

**TRAINING PLUMBERS TO DESIGN
AND INSTALL SOLAR
WATER HEATING SYSTEMS FOR
HOUSEHOLDS (“SHINE 21”)**

ETSU S/P3/00272/REP

DTI/Pub URN 01/1485

Contractor

Filsol Solar Limited

The work described in this report was carried out under contract as part of the DTI Sustainable Energy Programmes. The views and judgements expressed in this report are those of the contractor and do not necessarily reflect those of the DTI

First published 2001
© Crown copyright 2001

EXECUTIVE SUMMARY

Objectives

The overall aim of the project has been to develop innovative, high quality training materials and methods of delivery that will facilitate effective training of plumbers in the design and installation of household solar water heating systems.

The new training programmes emerging from the project are intended to assist the UK plumbing industry to adapt to the new opportunities presented by growth in the UK solar water heating market and to support regional solar water heating market development initiatives.

The specific objectives of the projects included:

- Assessment of the needs of plumbers in England and Wales in relation to undertaking new learning.
- Development of new training materials and piloting of training delivery.
- Provision of the new training materials to the 190 colleges that provide training support for plumbing NVQs.
- Development of models for regional co-operation on solar market development initiatives.
- Stimulation of growth in the UK solar water heating market.

Background to the project

The present small base of solar water heating system design and installation skills is limiting UK market growth, with most UK manufacturers and suppliers reporting difficulties in recruiting new installers. Lack of design and installation skills therefore presents a major barrier to the development of the UK solar water heating market.

The majority of skills required to design and install solar water heating systems for households are within the skill base of plumbers. The amount of additional, solar water heating specific, information that needs to be provided to plumbers is relatively small.

Anecdotal evidence prior to the project (and confirmed within the project), however, suggests that most plumbers consider themselves poorly equipped to fit solar water heating systems.

The project was therefore designed to help plumbers in the UK in the future have access to training in the specific skills required to design and install solar water heating systems for houses to a high quality.

The project builds upon an earlier training course file “Design and Installation of Solar Water Heating Systems for Households”, developed by Filsol Solar Limited (Filsol) and the Association of Plumbing and Heating Contractors (APHC), with support from the DTI (project reference: S/P3/00248 [1]) and from the European Commission’s ALTENER programme (contract reference 4.1030/Z/95-018).

The project described in this report has been performed within the European Social Fund's ADAPT programme and with support from the DTI's Sustainable Energy Programmes. The project has been performed by a partnership led by Filsol and involving the APHC, Sustainable Energy Limited and Swansea Energy Agency.

J.R. Stammers has acted as an external project assessor, reviewing course materials, feedback from pilot course participants etc., to ensure that the training materials developed and the delivery of training programmes have been impartial and of a high quality.

Summary of the work carried out

During the project the following work has been performed:

Survey of plumbers:

2,910 questionnaires were distributed by the APHC, 2,110 to APHC members and 800 to non-member plumbing companies (selected at random from a database held by APHC). The questionnaire contained questions about the plumber and his or her business, questions about the plumber's experience relating to solar water heating and questions concerning attitudes to training.

Eight face to face interviews were held with plumbing employers and five with college lecturers in order to solicit more detailed responses to questions regarding solar water heating training.

New training materials developed:

A new training manual was developed within the project, involving a significant restructuring of the previous training file with the aim of improving "user friendliness". New content was also developed for inclusion within the new training materials, covering the use of solar water heating systems together with unvented cylinders, the use of solar water heating systems in conjunction with combi-boilers and issues regarding Legionnaire's Disease in relation to solar water heating systems within houses.

Video materials were developed in order to help illustrate practical aspects of solar water heating installations within a training day in a classroom (and then to help re-affirm this knowledge at the plumbers' convenience). A CD-ROM presentation of the manual was also developed to include a range of print options for users. It was also designed in a format that could in the future be made available via the internet.

The development and piloting of training programmes:

A training delivery programme based on a one-day format (in order to minimise the costs to plumbers) was developed. An assessment test for course participants to complete at the end of the day's course was also developed.

During the project 20 pilot training courses were held across England and Wales, with a geographical spread covering Truro to Berwick and Rochester to Warrington. The trainer for each of the pilot courses was Roy Blower of Filsol. For each pilot course the aim was to attract between 5 and 15 plumbers per course. Different methods of promoting the training courses were tried.

The project's independent external assessor, Judith Stammers, performed an evaluation of the first 12 pilot courses held, analysing questionnaires completed by all participants and conducting telephone interviews with a sample of participants from each course.

Work on regional co-operative partnerships:

Within each area in which a pilot training course was held, the project partners sought to assemble a co-operative regional partnership. This involved presenting the project to officers from local authorities and local environmental organisations and implementation of a range of promotional activities (including press releases and attendance at local shows).

Through dissemination activities, the project also provided information and ideas to organisations working to establish regional solar water heating market activity (outside of the project).

Piloting methods for driving demand for training:

During the project the following methods for promoting solar water heating training to plumbers were tried:

- Direct contact with plumbers (via post and telephone) by project staff.
- Encouraging local authorities and other agencies to make contact with plumbers themselves.
- Advertising (together with an editorial) in the plumbing trade magazine "Heating and Plumbing Monthly" and editorial in the magazine "Professional Heating and Plumbing Installer".

Co-operating with other European member states:

The project featured the following forms of co-operation with other European member states:

- Liaison with Energy Centre Denmark to learn how solar water heating training is provided in Denmark.
- Provision of assistance to relevant organisations in Ireland to disseminate the solar water heating training knowledge and materials developed within the UK.

