you be willing to be interviewed as part of this follow-up? The interview would last about 30 minutes and could be carried out in your home.

If you would be willing to be interviewed, please give your name, address and phone number below. ***Your contact details will only be used for the purposes of contacting you to arrange an interview. They will then be deleted from our records.***

Name.....

Address.....

.....

.....

Phone number.....

Launton interview questions

I work at the Environmental Change Institute, as part of a programme looking at energy and environmental issues. I'm interested in home energy use – ie heating, electricity -, in how people make their homes comfortable and in what makes energy advice programmes effective. I have come to ask them about matters related to these, following up the survey. I don't work for the Energy Efficiency Advice Centre, which ran the Energy-Conscious Village competition: I'm operating independently. Your answers will be anonymous.

1. Were you the person who filled in the form? If not, were you aware of the survey? [Have their questionnaire]

2. Clarify any outstanding questions from the survey.

3. How did you come to your estimate of annual fuel consumption? (Make sure they are including gas and electricity. If not speaking to the person who filled in the form, see what their estimate is. If speaking to the respondent, ask whether they still stand by their estimate).

Predisposition

4. Please could you tell me a bit about the home you grew up in and how it was heated?

5. How comfortable was it?

6. How different is this?

7. Would you have an upper limit for annual fuel bills? What would it be?

8. Refer to alterations and plans for their homes as set out in the survey. Are you satisfied with your home the way it is? If you'd like to change anything about it, what is it? (In terms of physical characteristics, appearance, comfort etc...)

Awareness

9. You describe yourself as strongly/fairly/not really 'energy conscious'. Could you explain what you mean by that? What does an energy conscious person do that other people don't?

10. What do you remember about REAP? (if not mentioned already). If they don't remember, describe it a little: It was the 'Energy Conscious Village of the Year' competition, won in 1995 and 1996 by Launton. People scored points for the village by sending in home energy surveys, installing low-energy lights, insulation etc, putting posters up in the windows to advertise the competition...The second time, most of the village took part and the prize money went towards the Millennium Wood. The interviewee's household took part once/twice and did...

11. How did you get involved?

12. You say that the competition started you thinking...how did it do so? What other things have started you thinking, or given you new ideas?

Or
You say that you already thought about energy use but the competition got you doing more about it. Please could you say what started you thinking about your energy use in the first place? And what it was about the competition that made you do more? Has anything happened since then to get you thinking?

Or
You say that the competition didn't make any difference to how energy-conscious you were. Did the organisers miss opportunities? Because the competition was supposed to make people more aware. What might have helped it to be more effective?

13. If I say 'environment', what do you think of? [What does improving the environment mean?]

14. What difference does it make, having an Environmental Group in the village?

15. Do you ever visit the Millenium Wood? What do you think of it?

Intervention/learning

16. Have you *asked for* energy advice at any point? If so, what happened?

17. Has anyone ever tried to help you or told you anything about your heating or electricity use, whether you wanted advice or not? What did they say?

18. Was the advice any use? Why/why not?

19. Have you read anything, or seen anything on TV, that made you think differently about your energy use or about how you use fuel? What was it?

20. REAP again. (Related to the usefulness of the EEAC system and paralleling questions in the Woolwich survey related to the usefulness of the energy report in the HomeFile):

- Did you go to a talk and/or a workshop when the competition was happening? Do you remember anything about them?

- Did you read your report from the EEAC?

- Did you refer back to it again at any time?

- How useful was the information from the EEAC? Was it credible – did the recommendations correspond well enough to reality?

- What could be done to improve the value of the EEAC report?

Feedback

21. What do you notice, day to day, about your fuel consumption?

22. Do you check your meters and bills? (follow up q18 in the survey) How much use are the bills/statements to you?

23. Do other members of the household remind you about things to do with energy use, or do you discuss usage and/or plans for the house with them?

24. Do you alter your heating and hot water controls much? When and why?

25. The EEAC estimated that in 1996 the average savings per household that took part in REAP were between £106 and £176 per year. Does that sound realistic to you?

Finally

26. Have you ever had any long-lasting power cuts? What do you remember about them? How did you cope? What difference would a fortnight's power cut make to you?

27. [Explain about carbon emissions. The reference for this is the RCEP 22nd report, *Energy – the changing climate*, (RCEP June 2000). 'Two-thirds of the current enhancement in the greenhouse effect is estimated to be due to this increased concentration of carbon dioxide. Nearly 4/5ths of the extra carbon dioxide entering the atmosphere since 1750 is estimated to have come from burning fossil fuels. A small amount has come from calcium carbonate used to manufacture cement and the rest is the result of deforestation and other changes in land use.']

The RCEP are pressing for a 60% in carbon emissions by 2050, to slow down the rate of climate change. If you found you had to cut your carbon use by 60% within a few years, how might you go about it?

APPENDIX 3: SURVEY QUESTIONNAIRE AND INTERVIEW PROTOCOL FOR WOOLWICH SURVEY

Environmental Change Institute
University of Oxford

Homebuyers' survey

Part A: your new home

1. Are you buying...

   freehold? ☐ 1 leasehold (usually flats)? ☐ 2

2. What sort of heating do you have? Please tick all that apply:

   Gas central heating ☐ 1
   Gas fires ☐ 2
   Oil central heating ☐ 3
   Coal or wood fires/ stoves ☐ 4
   Electric fires ☐ 5
   Electric central heating ☐ 6
   Electric storage heaters ☐ 7
   Other (please state)..... ☐ 8

3. Have you changed your home heating since obtaining the mortgage?

   Yes ☐ 1 No ☐ 2

4. If you have changed your heating, what did you have before?

   .....

5. What does it cost you (approximately) to pay for electricity and heating fuel for one year?

   Less than £300 ☐ 1
   £300-500 ☐ 2
   £500-700 ☐ 3
   £700-900 ☐ 4
   £900+ ☐ 5
   Not sure ☐ 6

6. How do you pay for your electricity?

   Monthly direct debit ☐ 1
   Quarterly direct debit ☐ 2
   Quarterly, by cash or cheque ☐ 3
   Prepayment meter ☐ 4
   Other (please state)..... ☐ 5
   Not sure ☐ 6

7. How do you pay for your gas or other heating fuel (if not all-electric)?

Monthly direct debit	☐1
Quarterly direct debit	☐2
Quarterly, by cash or cheque	☐3
Prepayment meter	☐4
Cash/cheque on delivery	☐5
Other (please state).....	☐6
Not sure	☐7

8. Do you spend time on DIY or making things for your home?

Yes, a lot	☐1
I/we do occasionally	☐2
Rarely/never	☐3

9. How many adults (age 16+) and children normally live in your home?

(a)	One adult	☐1	(b)	no children ☐1
	Two adults	☐2		one child ☐2
	Three or more adults	☐3		two children ☐3
				three or more children ☐4

10. When you first saw your home, did you find any of the following? Please tick **all** that apply:

(a)	Loft insulation	☐
(b)	Cavity wall insulation.....	☐
(c)	Most or all windows double-glazed	☐
(d)	A few windows double-glazed	☐
(e)	A thermostat to control the central heating	☐
(f)	A timer to control the central heating	☐
(g)	Thermostatic valves on central heating radiators	☐
(h)	A hot water tank	☐
(i)	An insulating jacket on the hot-water tank	☐
(j)	Solar water heating panel (s)	☐
(k)	Low-energy lightbulbs	☐

Part B: alterations and plans

11. Have you installed any low-energy lightbulbs in your home since obtaining the mortgage?

None	☐1
1-2	☐2
3-5	☐3
6-10	☐4
10+	☐5

Since obtaining the mortgage, have you made any alterations to your home? Please tick **any** boxes that apply:

(a)	Loft extension	☐
(b)	Conservatory	☐
(c)	Draughtproofing doors and/or windows	☐
(d)	Replacing most or all of the windows with double glazing	☐
(e)	Replacing one or a few windows with double glazing	☐
(f)	New bathroom/major changes to bathroom	☐
(g)	New kitchen/major changes to kitchen	☐
(h)	Loft insulation (or additional loft insulation)	☐
(i)	Cavity wall insulation	☐
(j)	New central heating system	☐
(k)	New boiler (condensing)	☐
(l)	New boiler (standard or 'combi')	☐
(m)	Central heating thermostat	☐
(n)	Central heating timer	☐
(o)	Thermostatic radiator valves	☐
(p)	Hot water tank insulation jacket	☐
(q)	Instant water heating (removal of the hot water tank)	☐
(s)	Solar water heating panel(s)	☐
(t)	Other (please state)	☐

12. This list concerns your plans for the next 6 months, the next two years, and 'in your dreams' - if you had unlimited money. Please tick **any** boxes that apply, for each column:

	6 months	***2 yrs***	***'in my dreams'***
(a) Loft extension	☐1	☐2	☐3
(b) Conservatory	☐1	☐2	☐3
(c) Draughtproofing doors and/or windows	☐1	☐2	☐3
(d) Replacing most or all of the windows with double glazing	☐1	☐2	☐3
(e) Replacing one or a few windows with double glazing	☐1	☐2	☐3
(f) New bathroom/major changes to bathroom	☐1	☐2	☐3
(g) New kitchen/major changes to kitchen	☐1	☐2	☐3
(h) Loft insulation (or additional loft insulation)	☐1	☐2	☐3
(i) Cavity wall insulation	☐1	☐2	☐3
(j) New central heating system	☐1	☐2	☐3
(k) New boiler (condensing)	☐1	☐2	☐3
(l) New boiler (standard or 'combi')	☐1	☐2	☐3
(m) Central heating thermostat	☐1	☐2	☐3
(n) Central heating timer	☐1	☐2	☐3
(o) Thermostatic radiator valves	☐1	☐2	☐3
(p) Hot water tank insulation jacket	☐1	☐2	☐3
(q) Instant water heating (removal of the hot water tank)	☐1	☐2	☐3
(s) Solar water heating panel(s)	☐1	☐2	☐3
(t) Other (please state)	☐1	☐2	☐3

.....

Part C: your views and interests

In this section we are asking you to tell us something about your views on how you use energy in your home (probably gas and electricity, but it may include other fuels). This is not an exam – there are no wrong answers. Just tick the statements that come closest to your meaning.

13. How satisfied are you with your heating and water heating?

Very satisfied ☐1
Fairly satisfied ☐2
Not very satisfied ☐3
Very dissatisfied ☐4
(Please explain if dissatisfied).....

.....

14. How easy is it to control the temperature in your home?

Very easy ☐1
Fairly easy ☐2
Quite difficult ☐3
Very difficult ☐4

15. Here are some statements about fuel use in your home (probably gas and electricity – maybe other fuels). Please tick **whichever box comes closest to what you think**:

(a) I don't generally think about how much fuel I/ we use

strongly agree ☐1
agree ☐2
neither agree nor disagree ☐3
disagree ☐4
strongly disagree ☐5

(b) I wish I/we could afford to use more fuel for heating, lighting, hot water and appliances – it would make life more comfortable

strongly agree ☐1
agree ☐2
neither agree nor disagree ☐3
disagree ☐4
strongly disagree ☐5

(c) I/we try to use fuel for heating, lighting, hot water and appliances as carefully as possible

strongly agree ☐1
agree ☐2
neither agree nor disagree – both equally important ☐3
disagree ☐4
strongly disagree ☐5

16. Do you have discussions or arguments about how warm your home should be, or about how much the lights/TV/immersion heater etc should be switched on?