The aims of the co-operation were therefore to benefit from lessons to be gained from experiences in Denmark (where the market for solar water heating installations is more established than the UK) and to share the knowledge being developed within the project with Ireland (where the market for solar water heating is less developed).

Summary of the main results of the project

Results of survey exercise:

From the 2,910 survey questionnaires distributed, 250 were returned in a form suitable for processing, representing an 8.6% return and considered adequate for the purpose of the project.

Approximately 45% of businesses responding to the survey reported having worked on solar water heating systems. This, however, is unlikely to be representative of the industry as a whole as those who have experience of solar water heating systems were probably more likely to complete and return the survey questionnaire. Notwithstanding the relatively high numbers of businesses that reported having worked on solar water heating systems, only 12% of all respondents considered that their level of knowledge was “enough to install or maintain a domestic solar water heating system competently”.

The cost of training was identified as the major barrier to plumbers undertaking more training.

New training materials finalised:

Following completion of the pilot courses and after due consideration of the feedback obtained, the training manual was finalised. The training manual features many photographs and diagrams so as to be as informative as possible. Professional graphic design has been utilised to ensure that the manual is attractive and professional in its appearance.

500 copies of the final training manual were produced within the project in order to support future training initiatives.

The training video produced within the project is approximately 45 minutes in length and is therefore largely practical in its content.

The CD-ROM produced within the project presents a version of the training file that can be viewed via computer. A trainers' version of the CD-ROM has also been produced; this includes guidance notes for trainers to help them deliver the course effectively and a Powerpoint slide presentation for use by trainers.

Results and feedback from pilot training courses:

In total 208 people participated in the pilot courses of which 172 were plumbers (either self-employed or from small companies). The evaluation of pilot courses confirmed that:

- Over two-thirds of the participants were in the plumbing and heating trade.
- Most of these had not done any solar installation work before the course.
- A large proportion were sole traders.
- There were a few participants from related professions such as manufacturers of plumbing components, council employees, energy consultants and energy advisors.

The external assessor's report states that "analysis of the forms completed ... suggested that participants were highly delighted with the manual and course teaching. Those in the trade who were in a position to sell solar proactively intended to do so. Many felt that they now know enough to pass information about solar installation to colleagues and employees".

The evaluation confirmed that the one-day delivery was considered by the plumbers to be effective and that there was scepticism concerning the effectiveness of self-learning within the industry. Comments on the course delivery and the materials also confirmed that whilst participants were generally very pleased with the course, the availability of video and CD-ROM will improve the course.

Experiences from work on regional co-operative partnerships:

It was found that the success and nature of co-operative regional partnerships varied significantly from area to area. The critical factor was the identification of a project "champion" within an appropriate organisation within the region. For this role to be completed successfully, the individual concerned requires to have a commitment to driving the project in the region and plentiful resources of energy and persuasion.

One of the most significant outputs of the project has been the assistance, through the sharing of ideas and experiences and the organisation of training, of two regional solar water heating initiatives. These are the Kirklees and Calderdale Solar Partnership (in the Huddersfield area) and a scheme run by RENU (Renewable Energy in the Urban Environment) in South West London.

The Kirklees and Calderdale Solar Partnership is offering grants to householders in the region of £700 each towards the installation of solar water heating systems. The funding for the grants is provided by the Energy Savings Trust and the two participating local authorities. The partnership aims to stimulate the installation of 200 solar water heating systems within the year to 31st March 2002. Following discussions with the project managers, the Kirklees and Calderdale Solar Partnership is combining training of local plumbers (using the materials developed within this project) with a regional solar water heating promotional campaign.

Results of efforts to drive demand for training:

By far the most successful initiative was direct contact with plumbers by local agencies in those regions in which the local agency staff took a proactive approach.

The second most effective technique for stimulating demand was found to be advertisements and editorial in plumbing trade magazines.

Results of co-operation with other European member states:

Energy Centre Denmark presented the project team with a copy of the Danish solar water heating training manual together with a copy of an accompanying training CD-ROM. Images used within the Danish CD-ROM have been used, with Energy Centre Denmark's permission, in the training materials developed within the project.

As a direct result of the assistance provided by the project, two solar water heating pilot training courses were delivered within Ireland (though not within the project itself). The partners in Ireland have also made progress in developing a solar water heating training manual for the Irish market based on the materials developed within this project for the UK.

Conclusions

The majority of plumbing businesses employ less than five people and work primarily in the domestic sector. The industry is generally experiencing strong demand but there remains a degree of seasonality, whereby demand for plumbing services is lower in the spring and summer than in the winter. Solar water heating therefore potentially provides a useful and profitable addition to a plumber's range of services.

Most plumbers recognise that they would require training before they would be able to design and install solar water heating systems.

A large number of plumbers will engage in solar water heating training so long as two key conditions exist. Firstly, the training must be priced at less than £150. Secondly, there must be clear evidence of a likelihood of future installation work being readily available to the plumbers as a result of undertaking the training.

The involvement of local agencies in promoting training and in stimulating regional solar water heating market growth (though raising awareness and where possible reducing costs, through negotiating discounts and/or through providing grants) can clearly increase significantly the demand for training.

Most plumbers have access to personal computers and so would be able to access the course file on CD-ROM. The classroom based one-day course delivery method, however, remains the favoured delivery mechanism. Courses provided on a Saturday could minimise the inconvenience to plumbers' businesses caused by undertaking solar water heating training.

The pilot courses were very successful and the format and content of the new training materials were highly rated by the pilot course participants.

The project has therefore produced training materials that can support future solar water training courses for plumbers and help underpin UK solar water heating market growth.

The CD-ROM and video will provide a useful resource to colleges providing NVQ plumbing training services.

Recommendations

The challenge following completion of the project is for the new training materials to be used to support solar water heating market growth across the UK. At the date of preparation of this report, the Kirklees and Calderdale Solar Partnership and RENUÉ's training programme in London Borough of Merton, have already started to benefit from the materials developed and experiences gained within the project.

Filsol, as original designers of the project, plan to market actively training services to local authorities and other agencies across the UK. A copy of the database of course participants has been provided to the Solar Trade Association and Filsol has entered discussions with the Solar Trade Association and with plumbing trade associations concerning future training activity.

A key recommendation, however, is that local authorities and other relevant local agencies are encouraged to develop and implement regional solar water heating market development programmes, incorporating training alongside promotional activities. The provision of funding assistance to such regional partnerships, possibly including the funding of grants to purchasers of solar water heating equipment, would be likely to stimulate this kind of regional programme. With appropriate promotion plumbers could be easily attracted to take part due to the clear potential business benefits (ie solar water heating system installation work) that would be likely to be derived.

The availability of high quality solar water heating training materials forms only one part, albeit an important one, of an infrastructure that can help assure the quality of solar water heating installations in a growing UK market. Experience gained within the Danish market highlights the need for a broader quality infrastructure, including checks of installations, registration of approved installers etc.

In the UK the need for the development of quality assurance infrastructure in the solar water heating sector mirrors the need for quality assurance within other related sectors including the plumbing, central heating and building sectors. Across this range of sectors a number of different schemes are being evolved and it will be important to ensure that quality assurance procedures in the UK solar water heating market are developed so as to best (and cost effectively) dovetail with other related programmes.

At the time of writing this report, the Solar Trade Association is working on defining the scope and nature of work needed to establish a quality assurance infrastructure for solar water heating in the UK. It is recommended that this work be carried out with as much urgency as is practicable.

TABLE OF CONTENTS

	Page	
1	Introduction	1
1.1	Background to the project	1
1.2	The ADAPT programme	1
1.3	Project objectives	2
1.4	The project partnership	2
2	Assessment of the needs of plumbers	3
2.1	Survey of plumbers	3
2.2	Key results from the survey exercise and their implications	5
2.3	Implications of the results of the survey	9
3	Development of new training materials	11
3.1	The development of a new training course file	11
3.2	Development of the training video	13
3.3	Development of the training CD-ROM	13
3.4	Development of a trainers' pack	13
3.5	Development of a business skills module	14
4	The development and piloting of training programmes	15
4.1	Definition of programme for training delivery	15
4.2	The organisation and performance of pilot training courses	16
4.3	Feedback from pilot training courses	17
5	The development of models for regional co-operation	22
5.1	The experiences gained within the project	22
5.2	Stimulation of further regional initiatives	23
6	Driving demand for learning	24
6.1	Methods of driving demand tested	24
6.2	Results of actions to drive demand for training	24
7	Co-operation with other European member states	25
7.1	Forms of co-operation	25
7.2	Liaison with Energy Centre Denmark	25
7.3	Provision of assistance to organisations in Ireland	26
8	Recommendations for further work	27
8.1	Implementation of training programmes	27
8.2	Development of quality assurance infrastructure	27

REFERENCES

1 INTRODUCTION

1.1 Background to the project

- 1.1.1 One significant constraint to the growth of the UK solar water heating market is the present small base of design and installation skills. The majority of suppliers of solar water heating equipment within the UK market are seeking to increase the number of installation contractors with whom they can work. The need for an increase in solar water heating skills is most critical in relation to solar water heating systems for houses, as this sector makes up by far the largest proportion of UK solar water heating market activity.
- 1.1.2 The majority of skills required to design and install solar water heating systems are within the skill base of plumbers. The vast majority of plumbers, however, consider themselves to be unable to fit solar water heating systems as they are not familiar with the technology.
- 1.1.3 The project was therefore designed to help provide plumbers in the UK with access to training in the specific skills required to install solar water heating systems for houses, thereby providing new business opportunities to plumbers and assisting UK solar water heating equipment suppliers to expand their contractor networks.
- 1.1.4 The project builds upon a training course file “Design and Installation of Solar Water Heating Systems for Households”, developed by Filsol Solar Limited (Filsol) and the Association of Plumbing and Heating Contractors (APHC), with support from the DTI (project reference: S/P3/00248 [1]) and from the European Commission’s ALTENER programme (contract reference 4.1030/Z/95-018).

1.2 The ADAPT programme

- 1.2.1 The project has been performed within the European Social Fund’s ADAPT programme, administered in the UK by the UK Government’s Department for Education and Employment. This programme has supported innovative projects that help adapt the UK workforce (present and future) to face new opportunities.
- 1.2.2 The DTI has also supported the project as part of its Sustainable Energy Programmes.

1.3 Project objectives

1.3.1 The objectives of the project were to:

- (i) Assess the needs of plumbers in England and Wales in relation to undertaking new learning.
- (ii) Develop new training materials, namely a new training course file, video and CD-ROM to support the delivery of high quality solar water heating training programmes for plumbers and plumbing National Vocational Qualification (NVQ) students.
- (iii) Establish an infrastructure for ongoing training of plumbing NVQ students by providing the 190 colleges that offer plumbing NVQs with solar water heating training materials.
- (iv) Develop models of regional co-operation between a variety of market actors (including local authorities, plumbing firms and solar water heating businesses).
- (v) Determine the most effective methods of driving demand amongst the plumbing industry for learning new skills.
- (vi) Develop and pilot a range of training programmes.
- (vii) Learn from the solar water heating training developments in Denmark and disseminate the results of the project to Ireland.
- (viii) Help stimulate growth in the UK solar water heating market.