Yes, often	☐1
Occasionally	☐2
No	☐3

17. Please tick if you have done any of the following over the last few years:

(a)	Changed electricity supplier	☐
(b)	Bought 'green' electricity	☐
(c)	Read your meter(s) regularly	☐
(d)	Checked your fuel/electricity bills	☐
(e)	Kept your fuel/electricity bills	☐
(f)	Asked for advice about heating/electricity/insulation/appliances	☐
(g)	None of these	☐

18. Have you ever had information or advice that helped you to save electricity or other fuel, or that made your home more comfortable, from any of the following? Please tick **all** that apply:

(a)	Electricity supplier	☐
(b)	Oil or other fuel supplier	☐
(c)	A friend/neighbour/family member	☐
(d)	The Energy Label, when I bought a fridge/freezer/washing machine	☐
(e)	A heating engineer or installer	☐
(f)	An energy adviser, in your own home – face to face	☐
(g)	An energy adviser, by phone or not in your home	☐
(h)	A TV programme or advertisement	☐
(i)	Someone/something else, eg district nurse, magazine article	☐

(please state).....

(j)	None of the above	☐

19. If you have had helpful advice or information from any of the above, what was it?

.....

.....

20. Most scientists agree that increased levels of carbon dioxide in the atmosphere are contributing to climate change. What would you say is the **main** cause – worldwide - of the increase in carbon dioxide in recent times? Please tick **one**.

Destruction of forests	☐1
Burning coal, oil or gas, and electricity from these, eg in buildings and cars	☐2
Industrial pollution	☐3
Volcanoes erupting	☐4
Other (please state).....	☐5
Not sure	☐6

Part D: the HomeFile

21. When your new home was surveyed, the surveyors produced a HomeFile with information about the property. Please tick **one** of the boxes below to show how much you have used it:

I have checked the HomeFile several times	☐1
I looked at the HomeFile once, when I was first given it	☐2
I looked at the HomeFile once, after moving house	☐3
I haven't looked at the HomeFile yet	☐4
I don't have the HomeFile any more	☐5

[Please use your copy of the HomeFile if you wish, to help you in answering the questions. If you do not have the HomeFile any more, please answer any questions in this section that you can and leave the rest.]

22. What was the valuation of your home given in the HomeFile?

Up to £30,000	☐1
£30-50,000	☐2
£50-80,000	☐3
£80-120,000	☐4
£120-170,000	☐5
£170-250,000	☐6
£250,000+	☐7

23. This question is about the **Energy Rating Report** section of the HomeFile – please tick **any** statements that apply:

I read and understood the Energy Rating Report on my own	☐1
I discussed the Energy Rating Report with someone in the household	☐2
I discussed the Energy Rating Report with a friend/ neighbour	☐3
I discussed the Energy Rating Report with a builder/ architect/ energy adviser	☐4
I've looked at the Energy Rating Report but didn't understand it	☐5
I haven't yet looked at the Energy Rating Report	☐6

Please take a look at the Energy Rating Report section of your HomeFile.

24. What was the Home Energy Rating given to your home on the first page of the Energy Rating Report?

0 to 10	☐1
10 to 20	☐2
20 to 30	☐3
30 to 40	☐4
40 to 50	☐5
50 to 60	☐6
60 to 70	☐7
70 to 80	☐8
80 to 90	☐9
90 to100	☐10

25. What are the Estimated Fuel Costs for one year given on the first page of the Energy Rating Report? (A breakdown of the costs is given on the second page)

Less than £300 ☐1
£300-500 ☐2
£500-700 ☐3
£700-900 ☐4
£900+ ☐5

26. Do you think that the Estimated Fuel Costs are realistic?

Too low ☐1
About right ☐2
Too high ☐3

27. Does the report say (on the first page) that the property had some Energy Efficiency features installed already?

Yes ☐1 No ☐2

If 'Yes', please state what they were .....

.....

28. The first page of the Energy Rating Report gives suggestions for the two 'best improvement options' for the property – for example, putting in loft insulation or low-energy lighting. Please **write in the 'best improvement options' from your Report** in the spaces below and then **tick the box that most closely applies:**

(a) Suggested 'best improvement option' 1:.....

I have carried this out ☐1
I plan to carry this out within the next six months ☐2
I plan to carry this out when I/we can afford it ☐3
I plan to carry this out when we need a replacement ☐4
I don't plan to do this ☐5
I didn't agree with this recommendation ☐6

(b) Suggested 'best improvement option' 2:.....

I have carried this out ☐1
I plan to carry this out within the next six months ☐2
I plan to carry this out when I/we can afford it ☐3
I plan to carry this out when I/we need a replacement ☐4
I don't plan to do this ☐5
I didn't agree with this recommendation ☐6

29. How useful do you think the Energy Rating Report is as a way of informing homebuyers about what they can do to improve their property? (Please tick **any** that apply)

The report was useful – if I move house again, I'd like another	☐
I would have liked more information and explanation in the report	☐
I would have liked to talk to the person who wrote the report	☐
I would have liked information on who could supply and install the improvements	☐
The report was interesting, but I can't afford the recommendations	☐
The report didn't interest me	☐

30. Have you any suggestions as to how the report could be improved?

.....

.....

Part E: Finally, three questions about yourself...

31. Please tick the box if you are...

Female ☐1 Male ☐2

32. Which age group do you belong to?

18-30	☐1
31-50	☐2
51-65	☐3
65+	☐4

33. What is the highest educational qualification that you have gained?

No formal qualifications	☐1
GCSE/ SCE/ GCE 'O'-level	☐2
'A'-level / Scottish Higher Certificate	☐3
Vocational qualification, eg OND/ HND/ C&G/ NVQ /GSVQ	☐4
Degree	☐5
Postgraduate diploma or higher degree	☐6
Other (please state).....	☐7

.....

Thank you very much for your help with this survey. If you would like to include your name and address below, you will be entered into a prize draw to win energy efficient light bulbs to the value of £50.

This will not affect the confidentiality of your answers in any way – they will still be treated as anonymous.

Name.....

Address.....

.....

tel: .....

email:.....

When the results have been analysed, we may wish to interview some of our respondents as a check on whether our ideas for improving our service to home-buyers are moving in the right direction.

Would you be willing to be interviewed as part of this follow-up? The interview would last about 45 minutes and could be carried out over the phone or at home.

Yes ☐ No ☐

Your contact details will only be used for the purposes of contacting you for prize draw notification and/or interview, as appropriate, and then be deleted from our records.

Woolwich interviews

The first interview, with W62, was used as a pilot. Following that, the interviews were loosely structured, with all respondents being asked questions as appropriate from the following list:

Completion date of house purchase (for confirmation):

Awareness

- Tell me about your experience with low-energy lights (if they have had any). How did you come by them? Do you like them? Where do you use them?
- (if they have had advice from other sources than the ERR). Why did you ask for advice?
- How did you come to see the ERR?
- How well did you understand it?
- Was fuel use something you thought about when looking for your home? Did the ERR make a difference at all?
- How does your home compare with your previous home in terms of fuel use?

Advice

- (if they have had advice from other sources than the ERR). What advice were you given?
- How well did you think the advisers understood what your circumstances were?
- How easy were the different sorts of advice to understand?
- (if they had home advice) please describe what happened.
- Did the ERR fit in with the other advice you received?
- Which advice was most useful? Why?
- Did you talk about the advice with other members of your household?

- Would you go back to any of those sources of advice?
- (especially if they have not had any advice). Are there other things to do with your home that you have asked advice on, eg security, design?
- When you installed measures/ had them installed, what was it like getting hold of materials/ workpeople? What was the experience like? How smoothly did it go?

Feedback

- how often do you read your meter? Why?
- When you check bills, how do you do it? Check the arithmetic? See if the bill corresponds to the meter reading? Do you ever look back to the bill you had at the same time last year?
- What are the issues if you discuss energy use at home (if applicable)?
- Do you ever alter your thermostats and timer? Why?
- What do you think have been the results of the alterations that you made since moving in and/or the advice that you followed? [cost/comfort/convenience/effects on who does what and where]

Any other comments?

APPENDIX 4: THE USEFULNESS OF ENERGY RATING REPORTS TO EKINS CUSTOMERS

From a report submitted to Ekins Surveyors, April 2002

1 Background to the survey

1.1 Origins of the Energy Rating Report and survey

Ekins Surveyors, a Woolwich business, began to incorporate home energy surveys in September 1998 as part of their mortgage surveys and by January 1999 all customers were receiving an Energy Rating Report (ERR). The intention is that the survey should 'add value' to the customer who takes out a mortgage with Woolwich plc. Ekins won the 'Home Energy Rater of the Year' award at the 1999 National Home Energy Rating conference. The following year they went on to win the lifetime award for commitment to promoting energy efficiency.

The ERR was produced using NES or Elmhirst software. It takes up three pages in most of the HomeFiles which are issued to customers as 'log-books' for the home. The report is introduced in the covering letter for the HomeFile as follows:

> *This section of the report prepared by our specially trained surveyors includes recommendations for the most cost-effective improvements to save energy, reduce heat loss and save you money. If you wish to take action on some of the recommendations made, the Woolwich may be able to assist you further.*

In March 2000 Chris Reynolds, then Environmental Manager of Woolwich plc, requested a survey of Woolwich/Ekins clients to address the following questions:

- How much do customers refer to the ERRs?
- How useful do they find them?
- To what extent do they act on the recommendations they find there?
- What sort of people responded to the ERRs – at what stage in their life cycle, what educational levels?
- What other sources of advice and information have they used?
- Do they have any comments on how to improve the usefulness of the surveys?

More questions emerged during the questionnaire design. They were:

- What was the perceived accuracy of the ERRs?
- What were the priorities of the householders for altering their homes, and where did improvements in energy efficiency stand in the scale of priorities?
- What factors are involved in raising awareness of domestic energy use?
- What factors appear to contribute to action taken by householders following energy advice?

1.2 Piloting the questionnaire

The questionnaire was piloted with 60 householders. It was sent out with a covering letter explaining the purpose of the survey and offering a prize of a solar-powered radio to any respondent willing to give their name and address to be placed in a draw. Only three people responded, indicating a general lack of interest in the subject, but their replies helped in compiling the final version of the questionnaire.

1.3 Survey and response

The survey was sent out early in July 2001. It went to 2000 householders who had completed their house purchases between November 1999 and May 2000[1]. This meant that they had lived for at least a year in their homes and had had time to make alterations and consider plans for changes to their property.

There were 70 responses to the survey - again, an extremely low response rate that was not helped by at least a third of the forms being poorly photocopied and/or collated. Four responses were unusable, for various reasons, while some were incomplete because:

- one or more questions were only partly visible, having been photocopied on the slant (10 forms);
- page order had been reversed for some pages when 12 of the returned questionnaires were collated. Five of these 12 also had some illegible questions;
- 11 respondents did not appear to have their HomeFile to hand and did not respond to any of the questions about what was contained in their ERR. Three of the 11 also had illegible questions and/or wrong page ordering.

The summaries and interpretation below are based on all 66 of the replies, as all were usable to some degree. The number of responses to each separate question is given in the report.

1.4 Interviews

35% (23) of the respondents stated that they were willing to be interviewed as a follow-up to the questionnaire and six were interviewed by phone during the week September 24-28 2001. Questions asked in the interviews are given in Appendix 3 and a summary of the main points is given at the end of this report. The interviews added some depth and detail to the views outlined on the survey form.