1.4 The project partnership

1.4.1 The project has been performed by a partnership led by Filsol and involving the APHC, Sustainable Energy Limited and Swansea Energy Agency.

1.4.2 The APHC has helped to ensure that the project has been developed in a manner appropriate to the UK plumbing sector. This has helped inform the development of training materials, the methods used to promote training and the formats in which training packages are offered. Sustainable Energy Limited has helped develop the training materials within a CD-ROM format; Swansea Energy Agency has provided a regional market development perspective.

1.4.3 In addition to the project partners listed in 1.4.1, Encon Limited has participated in the project, helping to provide information to enquirers and organising pilot courses.

1.4.4 J.R. Stammers has acted as an external project assessor, reviewing course materials, feedback from pilot course participants etc, to ensure that the training materials developed and the delivery of training programmes have been impartial and to a high quality.

2 ASSESSMENT OF THE NEEDS OF PLUMBERS

2.1 Survey of plumbers

- 2.1.1 A survey programme was designed to evaluate the attitudes of plumbing businesses to training and to solar water heating systems, to assess trends in levels of business activity and to research the use of information and communication technologies (ICT) in the plumbing industry.
- 2.1.2 The following three information gathering techniques were used as part of the survey:
- (i) Desk research of industry reports [2] to [5]
 - (ii) Survey of a sample of plumbing employers by use of a questionnaire
 - (iii) Structured interviews with plumbing employers and college lecturers.
- 2.1.3 The survey questionnaire was divided into three sections:
- (i) Section one: questions about the plumber and his or her business.
 - (ii) Section two: questions about the plumber's experience relating to solar water heating.
 - (iii) Section three: questions concerning attitudes to training.
- 2.1.4 In section one, the survey sought to establish the size of business, the type of work that the business was engaged in, the seasonality of trade, trends within the business and the extent of availability and use of ICT within the business.
- 2.1.5 The second section asked plumbers to describe the level of their knowledge relating to solar water heating systems and the extent of any experience that they have working with such systems.
- 2.1.6 Section three sought to address the extent to which plumbers participate in training activity, to identify what plumbers consider to be their training needs, to identify barriers to training and to assess what developments might increase levels of participation in training.

- 2.1.7 The sample of plumbers used for the questionnaire survey was selected from two sources:
- (i) APHC's membership database
 - (ii) A database of plumbing businesses that are not APHC members (a database maintained by APHC).
- 2.1.8 The APHC database contains a membership listing of 2,110 members. The membership spans six regions: the North West (including North Wales), North East, South West, South East, West Midlands (including South Wales) and East Midlands. The profile of APHC's membership in terms of size of business is considered to be representative of the profile of the total population of plumbing businesses in England and Wales (by reference to British Plumbing Employers' Council (BPEC) reports [3], [5]).
- 2.1.9 All 2,110 APHC members were sent a copy of the questionnaire.
- 2.1.10 In addition to APHC members, a further 800 non-members were selected, in equal proportions, from the six APHC regions. Within each region these selections were made randomly from the database (which contains details of a total of 18,000 businesses).
- 2.1.11 A total number of 2,910 questionnaires were therefore distributed by APHC. These questionnaires were accompanied by a covering letter explaining the purpose of the survey.
- 2.1.12 250 replies were suitable for processing, representing an 8.6% return. This response rate, whilst lower than the BPEC surveys' [3] [5] responses (18.45% in 1992 and 13.7% in 1998), is considerably higher than the norm for a national survey (3% to 5%) and was considered adequate for the purpose of the project.
- 2.1.13 The survey questionnaire was also used as the basis for a sample of structured employer interviews together with a number of additional "prepared" questions designed to elaborate on the content of the questionnaire. The rationale for this approach was:
- (i) To evaluate the strengths and weaknesses of the design and content of the questionnaire.
 - (ii) To illicit additional information of a broader nature, particularly regarding solar water heating, (based on "open questioning" techniques) which could not be determined from the completed questionnaires.
- 2.1.14 A sample of college lecturers were also interviewed using a number of pre determined questions based on plumbing training and attitudes to solar water heating.

2.1.15 The following respondents were interviewed across the different regions of England and Wales:

North West	2 employers	1 college
North East	1 employer	1 college
West Midlands	1 employer	-
South Wales	2 employers	1 college
South West	-	1 college
South East	2 employers	1 college

2.2 Key results from the survey exercise and their implications

2.2.1 The majority of businesses within the plumbing industry in England and Wales employ up to four people. A large proportion of businesses are individually owned and unincorporated.

2.2.2 Most businesses have been established in excess of five years and have a director/ownership age profile in the age range 35 to 54 years old. This suggests a tendency for individuals to "set up" in business once they have a number of years' experience in the industry.

2.2.3 Approximately one third of businesses employ at least one apprentice and approximately two thirds sometimes use sub-contract labour in support of their plumbing activities. An extremely low percentage indicated regular use of sub-contract labour, which could be attributed to the recent changes to the legislation affecting the use of sub-contract labour in the construction industry.

2.2.4 Plumbing businesses experience problems in recruiting suitably qualified employees. A number of reasons for this were proffered by employers and these are summarised below:

- Poor standards of industry training.
- A poor industry image makes it difficult to attract motivated individuals.
- Technological and legislative changes have resulted in "skills gaps" in the existing labour force.