---

[1] (One respondent however indicated on the survey form and confirmed during interview that she had moved into her home during the mid-1990s: she had been sent a questionnaire because she had remortgaged the property between November 1999 and May 2000).

2 The respondents

2.1 Tenure (Q1)

62 responses. All stated that they were buying freehold apart from seven leaseholders.

2.2 Gender (Q32)

64 responses. 21 were from females (six of them the only adults in the household) and 43 from males.

2.3 Age (Q33)

63 responses. 67% (43) were in the age group 31-50 and 21% (13) in the age group 18-30. Only 12% were 51 or over.

2.4 Household size (Q9)

Just over a third of the households – 25 – had children under the age of 16. Most of those who responded came from small households: over half (38) were in one- or two-person households. Just under a third (20) were single adults, two of whom had a child living with them.

Table 1: Household size

Adults	Children	Number of households
1	0	18
1	1	2
2	0	18
2	1	4
2	2	7
2	3+	8
3	0	5
3	1	2
3	2	1
3	3+	1

2.5 Education (Q34)

62 responses. Three had 'no formal educational qualifications'.

14 (23%) had GCSEs or O-levels and 4 (6%) had A-levels or equivalent as their highest formal qualification.

17 (27%) had some form of vocational certificate as their highest formal qualification.

24 (36%) had degree-level qualifications, well above the level in the working-age population of approximately 9% (http://www.fathom.com/feature/35711, LSE source for online learning. 1997 figures). Half of these had additional postgraduate qualifications.

2.6 Ability to afford home improvements and fuel (Q6,7,12,13,16b)

The survey did not ask about income directly: the main interest was in householders' *priorities* for using their disposable income.

Six respondents paid for their electricity and/or gas by prepayment meter – an indicator of difficulty in making payments in some cases (although one householder with tenants welcomed that method of payment as it was a way of keeping her tenants' electricity use within bounds).

Most of the sample were satisfied with their heating arrangements (see 2.17 below) even if some of their home energy ratings (HER) showed that they were paying far more for comfort than was necessary. Only eight respondents said that they would like to use more fuel if they could afford it, in order to be comfortable (Q 16b). The survey did not therefore uncover much difficulty in achieving affordable comfort.

2.7 Home heating (Q2-4)

66 responses. 64 (97%) had some form of programmable heating if electric storage heaters are included (this compares with 88% in the English House Condition Survey Energy Report (EHCS), 1996). Almost all the households therefore had some type of heating which required an understanding of thermostats, timers and other controls.

2.8 Home energy ratings (Q25)

Home energy ratings (HERs), as given in the ERR, were reported by only 45 respondents out of the 55 who gave some information about their ERRs. This figure suggests that several respondents did not understand what the HER was. The numbers in different rating bands[1] were:

0-10	1
10-20	7
20-30	3
30-40	7
40-50	9
50-60	10
60-70	6
70-80	2

The national mean SAP rating was given as 'almost 44' in the 1996 English House Condition Survey Energy Report. It is not possible to calculate an accurate mean figure for this sample, but if median figures are used for each rating (5, 15 etc), the mean comes out at 43, almost identical to the national figure.

[1] In two instances, the figure given was not expressed in terms of 'decades', eg 45-55. It was recorded in the 'decade' below, eg 45-55 was recorded as 40-50.

2.9 Energy efficiency features noticed on first seeing the home (Q10)

Q10 asked 'When you first saw your home, did you find any of the following?' and gave a range of possible energy efficiency measures. There were 65 responses. In order of frequency, measures noticed on first viewing the home were:

CH timer	47
CH thermostat	40
Loft insulation	38
Hot water cylinder insulation (HWCI)	36
Most windows double-glazed	33
Thermostatic radiator valves	20
Cavity wall insulation (CWI)	11
Low-energy light bulbs	3

The answers are related to what the respondents *noticed* as well as to what was actually installed. For example, only 58% of the responses mentioned loft insulation – a low percentage compared with the 93% of all eligible homes with some form of loft insulation recorded in the 1996 EHCS.

The level of CWI observed (17%) was approximately 40% *higher* among Woolwich clients than nationally. The 1996 EHCS estimated that 55% of homes had cavity walls, of which only 22% were insulated, giving an overall figure of 12% of all properties.

The proportion of respondents who stated that most or all of their windows had been double-glazed was 51% - considerably higher than the 31% recorded in the 1996 EHCS.

As seen later in this report ($5.3), there are discrepancies between the records of the householders and the surveyors, with surveyors more likely *not* to note a feature recorded by the householder than vice versa.

2.10 Alterations made to the home since completion (Q12)

Q12 asked 'Since obtaining the mortgage, have you made any alterations to your home?' and gave a range of possible alterations. There were 65 responses. In order of frequency, the alterations made were:

One or more low-energy lights (CFLs)	29
Thermostatic radiator valves (TRVs)	18 (8 as part of new CH systems)
Draughtproofing	13
New bathroom/major changes to bathroom	13
New kitchen/major changes to kitchen	12
Double glazing most/all windows	12
Loft insulation/additional loft insulation	11
CH timer	11 (7 as part of new CH systems)
CH thermostat	10 (8 as part of new CH systems)
New CH system	9
New boiler	9 (6 as part of new CH systems)
CWI	7
HWCI	6
Double glazing one/a few windows	3
New condensing boiler (CB)	1
Conservatory	2
Loft extension	1

The list shows measures with a wide range of prices and involving different levels of disruption. From an energy-saving perspective, the popularity of TRVs and draughtproofing stands out. These are relatively inexpensive and unobtrusive measures but can make a considerable difference to the ability to control temperature and reduce the rate of heat loss. By contrast, double-glazing is expensive, disruptive to install and likely to have a long payback period (although it is heavily marketed, highly visible and helps to insulate against noise).

2.11 Planned improvements (Q13)

63 responses. Q13 gave a list of possible alterations and energy efficiency measures and asked respondents to tick boxes if they planned any of these for the next 6 months, the next two years, and 'in their dreams' – if they had unlimited money.

Only eight respondents had no plans for their homes. Another eight only had plans 'in their dreams'. 75% of respondents (47) had plans for their homes that they intended to carry out during the next two years – suggesting that they had ideas for improvement and access to funds. Details are given below.

2.12 Priorities for improvements (Q13)

63 responses. The various alterations and measures listed in Q13, in order of popularity, are summarised in Table 2. Conservatories are usually built for non-functional reasons, unlike bathrooms and kitchens, but are clearly very desirable. Three respondents stated that the only alteration they wished to make was a conservatory.

Cavity wall insulation comes low down the list, although the scope for it is still high. 28% (18) of the Woolwich sample appear to have had CWI at the time of this survey (17 householders and one surveyor are recorded as having noted it). 11 of the sample had found it already installed and seven had recently installed it. However, using the EHCS figures as a guide, another 18 homeowners in the sample were likely to have had unfilled cavities but only four had plans to fill them and only one planned to do so within the next two years. This indicates a continuing need to promote CWI as a means of saving energy.

Table 2: Plans for alterations and measures

Measures	**Measures planned within 6 months**	**Measures planned within 2 years**	**Measures planned 'in dreams'**	**Total measures planned**
New/improved bathroom	5	14	7	26
New/improved kitchen	5	12	8	25
Conservatory		7	16	23
Loft extension	1	3	13	17
Double glazing (most windows)	3	5	6 *	14
New CH	1	6	7	14
Loft insulation	6	6	1	13
New boiler#, combi/standard	2	2	1	5
Solar water heating			9	9
Draughtproofing	4	4		8
Double glazing (few windows)	4	3	1	8
TRVs	2	4	1	7
Instant water heating	1	2	3	6
CWI		1	3	4
CB		1	2	3
CH timer#				
CH thermostat#				
Other	New radiators	Make flat roof into terrace	Extend house; water softener + knock through rooms	5
Total	35	71	80	187

*this figure includes 2 respondents who planned to double-glaze a *few* windows within 2 years.

#The criterion for counting an energy efficiency measure was that **it should involve a separate decision to install**. Thus standard or combi boilers, CH timers and thermostats are not counted if new central heating is planned, as it was thought that

these would all form part of the central heating package. Boilers, CH timers and thermostats were counted only if they 'stood alone', apart from an entire CH system. TRVs and condensing boilers were counted separately, though, even if a new CH system had been installed, as it was thought that these would require separate decisions and more money than the default option.

2.13 Planned energy-related improvements (Q13)

31 of the 63 respondents had some plans to do energy-related work on their homes within the next two years. 29 planned at least one insulation/draught reduction measure, with 20 of these opting for at least one of the less visible measures – draughtproofing, loft insulation or CWI. Nine had planned for double-glazing only. These figures show a substantial recognition of the importance of insulation.

25 of the respondents had no energy-related plans at all. Of these, 15 had acquired homes with basic energy-efficiency measures (two out of the three of loft insulation, CWI and double glazing, plus at least one other measure), or else they had carried out alterations to bring them up to this level. That leaves ten respondents with very few efficiency measures in place. In the seven instances where energy ratings were given, all but one had low ratings. None of the ten had carried out any ERR recommendations or planned to do so within six months, and five appeared to have chosen *not* to carry out either recommendation. Nine of them said that they had had information or advice from at least one other source; but none of them had *asked* for advice from anyone. They were not interested, and the ERR did not manage to alter this indifference. This represents a challenge in communication terms.

Seven respondents had energy-related plans only 'in their dreams' – in the indefinite future. Of these seven, three planned for solar water heating, one for double glazing and loft insulation, one for double glazing only, one for CWI and a condensing boiler and one for a new CH system.

Four of those who only had energy-related plans 'in their dreams' had either bought a home with a relatively high rating and/or a number of measures in place (W12, W48, W50) or had bought one with a very low rating and gone on to install a number of measures (W60). The rest (W6, W8, W55) had bought homes with few efficiency measures and had done little in the way of alterations.

One category is worth a special mention, as it involves renewable energy. Nine respondents – almost one in seven of the respondents - stated that they would like to install solar water heating panels, but none of them was wishing to do so within a definite time span (two years). The most likely explanation is that solar water heating is seen as too expensive at present, although the cost continues to fall and can now be less than £1,000 per household through bulk purchasing agreements[1]. There may be scope for Woolwich plc to operate such a scheme and promote it to mortgage-holders.

[1] Eg the Solar Partnership of Calderdale and Kirklees (Andrew Cooper, pers. comm.)

2.14 Leaseholders and alterations

The only alteration made to a leasehold property was installation of an electric shower in one home and there were few plans for the future, with alterations to the bathroom/creation of a bathroom the most likely (five).

The number of leaseholders (seven) is too small to draw any conclusions as to the effect of tenure. The common-sense guess that those buying leasehold rather than freehold might be less inclined to make alterations and to plan for them seems to be borne out, but this may be as much an effect of 'singleness' as of tenure - all but one of the leaseholders was single (see §3.5, 7.6 and 8.6 below).

2.15 DIY, alterations and plans for the home (Q8, 12, 13)

Q8 asked 'Do you spend time on DIY or making things for your home?' There were 64 responses. 25 said they did so 'a lot' and 28 said they did so occasionally. 11 said that they carried out DIY rarely or never.

Table 3 below indicates the extent to which those who were actively involved in work on their homes were likely to have installed new measures in the period since acquiring the property (Q12). It is not known whether or not they did the work themselves. DIY may mean that a homeowner is more likely to *think* about changing the fabric of the home in some way, whether or not s/he carries out the changes.

Draughtproofing, improving the kitchen or bathroom, installing loft insulation, installing thermostats, timers and TRVs and insulating the hot water cylinder all show an association with DIY.

Table 3: DIY and measures installed since moving into the home

Measures installed	**Frequent DIY** (n=25)	**Occasional DIY** (n=28)	**Rare/no DIY** (n=11)	**Total** (n=64)
Loft extension			1	1
Conservatory	1	1		2
Draughtproofing	7	5	1	13
Double glazing	8	4	3	15
New/improved bathroom	9	5		13
New/improved kitchen	7	5		12
Loft insulation	6	4	1	11
CWI	3	3	1	7
New CH	6	1	2	9
Condensing boiler		4		1
Other new boiler	4	3	2	9
CH thermostat	7	2	1	10
CH timer	9	2		11
TRVs	11	6	1	18
HWCI	4	2		6
Low-energy lights (1+)	13	10	6	29
Low-energy lights (2+)	5	6	3	14
Other	Floor insulation	New radiators and HW stat; sealed chimneys	Electric shower	

The answers to Q13 of the survey indicated that DIY enthusiasts also plan more for their homes than others, though the effect was less marked for plans than for projects carried out.

2.16 Satisfaction with heating and ability to control temperature (Q14,15)

66 responses. These questions asked how satisfied householders were with their heating and water heating and how easy it was to control the temperature in their homes. The responses showed a close connection between these two factors.

The total percentage of those 'very' or 'fairly' satisfied was 86% (almost the same as in the EHCS Energy Report of 1996, which gives a figure of 87%).

- 22 respondents were 'very satisfied' with their heating and water heating. 17 of these found the temperature in the home very easy to control and 5 found it fairly

easy. 14 of the 22 gave an energy rating for their home: nine had ratings of 40-50 and above; two of 30-40; one of 20-30 and two of 10-20.

- 35 respondents were 'fairly satisfied', of which eight found the temperature in the home very easy to control and 25 fairly easy. Two found it 'quite difficult' but did not say why. 23 of the 35 householders in this group gave an energy rating for their home: 14 had a rating of 40-50 and above; four of 30-40; one of 20-30; three of 10-20 and one of 0-10.

- Six respondents were 'not very satisfied'. One found the heating very easy to control but 'couldn't have heating without water heating also'. Two found the heating fairly easy to control, one found it fairly difficult and two found it very difficult. Three had energy ratings of 40-50+ and two had 10-20. Of these last two, one had inadequate electric storage heaters (ESHs) and the other had a broken thermostat and a very old boiler. All of these householders gave information about their ERRs but five of them did not appear to have been given any relevant 'best improvement options' or recommendations. The sixth, who found the heating quite difficult to control and had only two radiators downstairs, had been prescribed draughtproofing in the ERR and had installed it.

- Three householders were 'very dissatisfied'. Two found the heating fairly difficult to control: 'hot water and cold problems'; 'needs new boiler and thermostat'. The third found the heating very difficult to control and had 'no constant hot water'. Their energy ratings were 50-60, 20-30 and unknown. The householder who said that she needed a new boiler and thermostat had a new boiler recommended in her ERR and she planned to install new CH within two years. One of the other two reported ERR recommendations that they would carry out when she could afford it, but gave no details as to what the recommendations were; she planned a new boiler within 6 months. The other planned new CH within two years but gave no information about her recommendations.

There is some evidence that the ERRs could give more help in identifying unsatisfactory heating and water heating systems and in making recommendations.

2.17 Level of satisfaction and home energy rating (Q14,15,25)

As seen above, 'satisfaction' with heating may involve paying an unnecessarily high price for comfort, as demonstrated by the householders who managed to be 'very satisfied' in homes with very low energy ratings.

In the ERR, the home energy ratings were given in 'decade' bands, eg 50-60[1]. There is therefore no accurate way of calculating mean energy ratings for the sample or for any sub-sample. However, if median figures are used for the bands (5, 15 etc) it is possible to derive indicative figures for ratings in households with different levels of satisfaction:

[1] or, in two instances, in bands ending in 5, eg 35-45. If the latter, the rating was recorded in the lower 'decade' – in this case, 30-40.

14 householders who were 'very satisfied' and gave a rating had a mean rating level of 45.7
12 " " " 'fairly satisfied' " " " " " 42.4
8 " " " 'not very satisfied or very dissatisfied' " " " 38.8

There seems to be a stronger association between ability to control the temperature in the home and satisfaction than between energy rating and satisfaction.

3 Sources of information and advice used by householders

The term 'information' is taken to be general in nature, while 'advice' is specific to householders and their circumstances (Boardman and Darby, 2000). As it was often unclear just how specific the communication was, the term 'advice' is sometimes used to cover both terms in what follows.

3.1 Sources of advice used by respondents (Q19)

Q19 asked 'Have you ever had information or advice that helped you to save electricity or other fuel, or that made your home more comfortable, from any of the following?' Nine options were given and the ERR itself can be added to these. Ranking the sources of advice in order of frequency for the 64 respondents gives:

Advice source	**No. of respondents using source**
The ERR	36
The Energy Label	21
Electricity supplier	16
A heating engineer or installer	13
A friend/neighbour/family member	10
A TV programme or advertisement	10
An energy adviser, in your own home – face to face	6
Oil or other fuel supplier	5
Someone/something else, eg district nurse, magazine article	5
An energy adviser, by phone or not in your home	1
None of the above	13

The ERR was the single most frequently noted form of energy information or advice, the Energy Label was recognised as a source of information by a third of respondents, and a quarter had received some form of advice or information from their electricity supplier[1]. This advice may or not have been sought by the householder.

Only 20% of respondents said that they had had *no* information or advice from non-ERR sources on fuel usage or comfort.

3.2 Respondents asking for advice and using sources of advice (Q18,19)

Respondents were asked to indicate if they had taken any of a range of actions over the last few years, including asking for advice about heating/electricity/insulation/appliances

[1] however, much of this probably related to reducing the unit cost of electricity rather than conserving energy – see Boardman and Darby, 2000

(Q18). They were also asked 'Have you ever had information or advice that helped you to save electricity or other fuel, or that made your home more comfortable, from any of the following?' (Q19) and given a range of possible sources of information and advice, as outlined in Table 5.

17 of the 64 respondents to this question said that they had asked for advice. Their sources of advice and information are listed in Table 4, along with the sources of advice and information given by those who did not claim to have *asked* for advice. Just over half of the latter stated that they had nonetheless *received* information or advice that helped them to save electricity or other fuel.

Table 4: Percentage of advice-seekers and non-advice-seekers using different sources of advice and information

Source of advice and information	**% of advice-seekers** (n=17)	**% of non-advice-seekers** (n=47)
Electricity supplier	41	19
Energy Label	65	21
TV programme/advertisement	29	11
Other fuel supplier	24	2
Heating engineer/installer	41	13
Friend/neighbour/family member	18	15
Energy adviser in home	35	0
Energy adviser elsewhere	6	0
Someone/something else, eg district nurse, magazine	12 (magazine+internet; Ekins survey+'National survey)	0
None of the above	-	47

Fuel suppliers, TV, the Energy Label, heating engineers or installers, friends, neighbours, family members all emerge as significant sources of unsought advice or information. All these sources, however, show up more in the responses of those who sought advice than those who did not.

3.3 Number of sources of advice and information (Q19)

Several respondents claimed that they had learned something useful from more than one source. Those who had sought advice were more likely to say that they had learned something from several sources than those who had not sought it, as shown in Table 5.

Table 5: Percentage of advice seekers and non-advice-seekers using different numbers of advice sources (including the ERR)

No. of sources of advice and information	**% of advice-seekers** (n=17)	**% of non-advice-seekers** (n=47)
None	-	23
One, ERR only	-	23
One, non-ERR	12	6
Two	24	32
Three	24	8
Four	12	6
Five	12	-
Six	-	-
Seven	18	-

The data suggest that those whose interest has been engaged are likely to go on to seek out information or advice from other sources. (Four of the six interviewees were clearly enthusiastic seekers of information about matters relating to energy use; this was part of a wider curiosity. Motivation varied from environmental concern to grant-seeking.)

There was a significant association between whether a respondent named a (non-ERR) source of information/advice and whether they acted on one or more ERR recommendations ($\chi^2 = 4.85$, 1df). Only 4 of the 22 who did not give a source of information installed one or more ERR recommendations but 17 of the 44 who did give a source installed one or more recommended measures. A better-informed householder is more likely to take note of the ERR and act on it; alternatively, someone who has acted on the ERR is more likely to take note of other sources of advice.

It is worth noting that the ERR was the *only* source of energy advice for 22 of the 47 respondents. 11 of these gave some information about what was in their ERR. Three were unwilling to act on their recommendations, three had already acted on one or more and five were willing to act on a recommendation at some point. But a further 11 had not used their ERR in any way.

The advice and information sources used by respondents can be described diagramatically as in Figure 1:

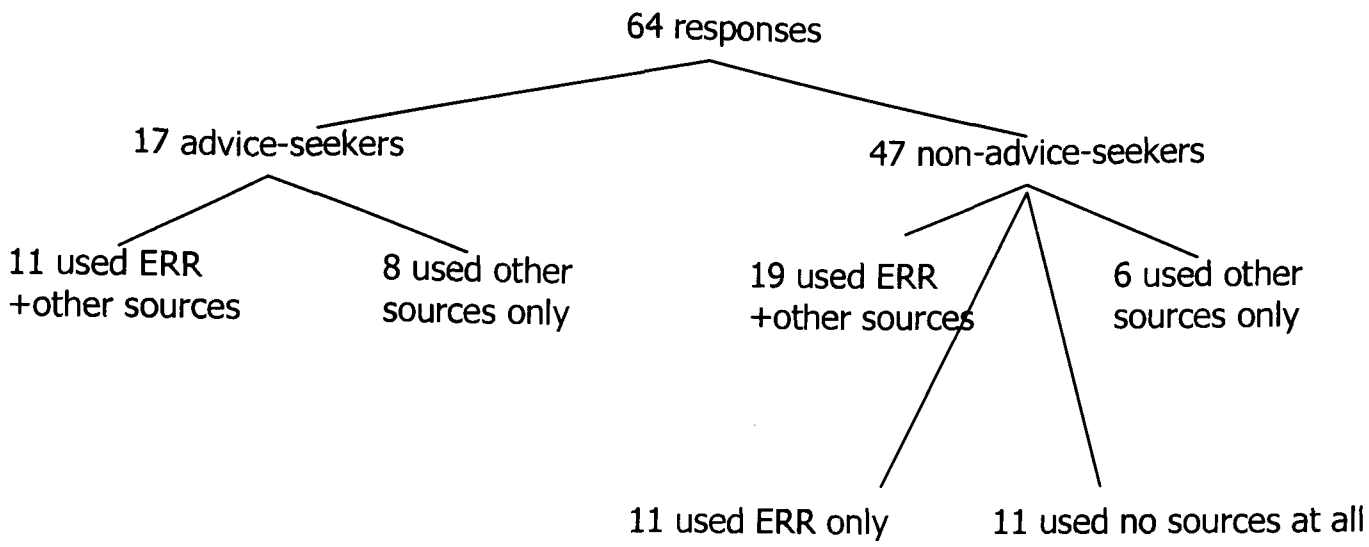


Figure 1: advice and information sources used by respondents

3.4 Advice and the single householder

Previous work on domestic energy advice has indicated that single people are proportionately *more* likely to ask for advice than those living with someone else (eg New Perspectives/BMRB, 1997). However, this was not supported by the evidence here: only three of the 20 single adults reported having asked for advice, as opposed to 14 respondents from the 46 households with two or more adults. Nine of the single adults (45%) reported having had *no* information or advice that had helped them save fuel or make their home more comfortable, compared with 13 (28%) of the adults from households with two or more adults.