2.2.5 A further explanation for the difficulty in recruiting qualified staff may be that the last recession saw a slow down in training and a reduction in the labour force (many of whom will be lost to the industry completely). As the industry's economy heats up and the need for qualified labour intensifies, the resources now required simply do not exist and employers are left to find the best compromise to meet their needs.

2.2.6 The range of work covered under the category of plumbing includes servicing, maintenance, new work and system design in the domestic market, with some of the businesses working in this category also carrying out work in industrial and commercial premises.

- 2.2.7 Approximately 80% of plumbing businesses reported that they work primarily on occupied domestic dwellings and/or small jobbing work. The remainder undertake work on new housing developments, sometimes in addition to working on occupied dwellings and/or small jobbing work. Some also work on contracts for British Gas or on maintenance contracts.
- 2.2.8 The domestic plumbing industry appears to be moving towards a "focused" approach to business activities. Whilst there is a high proportion of plumbing businesses which still carry out all aspects of plumbing work, some choose not to carry out work on specific areas such as sheet metal roofing, oil, drainage, gas, unvented and sanitation or a combination of each.
- 2.2.9 The most frequent range of contract value when tendering for a specific job is for work worth up to £20,000. Most plumbing businesses have turnover in the ranges £51,000 to £100,000 and £100,001 to £500,000.
- 2.2.10 Proactive marketing is a relatively low priority in most businesses, which in the main advertise in Yellow Pages or other sources such as local newspapers. The main source of work in the industry is repeat custom or word of mouth. Other sources of work are inclusion on clients' or contracts tender lists.
- 2.2.11 The overall indications provided by the survey, suggest an industry in which demand for services is strong and for which work is available is throughout the year. Work "peaks" are, however, still experienced during October to January/February with work "troughs" from February to June.
- 2.2.12 Business attitudes to the state of the plumbing industry economy are extremely positive with a high percentage of plumbing businesses stating that (for 1998), whilst competition is keen, work is readily available. The majority of businesses had increased or maintained turnover levels over previous years and gave an indication of a similar picture over the next 12 months.
- 2.2.13 A significant level of business support, such as administration etc, is provided by the partner (eg spouse) of the director/owner of plumbing businesses, whilst some family members also help out. The level of support tends to be dealing with customers and telephone calls but also includes book keeping and clerical/administration.
- 2.2.14 The majority of plumbing businesses have access to a personal computer with a comprehensive level of hardware and software. In the main the personal computer is used in support of the business and is utilised by the owner/director and partner/spouse. Some plumbing businesses would be prepared to use the computer in support of training packages.
- 2.2.15 Approximately 45% of businesses responding to the survey reported having worked on solar water heating systems. This, however, is unlikely to be representative of the industry as a whole as those who have experience of solar water heating systems were probably more likely to complete and return the survey questionnaire.

- 2.2.16 Notwithstanding the relatively high numbers of businesses that reported having worked on solar water heating systems, only 12% of all respondents considered that their level of knowledge was “enough to install or maintain a domestic solar water heating system competently”. This highlights the need for training.
- 2.2.17 Plumbing businesses in general are sympathetic to environmental issues and are relatively positive concerning the potential contribution that solar water heating systems can play in reducing harmful emissions. Their decision to work on solar water heating systems and to carry out training in support of these activities would be based purely on a commercial business decision, ie they will need to be convinced that there will be a market opportunity for these skills.
- 2.2.18 Some plumbers are sceptical that there is sufficient solar energy in the UK to make solar water heating a viable proposition and a definite view was expressed in responses that a national marketing strategy is required to convince the public of solar water heating’s effectiveness.
- 2.2.19 Key plumbing industry personnel are generally positive towards plumbing training although the majority of businesses did not pre-plan training, choosing to train to keep the business competitive, or to train when necessary (Approved Code of Practice (ACOP) in gas safety for example).
- 2.2.20 A very high percentage of businesses, at the time of the survey, participated in training. It is likely, however, that this picture is distorted by the fact that most businesses had to train in gas ACOP by the end of 1998 in order to continue working on gas installations legally.
- 2.2.21 There is however a relatively wide range of other forms of craft related training undertaken by plumbers across disciplines including water bylaws, unvented systems, condensing boilers, S/NVQ qualifications and apprenticeships, together with a range of additional subjects such as oil and health and safety.
- 2.2.22 Plumbing businesses also carry out training on non-craft subjects, albeit to a lesser extent, with computer skills and basic accounts/book keeping being the most popular.
- 2.2.23 An interesting factor derived from the questionnaire was the perceived reticence of employers to participate in formal training in support of business planning and marketing skills, a trend reflected in their attitude towards future non-craft related training needs.
- 2.2.24 Plumbing businesses' most immediate training needs over the next 12 months are likely to be in support of the introduction of new water regulations followed by health and safety. Whilst gas safety training is also a priority the need is likely to diminish, as many will have been certificated and will not need to train again for 5 years.