This discrepancy could be explained by the relatively young ages of those surveyed (the single householders were disproportionately younger than those in larger households and there was only one elderly single householder) and by their 'life-cycle' stages (see §7.6 below).

3.5 Non-ERR recommendations (Q19, 18)

21 respondents gave details of advice supplied from sources other than the ERR. Some was unsolicited - only 14 of these 21 claimed to have 'asked for advice about heating/electricity/insulation/appliances'. Some of the non-ERR advice was adopted:

- fitting ESHs (two households; one respondent gave no indication of the advice source and the other had been advised from a range of sources);
- new radiators and use of hot water - hot water thermostat installed;
- a cheaper fuel supplier – changed supplier.

It is not known whether the rest was acted on or not. Much of it was behavioural, including:

- how to balance radiators;
- use of the energy label when buying a fridge-freezer and a washing machine (two households);
- statement of daily energy usage (stated to be useful/interesting to the householder, but no measured difference in fuel use);
- investing in a water softener;
- setting a combi boiler for maximum efficiency (2 households) and how to make a new boiler work better;
- 'saving energy around the home';
- showers instead of baths; drawing curtains.

4 Use of the Ekins HomeFile (Q22)

Asked how much they had used their HomeFile, the responses were as follows:

I have checked the HomeFile several times	30
I have looked at the HomeFile once, when I was first given it	19
I looked at the HomeFile once, after moving house	11
I haven't looked at the HomeFile yet	2
I don't have the HomeFile any more	2
No response	2
Total	**66**

Over half of those surveyed therefore seem to have consulted their HomeFile on several occasions and almost all had looked at it at least once.

5 The Energy Rating Report

5.1 Reading, comprehension and discussion of the ERR (Q24)

Responses to Q24 were as follows:

I read and understood the Energy Rating Report on my own	32
I discussed the Energy Rating Report with someone in the household	11
I discussed the Energy Rating Report with a friend/neighbour	7
I discussed the Energy Rating Report with a builder/architect/energy adviser	2
I've looked at the Energy Rating Report but didn't understand it	4
I haven't yet looked at the Energy Rating Report	7
No response	6

A few respondents marked more than one response. 17 respondents claimed to have discussed the ERR with at least one other person – 31% of the total.

Six of the seven respondents who had not yet looked at the ERR then went on to find their ERR and to give at least some information about it, so that the questionnaire acted as a 'prompt'. One of these six then stated that she intended to adopt the recommendations (for loft insulation and draughtproofing) within the next six months.

5.2 Fuel costs – as estimated by householders and the ERR (Q5, 26, 27)

The survey asked 'What does it cost you (approximately) to pay for electricity and heating fuel for one year?' (Q5) and also 'What are the Estimated Fuel Costs for one year given on the first page of the Energy Rating Report?' (Q26). The self-estimated and ERR-estimated annual fuel costs (where both were available) were distributed as shown in Table 6.

Table 6: Householder and ERR estimates of approximate annual fuel costs

Approximate annual fuel costs	**Self-estimates**	**ERR estimates**
< £300	10	3
£300-500	18	18
£500-700	18	13
£700-900	2	11
£900+	2	5
Total	**50**	**50**

This suggests that householders tend to underestimate their fuel costs, or that the ERR software tends to overestimate them. As average annual expenditure on fuel and power in the UK during 1997-98 was £660, with the lowest decile paying £452, the former is more likely (*Family Spending*, ONS 1998). However, the discrepancy could also arise because several householders had improved the energy rating of their homes since the ERR was written[1]. There is some evidence for this, shown in Table 7.

Table 7: Percentage of householders installing energy efficiency measures, according to relative householder and ERR estimates of annual fuel cost

	% of householders who installed measures and whose ERR cost estimate was *higher* than householder's estimate (n=26)	**% of householders who installed measures and whose ERR cost estimate was *lower than or equal to* householder's estimate** (n=24)
At least one energy efficiency measure installed	65	46
CWI installed	19	8
Loft insulation installed	23	17

The 50 respondents also gave their assessment of the *accuracy* of the ERR estimate (Q27). These assessments indicate some uncertainty and confusion about fuel costs. Only 18 of the ERR estimates corresponded with the householder's own, with 26 being higher (16 by one level, nine by two and one by three levels) and four lower (three by

[1] For example, the householder who had carried out major changes in heating - from ESHs to gas CH - along with a replacement of his windows with double glazing. Annual fuel costs were now estimated by himself as £500-70 but they had been estimated in the ERR as £900+.

one level and one by three levels). In spite of this, 30 of the 50 householders answering the question thought that the ERR estimate had been 'about right'.

5.3 Energy efficiency features as seen by householders and surveyors (Q10,28)

There is considerable discrepancy between householder and ERR assessments of 'energy efficiency features installed' for the 31 householders who gave details of information on 'installed energy efficiency features' as noted in their ERRs. Table 8 shows that surveyors frequently appear to have omitted mention of installed energy efficiency measures.

Table 8: Energy efficiency measures noted by householders and surveyors

Measure	Noted by surveyor	Noted by house-holder	Noted by both	Householder omits mention of feature noted by surveyor	Surveyor omits mention of feature noted by householder
Double glazing	20	24	15	5	9
Loft insulation	19	31	15	4	16
Hot water cylinder insulation	12	29	10	2	19
Adequate heating controls*	8	23	5	3	18
Cavity wall insulation	4	9	2	2	7

*[1]this was counted when the householder recorded that s/he had a CH thermostat and timer. For the surveyor, 'adequate heating controls' may have a more specialised meaning. Only one household with thermostat, timer *and* TRVs had an ERR noting 'adequate heating controls', although five households giving details of their ERR had all three installed.

There does appear to be a problem with the credibility of the ERR if measures noted by the householder are not recognised and noted by the surveyor. Three householders picked this up in comments on the survey form.

The credibility problem caused when the Energy Rating Report does not match what the householder has observed may lessen willingness to carry out ERR recommendations. Testing this for three measures with varying 'visibility' gave the results shown in Table 9.

Table 9: Number of householders taking action on at least one ERR recommendation or planning to do so within 6 months

Measure installed at time of survey – noted by householder	No. taking action on ERR or planning to do so, when measure was also noted by surveyor	No. taking action on ERR or planning to do so, when measure was not noted by surveyor
Double glazing	8/15	1/9
Loft insulation	8/15	2/16
Hot water cylinder insulation	7/10	2/19

The figures in Table 9 suggest that if the surveys were more accurate, more householders might act on their recommendations.

6 Use of the ERR and suggestions for improvement

6.1 Use of the ERR (Q30)

Q30 asked 'How useful do you think the ERR is as a way of informing homebuyers about what they can do to improve their property?' 30 of the 50 responses to this question judged the ERR 'useful'. This indicates substantial support for the idea of an ERR and, for the most part, seeing the ERR as 'useful' did translate into implementing its recommendations (see §8.2 below). It was not merely a polite comment. A further 14 respondents would have liked further information or advice of some sort. The distribution of answers to Q30 is given below:

The report was useful – if I move house again, I'd like another	30
I would have liked more information and explanation in the report	6*
I would have liked to talk to the person who wrote the report	6#
I would have liked information on who could supply and install the improvements	2
The report was interesting but I can't afford the recommendations	7
The report didn't interest me	7~

6.2 Suggestions for improvement of the report (Q31)

The 12 suggestions for improvement of the report are given below in Figure 2, with reference to the list above.

Have you any suggestions as to how the report could be improved?

**Not clear what the "Best Improvement Options" were* [probably because the ERR was in a different format from that assumed in the questionnaire wording]

**Guidance on where to get further help. As a single female it is important to get honest advice from someone who is knowledgeable with nothing to gain*

* *The report was not accurate. It said the house would benefit from an energy efficient boiler and thermostatic radiator valves. It already had these*

\# *By checking facts correct!* [from someone who had been recommended a cylinder jacket, although there was already one in place]

\# *Comparisons of actual energy saving areas to suggested ones, ie costwise*

\# *Verbal discussion with the person who wrote it*

~ *Could be more accurate and relevant*

~ *Felt like a sales gimmick, not a sincere means of saving energy*

It's clear

Maybe suggest some product names for some of the menial jobs

Maybe a few graphs showing the payback in investment over the years [One of the ERR formats does give payback times, though not in graphical form.]

Very satisfied

Figure 2: comments on the report (Q31)

7 Householder characteristics and adoption of the recommendations in the ERR

Database queries were used to try to establish which people were most likely to find the ERR useful. The results below are presented in such a way as to distinguish between the 30 householders who stated that they found it useful and 25 'others': five who declared their lack of interest and 20 who gave no opinion.

7.1 DIY (Q30, 8)

There was an indication that those with an active involvement in changing their homes - as expressed in DIY - found the ERR more useful than those who did not. 47% of those

finding the ERR useful carried out DIY often, as opposed to 40% who did so occasionally and 13% who did so rarely or not at all.

7.2 Those with higher energy ratings (Q25, 30)

The energy ratings for the homes of those who found the ERR useful were higher on average than for those who did not. 58% of those finding the ERR useful and giving a HER figure had ratings of 40-50+, as compared with 14% for those who did not say that they found the ERR useful. If this applies generally (and a larger and more representative sample would be needed to establish this) then those who need to improve their energy ratings most are taking least interest in their audits.

7.3 Educational level (Q30, 34)

There was no apparent connection between finding the ERR useful and educational level.

7.4 Single householders

As indicated in $3.5, single householders may think about and react to advice in different ways from those in households with two or more adults. There was a marked difference between the two in terms of whether they thought the ERR had been useful: only two of the 20 single adults said that this had been the case, as opposed to 28 of the 46 in households with two or more adults.

It could well be that single adults found the ERR less useful because they lacked someone to help them make sense of it: the proportion of single adults who wanted more information and/or who wanted to discuss the ERR was higher than that for the other households: 30% vs 11%.

7.5 Views of the ERR from interviewees (see end of report)

Four of the six respondents who were interviewed had been pleased with their energy reports. They had found them accurate and helpful, with enough detail to work from. All expressed themselves as keen to find good sources of advice about how to save money on fuel, and all had consulted multiple sources. Two had been on benefits at times in their lives and had a clear motivation to save money (W46 and W51). Another also mentioned 'doing her bit' for the environment as a priority, along with 'value for money' (W62).

The main priority for the fourth (W49) had been the urgency of converting an abandoned ivy-smothered cottage without electricity into a family home. She had been delighted with what she described as a detailed report, which had not only dealt with energy efficiency and ratings but had explained about carbon monoxide hazards. The report was longer than is usual – some 10 pages. It had begun with the dramatic information that her home energy rating (HER) was 0 and gone on to describe a range of measures and their likely payback periods and impact on the HER. She had not previously heard of the HER – a concept that she linked to the EU Energy Label. At first the report had seemed like 'gobbledegook' but 'then you could identify what the purpose

was' and she had understood the contents.[1] She and her husband were now thinking of renovating another property and would definitely appreciate similar advice while doing so. She reflected that they had not been ready to take an interest in energy issues as first-time buyers. At that stage, they had been absorbed in other aspects of home ownership and starting a family. Now, with their second home, their interest was engaged and they were learning.