- 2.2.25 Both solar water heating and business skills training were also recognised in the survey as a training need.
- 2.2.26 There are a number of barriers which prevent plumbing businesses from training with the cost of training being attributed as a major barrier and the lack of flexibility of training delivery and insufficient grant support cited as two other contributory factors. It follows then that the majority of businesses would like to see improved levels of funding support and training delivery which is more cost effective both in terms of time and actual "course" costs and which is also more flexible in the method of delivery.
- 2.2.27 Whilst welcoming improved flexibility in traditional course delivery ie evenings, weekends, and/or half day blocks, plumbing businesses, although not dismissive, are more reserved towards the alternative methods of training delivery such as the use of audio, video, computer software and learning support packs for use on a self learning only basis. Of all the options a combination of video and self-learning material appeared to be the preferred choice, particularly if delivered in association with a college.
- 2.2.28 It was evident from the survey that there is a feeling of low morale amongst plumbing college lecturers which could be attributed to the raft of changes experienced by the plumbing college infrastructure over the recent years.
- 2.2.29 There is, however, a high level of commitment and inventiveness demonstrated by colleges and a positive and proactive attitude towards different methods of delivery, particularly in terms of information technology.
- 2.2.30 Colleges see future developments in plumbing training moving towards the greater use of information technology and an increase in the application of student centred learning packs. An increase in work based assessment of national qualifications is also anticipated.
- 2.2.31 Colleges are supportive of the introduction of solar water heating training, which is now an integral part of the plumbing NVQ at level 3.

2.3 Implications of the results of the survey

- 2.3.1 In order to stimulate plumbers to undertake training in solar water heating skills, they need to be convinced of the demand for these skills in the market place. The effectiveness of solar water heating (and its importance to the environment) therefore needs to be communicated to the general public and specifiers as well as to plumbing businesses and the image of a growing solar water heating market needs to achieve increased visibility.
- 2.3.2 In raising the profile of solar water heating, particular attention needs to be given to misconceptions about the effectiveness of solar energy in the UK climate, the perceived cost and aesthetics of solar hardware and the perceived cost of system installation.

- 2.3.3 The majority of plumbers recognise that they would need to undertake training to be able to design and install a solar water heating system competently. If a convincing case can be made to plumbers that solar water heating provides a business opportunity and if training delivery can be offered in a low cost and flexible format then it should be possible to generate demand for such training.
- 2.3.4 When marketing solar water heating training to plumbers, it must be borne in mind that the plumbing industry in general in England and Wales is experiencing busy conditions. This may tend to discourage plumbers from addressing new opportunities.
- 2.3.5 The busiest period for plumbing businesses tends to be October to January/February with the least busy periods being February to June. This should mean that the marketing of solar water heating training to plumbers would be most effective in the February to June period.
- 2.3.6 The results of the survey suggested that the solar water heating training package should be designed for delivery either on a self-learning basis, and or as a self-learning resource for use in a college or centre.
- 2.3.7 The survey results also confirmed that the solar water heating training package should be available in CD-ROM, computer disc and hard copy formats and should include a video, which demonstrates practical applications of solar water installations.
- 2.3.8 The survey also confirmed that, when developed, the new solar water heating training materials should be promoted to colleges for use in support of NVQ delivery.

3 DEVELOPMENT OF NEW TRAINING MATERIALS

3.1 The development of a new training course file

- 3.1.1 At an early stage of the project, the project steering group decided that whilst much content from the previous training course file would be used, the structure of the new course materials should be significantly different. This was determined on the basis that a restructuring could offer significant benefits in terms of facilitating smooth course delivery and “user friendliness” (it also reflected the fact that the previous course file had been a first attempt and that there was thought to be scope for improvement).
- 3.1.2 The project steering group also decided that new training content was required to cover:
- The use of solar water heating systems together with unvented cylinders.
 - The use of solar water heating systems in conjunction with combi-boilers.
 - Issues regarding Legionnaire’s Disease in relation to solar water heating systems within houses.
- 3.1.3 Filsol undertook the restructuring of the training pack and the preparation of new material in partnership with APHC. Appropriate research was undertaken, including meetings with the Water Research Council, regarding the implications of unvented systems and Legionnaire’s Disease on solar water heating system design and installation practice.
- 3.1.4 A draft revised training manual was produced in early 2000 and was then used to support the delivery of pilot courses during 2000. Following completion of the pilot courses and after due consideration of the feedback obtained (refer to section 4.3), the training manual was finalised and 500 manuals were printed.

3.2 Development of the training video

- 3.2.1 The project steering group determined, based in part on the findings of the survey of plumbers (refer to section 2), that the length of solar water heating courses for plumbers needed to be minimised and preferably kept to one day. Such a short course duration makes it difficult to include any practical element to the training course.

- 3.2.2 It was agreed by the project steering group that video material offered the potential for illustrating practical aspects of solar water heating installations within the training day in a class room (and for then re-affirming this knowledge at the plumbers' convenience). The project steering group considered that video could provide an ideal format for illustrating the following installation procedures:
- The site survey.
 - The fixing of a sample of different types of collectors (including flat plate and evacuated tubes) onto roofs.
 - The installation of a twin coil cylinder.
 - The installation of the solar primary circuit (noting the positions of the specific components therein).
 - The fitting of a differential temperature controller.
 - The filling and commissioning of a household solar water heating system.
- 3.2.3 It was also agreed that the video could be used to provide an introduction to the training course. This was considered by the project management group to provide the prospect for a consistent introduction to the course, whoever the trainer delivering the course. After a tender process, the video production company, Marine Seen, was appointed to work with Filsol on the development of the video.
- 3.2.4 In order to facilitate the filming of a range of solar collectors being fitted onto a roof, a mock roof structure was built by Filsol. Filming of installations and of collector fixing was undertaken between August and November 2000. Outdoor filming was disrupted on several occasions by adverse weather conditions, resulting in the video production taking longer than had been originally planned.
- 3.2.5 The solar collectors filmed being fitted onto roofs were:
- The Filsol on-roof flat plate panel.
 - The AES on-roof flat plate panel.
 - The Thermomax evacuated tube collector.
 - The AES/ZEN in-roof flat plate panel.
 - The Filsol on-roof flat plate panel.
- 3.2.6 As part of the video production process, both AES Limited and Thermomax Limited arranged for their installation experts to attend the video shoots. Riomay Limited was invited to have their evacuated tube collectors filmed being fitted but declined to participate.
- 3.2.7 As part of the introduction to the video, an interview with the managing director of Vaillant Limited was filmed.
- 3.2.8 The draft video and script was sent for review by both AES and Thermomax to ensure that the technical explanation of collector installation within the video was accurate. Following this external review, together with an internal review by project partners, the video was produced in final form.