Interviewee W51 demonstrated the importance of motivation and of taking time to seek out advice and to learn from what is available. He described himself as 'not very educated' and with no formal qualifications, but had found the ERR 'not too complicated'. He and his wife had bought their Council house under the 'Right to buy' scheme and their attention had been drawn to CWI for the first time by the ERR. A little later he had seen an advertisement for the local Energy Efficiency Advice Centre in their local paper and had gone on to get advice on obtaining a grant for CWI. They had now had it installed, along with a new hot water cylinder jacket, and were applying for a grant for gas CH. They had low-energy lights in each room and knew where to shop around for low-cost, good quality CFLs. This man had taken early retirement through ill-health at around the time that he and his wife bought their home. After a very busy working life he had had time, curiosity and a financial incentive to find out how to make their home more comfortable and energy-efficient. He clearly took some pride in what they had achieved so far.

By contrast, two interviewees were more critical of the report. Both were single men. One, recently divorced, said that he had ignored the report because it had recommended measures that were already in place. He was clearly not very interested in the condition of his new home. The second, a graduate teacher, said that he had found the ERR 'difficult to make sense of', in contrast to the less-educated householder described above. Again, he did not appear particularly interested in the energy status of his home. It was comfortable enough. He made the constructive suggestion that it would be as well to explain the HER on the same page as that on which it first appeared. It would be an improvement to open the report with the energy rating *and* an estimate of what the householder could save, in order to seize the reader's attention. (This may be the case with some formats already.)

8 Adoption of the recommendations in the ERR

8.1 Information on the ERR and alterations carried out (Q29, 12)

65 householders gave some information on alterations carried out since they completed on their mortgages. Five stated that they had had no recommendations in their ERR report. (This could be because they did not recognise the recommendations from the questionnaire description of them as 'best improvement options' – this was true of one of the six interviewed. Not all ERRs had used the 'best improvement option' wording, but

[1] Although, asked about whether carbon dioxide had been mentioned in the report, she went on to talk about carbon *monoxide*. The information on CO had clearly been useful but she had not understood the distinction between CO and CO_2 and had only hazy notions of the link between energy use, carbon dioxide production and climate change.

this was not known at the time the questionnaire went out.) One stated that he had had only one recommendation.

8.2 Responses to the recommendations (Q29)

42 respondents gave information as to whether or not they had acted on the recommendations in the ERR (Q29).

- 32 had acted on one or more recommendations or planned to act at some point – within six months, when they could afford it or when they needed a replacement.
- 26 of the 30 who had judged the ERR 'useful' had acted on one or more recommendations or planned to act at some point.
- 19 had acted on one or more recommendations or planned to act within six months.
- 16 had acted on at least one recommendation.
- 8 had acted on both recommendations.
- 7 disagreed with one or more recommendations (see $8.12 below).
- 3 disagreed with both recommendations.

8.3 Actions taken in response to advice and without advice (Q29, 12, 19, 20)

63 responses - from all those able to give details of their sources of advice *and* of any energy efficiency improvements made to their homes[1].

Table 10:2 Energy efficiency measures installed with and without advice

Measure	Given ERR advice only	Given other advice only	Advice from both	Installed in response to ERR	Installed and had 'other' advice only	Installed without mention of advice	Total installed
Low-energy lights (CFLs)	17	2	1	9	2	18	29
TRVs	1	1	-	-	1	16	17
Draught-proofing	*11*	*3*	-	*6*	*1*	*6*	*13*
Double glazing (most)	2	1	-	1	-	11	12
Loft insulation	*9*	-	*2*	*4*	-	*7*	*11*
Room thermostat	2	-	-	0	-	10	10#
New CH	-	-	-	1*	0	8	9
New boiler	4	1	-	2	-	7	9~
CWI	*12*	*1*	-	*4*	*1*	*2*	*7*
HWCI	4	-	-	1	-	5	6
Solid wall insulation	4	-	-	0	-	-	-
Total				**28**	**5**	**90**	**123**

* though the advice concerned a new boiler rather than an entire CH system
\# eight of these would presumably have been installed as part of the new CH system
~ six of these were installed as part of a new CH system

Table 10 shows the responses to advice from all sources in terms of action taken, along with the action taken *without* any acknowledged advice. Advice seems to have played a significant part in leading to installation of the 'invisible' energy efficiency improvements of loft insulation, CWI and draughtproofing; 12 householders took up one or more of these recommendations.

[1] One of those not included (because he was unable to fill in the questions asking about sources of information and details of advice, due to a mistake in collation) should also be mentioned, as he was the only respondent to install a condensing boiler and he did so in line with the recommendation in the ERR. He was a chartered structural engineer, and therefore may already have been familiar with the idea of a condensing boiler.

It can be seen that for a measure like draughtproofing, 14 homeowners were advised on installing this measure and 13 actually installed it – but the two groups only overlapped partially. Six of the 14 acted on the advice they had been given, but eight ignored it, while another seven installed draughtproofing without giving details of any source of advice or information that had prompted or informed their action. These apparently unprompted actions point to a fund of knowledge which people draw on for ideas – 'folk knowledge' – or to information which is not consciously registered by the householder but is nonetheless absorbed and acted on. *In total, three-quarters of all measures installed (90/123) appear to have stemmed from this 'folk knowledge' rather than any advice.*

Five of the 11 respondents who did not appear to have used the ERR or any other sources of advice (see $3.3 above) had installed at least one energy-related measure. Between them, they had installed a new central heating system (1), CWI (1), TRVs (4, including the household with the new CH) and a few double-glazed windows (1).

In summary, there are encouraging signs that the ERR *can* lead householders to install significant energy saving measures such as CWI. The table also shows how many alterations appeared to owe nothing to formal energy advice, notably CFLs, double glazing and new CH boilers and systems. Free gifts or special offers of CFLs, marketing of windows and discomfort or breakdown are likely to be the main forces behind installation of these measures.

8.4 Householders who had asked for advice (Q18, 11, 19,17, 30,29)

The data were checked to see if there was any relationship between those householders who had asked for advice in recent years and those who carried out various actions. There were 64 usable responses.

Table 11: percentage of those asking for advice taking action and using sources of guidance

Action taken	***% of advice-seekers*** (n=17)	**% of non-advice-seekers** (n=47)
Read meter(s) regularly	59	43
Had installed at least one CFL	82	30
Energy Label a source of information	65	21
Discussed fuel-related issues at home 'a lot' or 'sometimes'	65	23
Thought the ERR was useful	65	38
Carried out 1+ ERR recommendation/ planned to do so within 6 months	53	21

The numbers involved are too small to be definitive but they point in the same direction. As Table 11 shows, those who had asked for advice were more likely to read their

meters regularly, to have installed CFLs, to have used the Energy Label as a source of information, to discuss fuel-related issues at home, to think that the ERR was useful and to have carried out one or more ERR recommendations. The second of these is not surprising – many advisers will give or send CFLs to the householders they advise, or will sell them at a discount. What is more interesting is the extent to which having asked for advice is associated with actions that are likely to build energy awareness, such as discussing fuel-related issues, as well as with carrying out recommendations in the ERR.

8.5 Householders using multiple sources of information and advice (Q29, 19)

The number of sources of information or advice used by a householder appears to be connected to the likelihood of acting on a recommendation in the ERR. Table 12 gives numbers of those who have already acted on one or more ERR recommendations, or who plan to do so at some point, along with those who are not planning to act or who disagree with the recommendations.

Table 12: Action or planned action on one or more ERR recommendations and number of sources of advice or information

Sources of advice/information	**No. acting/planning to act at some point** (n=32)	**No. not planning to act/ disagreeing** (n=33)
No sources	-	10
ERR only	9	5
ERR + 1 source	10	9
ERR + 2 sources	5	4
ERR + 3 sources	3	3
ERR + 4 sources	2	1
ERR + 5 sources	-	-
ERR + 6 sources	3	1
Total no. of sources	87	59
Mean no. of sources/ household	2.7	1.8

Those acting on at least one ERR recommendation or planning to do so had had energy-related advice or information from a wider range of other sources, on average, than those who had not acted and were not planning to do so. The cumulative effect of the different sources has been positive, suggesting that they mostly give out similar messages.

It is important to note that for a significant minority of householders the ERR may be the first source of advice that they take account of. Although the recommendations may not be acted on at first, they may raise the homeowner's energy awareness and likelihood of acting at some point in the future - provided they are based on credible observations.

8.6 Single householders

Only 25% of the 20 single householders acted on an ERR recommendation or planned to do so at some point, and only 15% had acted or planned to do so within six months. Comparable figures for those in households with two or more adults are 61% and 37%.

8.7 DIY

There is an indication that DIY enthusiasts implemented more recommendations than others (see $7.2 above).

8.8 Knowledge of a link between fossil fuel use and climate change (Q29, 21)

Knowledge of a connection between accelerated climate change and the burning of fossil fuels does not seem to affect response to the ERR.

8.9 Those who 'can't afford' the recommendations (Q30)

Only four of the seven respondents who said that they couldn't afford the ERR recommendations gave details of what the recommendations had been, and only two of these had been costly (CWI and drylining). One homeowner had been recommended draughtproofing and low-energy lights: an interview with him clarified that it was lack of interest rather than lack of money that stood in the way of carrying out the recommendations.

Six of the seven had plans for alterations to their homes. These included a conservatory (2), draughtproofing (2), double glazing (2), major changes to the bathroom (5) and kitchen (3), a new boiler (2) TRVs (2) and solar water heating (1). Again, lack of money does not appear to be so much of an obstacle to carrying out recommendations on energy measures as lack of a sense that they are priorities in the overall scheme of things.

8.10 Those not planning to carry out ERR recommendations (Q29)

13 householders said that they did not plan to do anything about the recommendations in the ERR. In some cases – notably two where drylining was recommended– the expense and nuisance are likely to have been a factor. In most other cases, there are indications that the measure recommended would not have been out of reach of the householder and would have saved considerable amounts of money and energy within a relatively short time.

Table 3: Energy efficiency measures recommended but not adopted

Householder	Measures recommended but not adopted	SAP rating
W12	Low-energy lights	60-70
W13	Draughtproofing, low-energy lights	20-30
W19	Unstated, but 'couldn't afford recommendations'	unstated
W20	CWI (but was willing to install new boiler)	50-60
W22*	CWI, extra loft insulation	10-20
W24	Unstated	40-50
W29#	Solid fuel closed room heater, draughtproofing	10-20
W33	Drylining	30-40
W41	CWI	10-20
W57	Low-energy lights, draughtproofing	40-50
W60	Low-energy lights	50-60
W61	CWI, low-energy lights	30-40
W62	Drylining	60-70

*This householder (the only single pensioner in the sample) illustrates issues of perceived affordability, priorities and interest in energy. He had carried out major changes: from ESHs to gas CH and double glazing. Annual fuel costs were estimated by himself as £500-70 (by the ERR as £900+). He stated that he could not afford the recommended insulation measures (unlikely to come to more than £500), although he planned to install a conservatory within two years. He had looked at the HomeFile once and had not looked at all at the ERR prior to receiving the questionnaire. He had not asked for any form of advice.

#This householder had a combination of gas CH, solid fuel fires and ESHs. Annual fuel costs were estimated by herself as £500-70 and by the ERR as £900+ - an estimate that she saw as 'too low'! She was 'very satisfied' with her heating. The ERR stated that the cottage had loft insulation and 'adequate heating controls'. However, the Energy Rating of 10-20 suggests that it was still highly inefficient. She had not asked for any form of advice.

8.11 Disagreements with ERR recommendations (Q29)

Seven of those surveyed indicated that they actively disagreed with the ERR recommendations. The recommendations had been

W3: hot water cylinder insulation and drylining
W14: HWCI (jacket was already in place) and CWI (for a 3rd/4th floor flat)[1].
W29: draughtproofing
W52: drylining
W45: new boiler and TRVs, although they were already in place.
W58: solid fuel closed room heater

[1] The owner's view of energy advice was also coloured by her experience of installing draughtproofing on advice from an installer, which had not helped with her small flat, heated by ESHs.

W65: cavity wall insulation.

Two sets of recommendations were clearly unsuited to the property and four of the rest were relatively expensive. Such high-cost measures are likely to need more justification than low-cost measures if they are to be adopted.

9 Summary

A questionnaire aiming to assess the effectiveness of the Ekins Energy Rating Report (ERR) was sent to 2000 recipients of a HomeFile, 12-18 months after they had completed their home purchase. There were 66 usable responses, indicating a low level of interest in the subject-matter; the low response also means that the findings given here cannot be taken as representative of Woolwich customers as a whole. Although a broad spectrum of levels of knowledge, interest and activity was covered in the survey responses and it was clear that not all respondents were interested in energy efficiency, it would be as well to assume that those who replied represent the more 'promising' recipients of an ERR - those more likely to have the vocabulary and inclination to reply to questions on a subject of some interest to them, and to have carried out some energy-saving actions or investments.

Six householders were interviewed by phone in order to fill out the information gained from analysis of the questionnaire (see $7.7 and the summary of interviews at the end of this report).

Three quarters of the respondents had read and understood their ERR and almost half had found it useful and would like another if they move home again. Almost half had acted on one or more recommendations or planned to do so at some point. The survey findings give some insights into what the respondents think about their HomeFiles and ERRs, what they have learned about their energy use and what actions they took and plan to take, in the context of their overall plans for their homes. The results show where improvements in the ERR presentation and procedures could yield more in terms of householders learning and taking useful action.

Respondents and their homes

1. Respondents indicated 197 planned improvements to their homes, of which 103 involved heating, heating control or insulation measures ($2.12, 2.13).

2. Almost half of the respondents had some plans to do energy-related work on their homes within the next two years. Double glazing, new central heating and loft insulation were the most popular choices. Nine respondents wished to install solar water heating at some point in the future ($2.13).

3. Those who were keen on DIY had made more alterations to their homes and had more plans for them ($2.15).

The usefulness of the ERR

4. 49 respondents (74%) said that they had read and understood the ERR, and 17 of them had discussed it with at least one other person. 17 had not understood the report, not looked at it or made no comment on it ($5.1).

5. Six of the seven respondents who said they had not yet looked at the ERR went to find their copy in order to answer the questionnaire, so that the survey acted as a 'prompt' ($5.1).

6. 30 respondents judged the ERR to have been useful and said that they would like another if they moved house again ($6.1).

7. The energy ratings for the homes of those who found the ERR useful were higher on average than for those who did not. If this finding applies generally, those who most need to improve their energy ratings are taking least interest in their audits ($7.3).

8. Those who were keen on DIY were more likely to have found the ERR useful ($7.2).

9. There is some evidence that the ERRs could give more help in identifying unsatisfactory heating and water heating systems and in making appropriate recommendations ($2.16).

10. 13 respondents did not plan to act on their recommendations and seven respondents actively disagreed with one or more recommendations ($8.4, 8.5).

Acting on the recommendations of the ERR

11. Almost half the respondents (32) had acted on one or more recommendations in the ERR, or planned to do so at some point. Almost a quarter (16) had acted on at least one recommendation ($8.2).

12. ERR recommendations appeared to have played a part in persuading 12 householders to install loft insulation, cavity wall insulation and/or draughtproofing ($8.3).

13. Householders who had asked for advice (from any source) were more likely to have acted on the ERR recommendations than those who had not asked for advice ($8.4). Those who had received advice from multiple sources were more likely to have acted on the recommendations than those who had only received it from one or a few sources (8.5). Different sources of advice and information appear to have a cumulative effect on awareness and ability to act.

14. Where respondents and the ERR gave different descriptions of the measures installed in their homes prior to moving in, the householders were less likely to act on the recommendations than those with an ERR description of measures that more or less matched their own ($5.3).

15. Single householders were less likely to have acted on the ERR recommendations than those in larger households ($8.5).

Sources of advice used by householders

16. 75% of energy efficiency measures installed after the respondents moved into their new homes appeared to have been carried out without reference to any source of energy advice ($8.3). There seems to be a considerable store of 'folk knowledge' behind these actions.

17. The ERR appeared to be the *only* source of energy advice for 22 respondents. Of these, three had acted on one or more recommendation and five were willing to act at some point (suggesting that the ERR had managed to engage their interest); three were unwilling to act. A further 11 had not used their ERR in any way ($3.3).

18. Single householders were less likely than members of larger households to be interested in the ERR and in other sources of advice ($3.5).

19. A higher proportion of single householders than those living in larger households seem to want *more* information about their ERR and/or to discuss it with someone ($7.4).

10 Recommendations

1. The credibility of the ERR could be improved by taking more care in noting which energy efficiency features are already installed in a property ($5.3, 6.2).

2. Homebuyers should be given the option of phoning the surveyor who carried out their survey in order to enquire about anything they do not understand in the ERR ($6.1, 6.2).

3. Each ERR should contain at least one reference to other sources of advice and information on energy efficiency, installers, suppliers, materials and grants ($6.1, 8.4, 8.5).

4. Checks should be made from time to time to see that the ERR is consistent with other respected sources of advice ($8.5).

5. The ERR could be made more accessible by explaining what the HER means on the first page ($2.9, 7.7).

6. It would also help in engaging the attention of readers if the first page of the report 'headlined' the contrast between the estimated annual fuel cost and the estimated *potential* fuel cost following implementation of the recommendations in the report ($7.7).

7. There is a continuing need to promote cavity wall insulation as a means of saving energy and money ($2.13).

8. As conservatories can have a major impact on energy flows within a home, depending on how they are sited, built and used, it could be a useful addition to an ERR to point to good sources of information and advice on energy-efficient conservatories and passive solar heating ($2.13).

9. An offer was made in the covering letter that accompanies the HomeFile: 'If you wish to take action on some of the recommendations made, the Woolwich may be able to assist you further'. This could be repeated at a later date, serving as a prompt for householders to consult their ERR. It could also be used as a means of promoting loans for the more expensive measures and/or special offers on solar water heating panels and condensing boilers ($2.13, 5.1, 8.3).

11 References

Barclays social and environmental report 2000.

Boardman B and Darby S (2000) *Effective Advice: energy efficiency and the disadvantaged.* A report for the Electricity Association Fuel Poverty Task Force. Environmental Change Institute, University of Oxford.

DETR (1996): English House Condition Survey Energy Report. The Stationery Office

LSE (2002) The percentage of the UK working age population with each qualification. http://www.fathom.com/feature/35711.

New Perspectives/BMRB (1997) *EEAC Market Research Report on the year 1996/7* vol 1 - Introduction and Findings. Energy Saving Trust, London.

Office of National Statistics (1999) *Living in Britain.* The Stationery Office

Summary of Woolwich interviews

	Relevant details	Awareness	Advice	Feedback	Suggestions
W45	M, divorced, wanted smaller home, same village. 3-bed semi, 1980. HER=?. No use of meter/bills	Previous home 1990, cwi, li, fl ins, the lot. Not interested. No cfls.	He didn't have cwi – cd have benefited from it. It might have been one of the BIOs – couldn't remember.	Unlikely	Ignored ERR because of inaccuracy.
W46	F, 3A 4ch. V. busy. Large house (though <£30k). S/times on benefits. Competition bet oil companies in NI. HER 60-70. Checked and kept bills.	Keen for advice from any source. Used to be sceptical about cfls. Now has 3+, frequently used.	Door-to-door seeking out folk on benefits for dp, li, hwci. Acted on TV adv to shut doors, lts off, 40c washes. Elec adv good.	Shows her teenagers the bills – this helps. Latest bill only £125 – good.	No.
W49	F, 2A 2ch, in cottage that had been uninhabited for years. HER 0-10. Checked and kept bills.	Need to start from scratch. 'Anything was going to be an improvement'. Hadn't heard of HERs before.	V good. On establishing energy use, not altering it. Impartial advice – not selling a/thing	Check bills, discuss need to switch things off. Check and keep bills.	Excellent, detailed 10-page report. Explained dangers of CO. Arresting – their HER was 0.
W51	M, 2A. Age 60, retd w ill-health. 3-bed Council house. Time for surveys, shopping for bargains, improvements. 10+ cfls. Hoping for Warm Front CH. No qualifications. HER 30-40. Monitor	House had been cold when moved in, 1993. Previous home had CH, cwi, warm. Alerted to cwi by ERR; then saw Wirral EEAC ad in paper. EEAC HV led to grants.	Good – HV from EEAC, backed up with report later. Details of installers and grants.	Gas ppm in hse when they moved in. Like it – no nasty surprises. Abt to change elec supp to BG.	No. Explained v well, v accurate. ('Said he was not v educated')
W57	M, single, teacher, leases flat. No alterations. HER 40-50. Main living room has high ceiling, hard to heat - stat at 25-30. HER 40-50. Monitor	Hasn't thought abt cfls or been offered them. Lived in grim student places, s glazing, + snug converted stable. Uses timer.	Said he couldn't afford dp + cfls – ie not v interested. Had asked about DG for back door, but installers 'pestered' him too much.	Reads meters each month or so to see if continuity bet bills. No record – remembers. People are 'creatures of habit'.	Explain ER on front page, + how much could be saved. 'Difficult to make sense of.'
W62	F, 18-30, 2-bed 2-storey leased Victorian house; 2 men tenants, neither has run his own home before –clueless. Acts as a-raiser with them and her boyfriend. Voc. Qual. HER 60-70. Monitor	Interested in 'doing her bit' and in value for money. Tries to combine the two. Eg E Label, TRVs, cfls. Influences boyfriend. Asked for advice form elec. bcse of leaflets.	Elec supplier good – pleased with cfls. Carried out dp as recommended in ERR. Would like to do swi, but £2,700 too expensive. Also dg, ditto. Gas supplier wanted her to change boiler, but hers is <5yrs old.	Cfls from LE were good - you can *try out* different wattages. Convinced her of value. She + tenants discuss use when big bill arrives; she then instructs them in applance use etc. Ppm helps them think about electricity usage.	Her version different from the NES one – gave figs for SAPs, EFCs and CO2 now and after recommended measures in place. She liked this, but would also have liked payback times.