3.3 Development of the training CD-ROM

- 3.3.1 In order to demonstrate the possible presentation of the training materials on CD-ROM, at an early stage of the project, Sustainable Energy developed a CD-ROM based on the previous training manual.
- 3.3.2 This illustrative CD-ROM was shown by APHC to a number of college trainers who gave very positive feedback on the prospective usefulness of materials in this format to support their training initiatives.
- 3.3.3 Following the development of the new training manual (as described in 3.1), the new manual was designed into a CD-ROM presentation utilising (and adapting as appropriate) graphics originally developed for the training manual.
- 3.3.4 The CD-ROM was developed to include a range of print options for users. It was also designed in a format that could in the future be made available via the internet.

3.4 Development of a trainer's pack

- 3.4.1 A short guide to course delivery for trainers, together with a supporting selection of slides (in Microsoft Powerpoint format) was also produced within the project. This pack was included within the "Trainer's Release" version of the CD-ROM.

3.5 Development of a business skills module

- 3.5.1 As part of the original project aims, draft training materials were also developed concerning the provision of training in certain general business skills, deemed to be relevant to entering the solar water heating market (such as business planning, sales and marketing and finance) to plumbers. While these materials have been developed in a draft format and are available for future further development and use, the project steering group decided that it was impracticable to develop these fully and to pilot their use with the project. The primary reasons for this decision were:
 - The development time incurred on preparing the new solar water heating training materials (see 3.1, 3.2 and 3.3) was greater than originally envisaged and completion of these was seen as a higher priority than completion of the business skills module.
 - The marketing of 20 pilot solar water heating training courses to plumbers was found to be a very significant challenge. Within the present context of a relatively small UK market for solar water heating systems, it was considered that seeking to encourage plumbers to take time attending a business skills course as well as the solar water heating course was too ambitious.

4 THE DEVELOPMENT AND PILOTING OF TRAINING PROGRAMMES

4.1 Definition of programme for training delivery

4.1.1 After extensive discussions within the project steering group concerning the nature of training delivery, it was agreed that a one-day course delivery within an appropriate training room may provide the best delivery mechanism for the target audience (ie plumbers). This decision reflected the following issues:

- Plumbers may find it difficult to justify being away from their work for long.
- The costs of solar water heating training delivery need to be kept to a minimum to help such training to be sustainable in the future.
- The nature of the specific information on solar water heating that will generally be new to plumbers is such that plumbers will benefit from having access to a knowledgeable trainer who can answer their questions.

4.1.2 A training delivery programme based on the one-day format was therefore developed. This delivery programme was structured as follows:

- Introduction to solar water heating in the UK (9.30 to 11.00)
- Solar collectors (11.15 to 12.00)
- Hot water storage within solar water heating systems (12.00 to 13.00)
- Preparing for an installation (13.30 to 13.45)
- Fitting of solar collectors (13.45 to 14.30)
- The solar primary circuit (14.30 to 16.00)
- System controls and commissioning (16.00 to 16.30)

4.1.3 The delivery structure outlined above mirrors the restructured course file referred to in section 3.1, thereby helping the plumbers to follow the course as the day progresses.

4.1.4 An assessment test procedure for course participants to complete at the end of the day's course was also developed.

4.1.5 It was agreed by the project steering group that the first phase of pilot courses should be based on the one-day delivery programme methodology outlined above. It was also agreed that later modifications to, or variations from, this delivery methodology would be considered based on the feedback received from a survey of plumbers attending the first phases of pilot courses.

4.1.6 Feedback from the plumbers who attended the first phase of pilots, regarding the structure of the course, was very positive (refer to section 4.3). Indeed, the project steering group concluded that the method of delivery was likely to be the most effective in present UK conditions. It was therefore decided not to develop (or pilot test) alternative delivery mechanisms but instead to concentrate on developing supplementary materials (especially the video) to help make the one day delivery methodology even more effective.

4.2 The organisation and performance of pilot training courses

4.2.1 During the project 20 pilot training courses were held across England and Wales, as follows:

- Swansea (South Wales) – 10 September 1999
- Guildford (Surrey) – 21 January 2000
- Brighton (Sussex) – 28 January 2000
- Broxtowe (Nottinghamshire) – 10 March 2000
- Maidenhead (Berkshire) – 31 March 2000
- Bournemouth (Dorset and Hampshire) – 22 May 2000
- London – 3 June 2000
- Berwick-upon-Tweed (Northumberland) – 9 June 2000
- Bromsgrove (Worcestershire) – 10 July 2000
- Redbridge (Essex) – 14 July 2000
- Oxford (Oxfordshire) – 21 July 2000
- Birmingham (West Midlands) – 24 July 2000
- Doncaster (Yorkshire) – 4 September 2000
- Leicester (Leicestershire) – 11 September 2000
- Warrington (Cheshire) – 22 September 2000
- Milton Keynes (Buckinghamshire) – 25 September 2000
- Bristol (Avon) – 29 September 2000
- Rochester (Kent) – 9 October 2000
- Truro (Cornwall) – 13 October 2000
- Great Yarmouth (Norfolk) – 16 October 2000

4.2.2 The trainer for each of the pilot courses was Roy Blower of Filsol.

4.2.3 For each pilot course the aim was to attract between 5 and 15 plumbers. Different methods of promoting the training courses were tried and these are discussed in section 6 of this report.