NDIX 5: WEST LOTHIAN INTERVIEWS AND HOME VISITS

home visits made by the senior adviser were observed in November 2000. A second visit to .othian took place in June 2001, this time primarily to interview householders. Ten ıolders agreed to be interviewed in response to a letter that had been sent out to 40, chosen list of clients with closed case files and at least two meter readings. Geography was a eration in the choice, to allow for travel by bicycle between some interviews. Two more ıolders then agreed to be interviewed. The householders were told at interview that their would be confidential, and were offered a choice of recording the interview on minidisk or aking. Six of the twelve said that they would prefer not to have the interview taped.

the June 2001 visit the senior adviser and his (new) colleague, Pamela Gifford, discussed vork and notes were made and kept of these discussions, although there was no formal ew. The opportunity was also taken to study a selection of case files: those of the ewees plus random others (to check representativeness). Three more case files were sent y WLCES, as representative of different types of case. Material in these files is confidential.

terviews were coded on an Access database, using a combination of open coding (taking directly from the material) and more directive coding (using concepts from the literature).

nble to questions

carrying out some research on home heating – on how people use gas and electricity - and nt types of energy advice programme, in Oxford and West Lothian. I'm particularly interested at householders have to say about their homes and about the advice programmes.

to ask you a number of questions about what you remember about homes you've lived in ıe one where you are now, and about the advice service here.

y history

ease tell me about the home(s) you grew up in that you remember best:
Where was it?
Is there anything you specially remember about it?
How was it heated?
Did you have any difficulties with keeping warm?

hat has been the most comfortable home you've lived in?
Why did / do you like it best?
How was / is it heated?
Any other things that made it comfortable?

ow does that compare with where you are now? (if applicable)

erature control

ow easy do you find it to keep your home at the temperature you want? (Money, personal eferences, draughts etc, controls?)

(If applicable) How do you use the thermostat and timer /storage heaters? (leave them, adjust them, use as on/off switch etc)

Being without electricity/other fuel

5. Do you remember any long power cuts/fuel shortages/disconnections in the past? What was it like?

6. If there were to be a long power cut now – say a week or more, after a bad storm – what difference would it make? How well would you be able to cope with it? What would you miss most? What ways do you have of managing?

Awareness of advice programme

7. How did you know about the advice programme?

8. How did you come to have a visit from the adviser? [Did you ask for an adviser to come yourself, or did someone else refer you to the energy services?]

9. What was/were the problem(s) that you wanted help with?

The advice

10. What did the adviser do when s/he came? (eg what did they check)

11. What did s/he say?

Learning

12. What did you learn from the adviser, ie what did s/he say that was new to you, that you didn't know before?

Action

13. What happened then, after s/he'd gone the first time?
    - Did you have anything installed/ mended?
    - Did you make any changes to the house or appliances yourself?
    - Are there things you do differently now?
    - Do you think about how you use gas and electricity differently now, after the adviser came?

Follow-up

14. Have you been in touch with the adviser since s/he came to the house the first time?
    - By phone or with another visit – you to them or them to you?
    - How many times?
    - What did you talk about?
    - What did you learn, or sort out, from these extra visits/ calls?
    - Are you still getting in touch, or are they still contacting you?

15. Has the advice helped?
    - In terms of comfort
    - In terms of cost
    - In terms of how you understand how to use the heating etc/ what you have learned

16. How do you know it has helped? (ie, how do you check?)

› the other people in the house understand about the advice and what came of it? Do you ;cuss it?

ıve you recommended the advice programme/service to anyone else?

:al/
›w many of you live here? (check approximate ages)

e you a Council tenant/owner/HA tenant etc?

›w do you pay for your gas and electricity (and any other fuel)?

›out how much a year/ quarter/ month/ week does it cost you?

f not on a ppm or fixed tariff). Do you check your meter at all, or keep the bills?
Where is the meter?

ave you changed supplier at all?

› you have any low-energy lightbulbs? How many?

ave you had any work carried out in the house since you moved in, to save on your fuel bills?

› you think it has helped? (Why?)

APPENDIX 6: ADVISER INTERVIEW PROTOCOLS

Advisers were interviewed at

- West Lothian Council Energy Services, November 2000. George Trist, senior energy adviser, Dawn Bingham, energy adviser, and Janette Hunter, administrator and adviser. In June 2001 there were further discussions with George Trist and with Pamela Gifford (newly-appointed energy adviser).

- Calderdale District Council. Andrew Cooper, Energy Conservation Officer, and Angela Walsh, Energy Adviser.

- Kirklees EEAC, February 2001. Lisa du Lieu (manager), John [?....] and John Parton, an adviser who carried out home visits.

- Oxford City Council . John Green, energy adviser, and Paul Robinson, Energy Conservation Officer

- Thames Valley EEAC at Witney. Bob Johnson, manager and Jo Rutterford, adviser.

The interviews varied according to the situation but followed the same basic format:

1. Clarification on numbers of people advised each year, and other data from published reports.

2. Aspirations for the programme.

3. Describe how you go about giving advice.

4. Are you able to use any feedback and/or follow-up? If so, what effect does it have?

5. Has energy deregulation had any positive impacts, eg people thinking about energy in a way they didn't before?

6. About how many dropouts do you have from your programme? Folk who lose interest or lose touch.

7. How many people are already tracking their consumption? Or are in the habit of keeping an eye on things?

8. How many referrals from other agencies do you have per year? How well does the referrals network operate?

9. What effect does Agenda 21 have, and similar initiatives? What alliances?

10. What is the impact of the HECA, the Energy Efficiency Standards of Performance and HEES/Warm Deal?

APPENDIX 7: SAMPLE FILE SHEETS FROM WLCES

Extra sheets recording contacts with the householder were added as required.

WEST LOTHIAN COUNCIL ENERGY SERVICE'S – CONTACT FORM - WEST LOTHIAN COUNCIL ENERGY SERVICE'S

REFERENCE N° WLCES

Contact Number	Visit Notes:	B/F Date
Contact Type		Comments
Recipient		
Contact Date		
Time Of Contact		
Contact		
Advice Time		
Janettes Time		
Casework Time		
Travel Time	New appointment made ☐	Logged in diary ☐
Advisor GT DB JH	Meter reading included ☐	Admin, tick when logged ☐

Contact Number	Visit Notes:	B/F Date
Contact Type		Comments
Recipient		
Contact Date		
Time		
Contact		
Advice Time		
Janettes Time		
Casework Time		
Travel Time	New appointment made ☐	Logged in diary ☐
Advisor GT DB JH	Meter reading included ☐	Admin, tick when logged ☐

Contact Number	Visit Notes:		B/F Date	
Contact Type			Comments	
Recipient				
Contact Date				
Time				
Contact				
Advice Time				
Janettes Time				
Casework Time				
Travel Time	New appointment made ☐		Logged in diary ☐	
Advisor GT DB JH	Meter reading included ☐		Admin, tick when logged ☐	

Page time totals.				
	# HV		Advice time	
	# PC		Janettes time	
	#Let		Case time	
	# VO		Travel time	

Revised sheet # IV

WEST LOTHIAN COUNCIL ENERGY SERVICE'S - FUEL & PROPERTY DETAILS - WEST LOTHIAN COUNCIL ENERGY SERVICES

REFERENCE N° WLCES

METER READINGS

Date	Credit £	Tariff Rate 1	Tariff Rate 2	Tariff Rate 3	F/C £	C/Tot £	Gas	Debt £	Rec. £
Contact M/R									

Reading continuation sheet included ☐

FUEL SUPPLIER GAS

Supplier		Old Supplier	
Reference N°		Reference N°	
MPR N°		MPR N°	
Meter Serial N°		Meter Serial N°	
Switch Date		Switch Date	
1st Meter Reading		Final Meter Reading	
Payment Method		**Amount** £	**Debt** £

FUEL SUPPLIER ELECTRICITY

Supplier		Old Supplier	
Reference N°		Reference N°	
MP N°		MP N°	
Meter Serial N°		Meter Serial N°	
Switch Date		Switch Date	
1st Meter Reading		Final Meter Reading	
Payment Method		**Amount** £	**Debt** £

HEATING TYPE (REQUIRED)

Back Boiler & Rads		Room Heaters		New Storage Heaters	
Wall Mounted Boiler & Rads		Elec. Boiler & Rads		Old Storage Heaters	
Warm Air System		No Heating		Fire? Gas - Elec. - Coal	
Condensing Boiler		Combi Boiler		Standard Boiler	
Number of Rooms?		Number of Heaters?		Number of Rooms Heated?	

CONTROLS (REQUIRED)

Room Thermostat		Digital Programmer		Weathercall	
TRV's		Mechanical Programmer		Manual Control	
Room Thermostat & TRV's		Economy 7 Water Timer		No Controls	

DWELLING DETAILS (REQUIRED)

Detached		End Terrace		Mid Terrace with Passage			
Semi Detached		Mid Terrace		Maisonette		Flat	
Number of Floors		Number of Rooms		Dampness/Condensation		Low Energy Lighting	
Wall Construction			Energy Audit		Audit Filename		
Post 1989		1982 - 1989		1976 - 1981		1965 - 1975	
1950 - 1964		1930 - 1949		1900 - 1949		Pre 1900	

WARM DEAL (OPTIONAL)

Attendance Allowance		Disability Living Allowance		Family Credit		Job Seekers Allowance		Industrial Injuries Benefit	
Council Tax Benefit		Disability Working Allowance		Housing Benefit		Income Support		War Disablement Pension	
Over 60		Not Eligible							

PREVIOUS GRANT (HEES/WARM DEAL) WORK DONE.

Loft Insulation		Cavity Wall Insulation		Draughtproofing		CFL's	Heating Controls
Landlord				Refer for Warm Deal		Date Faxed	

WEST LOTHIAN COUNCIL ENERGY SERVICE S - CASE RESULTS - WEST LOTHIAN COUNCIL ENERGY SERVICE'S

REFERENCE N° WLCES

CASE COMPLEXITY (REQUIRED)

Routine		Straightforward		Challenging		In-Depth		Complex	

SAVINGS

Suitable For Case History	Yes		No		Grant Money	£	
Lump Sum Refund	£				Reduced Consumption - Elec.	£	
Amount Written Off	£				Reduced Unit - Elec.		
Reduction In Payments	£				Reduced Consumption - Gas	£	
Any Other Savings	£				Reduced 100's Cu Ft		
Improved Comfort	Yes		No		Estimated Results		

TIME SPENT ON CASE (REQUIRED)

Number of Phone calls		Total Advice Time	mins
Number of Letters		Total Admin Time	mins
Number of Home Visits		Total Casework Time	mins
Number of Visits to Office		Total Travel Time	mins

Case Overview;

ADVISED ON (tick other subjects covered). (REQUIRED)

Hot Water Fault		Disconnection		Arrears		Dampness/Condensation	
Hot Water Use		High Bills		Arrears From Previous		Med.-Grant - HIG	
Heating Fault		Disputed Bills		Alleged Meter Tampering		Environment	
Heating Use		Payment Methods		Meter Fault/Check		Benefits	
Appliance Fault		Siting Of Meter		Safety Check		Health	
Appliance Use		Reading Meters		System Service		Energy Saving Tips	
Controls Fault		Understanding Bills		Appliance Purchase		Legal Advice	
Controls Use		VAT		Repairs		Other Grants	
		Econometers		Consumption Calculator			

FOLLOW UP DETAILS (OPTIONAL)

Date for Follow Up				Follow Up Details	

FOLLOW UP (admin).

Date			Customer Satisfied	Yes	No
Time			Case Re-Opened	Yes	No
Contact	Yes	No	New ID Number	WLCES	
Meter Reading (insert in meter readings section)	Yes	No	Send Questionnaire	Yes	No

FOLLOW UP COMMENTS.

Meter reading and Fuel Supplier continuation sheet.