4.2.4 In total 208 people participated in the pilot courses of which 172 were plumbers. The table below sets out an analysis of course attendance and of the numbers who passed the course assessment test:

Table 1:

	Passed test	Failed test	Did not Take test	Total
Plumbers/heating engineers	136	9	27	172
Lecturers	4	0	4	8
Local authority employees	7	0	1	8
Environmental organisation employees	7	0	4	11
Solar system equipment suppliers' staff	1	0	3	4
Others	<u>1</u>	<u>0</u>	<u>4</u>	<u>5</u>
Total	<u>156</u>	<u>9</u>	<u>43</u>	<u>208</u>

4.2.5 The significant number of plumbers who decided not to take the test is considered to be a consequence primarily of the length of the training day. On some courses, it was not until after 16.30 hours that the test began. Plumbers who had some distance to travel were sometimes keen to depart and therefore declined to take the test. The issue of completion of the test papers will require attention in future solar water heating training courses.

4.3 Feedback from pilot training courses

4.3.1 During August and September 2000, the project's independent external assessor, Judith Stammers, performed an evaluation of all of the pilot courses held up to and including the course held in Birmingham on 24th July 2000.

4.3.2 On the day of each of the courses, each participant had been asked to complete a simple two-page questionnaire asking for their immediate views on the course. These had been passed to Judith Stammers for analysis. Telephone interviews were also conducted with a sample of participants from each course.

4.3.3 The evaluation confirmed that:

- Over two-thirds of the participants were in the plumbing and heating trade.
- Most of these had not done any solar installation work before the course.
- A lot were sole traders.
- There were a few other participants such as manufacturers of plumbing components, council employees, energy consultants and energy advisors.

4.3.4 The external assessor's report states that "analysis of the forms completed ... suggested that participants were highly delighted with the manual and course teaching. Those in the trade who were in a position to sell solar proactively intended to do so. Many felt that they now know enough to pass information about solar installation to colleagues and employees".

4.3.5 During the telephone interview stage of the evaluation, 27 participants were interviewed of which 19 were in the plumbing and heating trade, 3 were plumbing trainers and 5 were from other backgrounds.

4.3.6 The feedback from the telephone interviews with regard to the training manual was as follows:

- Generally, everyone thought the content of the manual was very good.
- Plumbing trainers could see themselves using the manual to prepare courses, copy diagrams onto overheads etc.
- A number of people in the trade who had never performed a solar installation before the course, mindful that they could need help over their first installation, wanted names and addresses of component suppliers willing to provide technical support added to the text.
- There were also requests for information and tips on output, sizing, costs and economics.

- Individual plumbers asked for information on when plastic pipes can be used and when they cannot, the use of safety harnesses, and warnings not to venture onto roofs in the rain.
- Quite a few people suggested a subject index for the manual.
- No-one in the trade saw the need to alter the order of the text. Some plumbing lecturers, however, thought that the manual should begin with a brief overview of what a solar system looks like, how it works, what its output is and how it is installed.
- One person in the trade wanted the format of the manual condensed to make it easier to carry. Another wished it made better use of colour.

4.3.7 Feedback with regard to the course teaching was as follows:

- Most people liked the course teaching very much indeed and could not fault it. It was suitable for plumbers and plumbing teachers alike.
- One person thought the trainer should put up a slide at the beginning outlining the day's programme.
- A few noticed that "down to earth trade people" were turned off by the course trainer's pre-amble on global warming. They thought that this section should be shortened and sharpened.
- A few people suggested the event would be more lively if the trainer asked questions of participants, encouraged them to ask him more, tailored the course to the needs of the region by focusing on building types found locally etc and gave participants the opportunity to handle components, touch an installation in the car park and feel the warmth of water etc.
- Two people felt that a module should be added to the end of the course giving tips on how to sell solar water heating for particular situations.
- The plumbing teachers wanted information on the market added to the course – details of suppliers, competing methods of heating water etc.
- Quite a few people found it difficult to take in everything in one day. They all stressed they would have been helped if the manual had been sent to them beforehand so they could read it before the course began. A few suggested the course be run over two days especially if it enabled them to do some practical work and visit a solar installation, but the majority said that they preferred a one-day course.
- Everyone thought a video showing practical aspects of installation was an excellent idea. If possible, participants should be sent a copy before the course so they could run through it at home. This way they could get the most out of the course.

4.3.8 The feedback obtained on the method of course delivery was as follows:

- Everyone was complimentary about the course delivery, manual and the prospective video.
- All agreed that the best way for practicing plumbers and plumbing students to learn from scratch was through a formal course, either a one-day course or a course at a plumbing college.

- Two of the plumbing teachers said they had found self-learning does not work. A few years ago they offered self-learning NVQ courses but this was not successful. They were waiting to receive the updated manual and video so that they could start pilot courses for NVQ students and practicing plumbers.
- Plumbers noted that “the only way you can be sure employees learn anything is to send them on a course”.
- Managers in plumbing firms thought that it would be useful to have access to a manual, video, CD-ROM or web-site so they could educate themselves on solar water heating when a job came along. However, it was felt that even such people would be better off attending a course if this was possible.

4.3.9 With regard to the idea of a CD-ROM comments were as follows:

- A number of people thought some course attendees would find it helpful to have the manual on CR-ROM for future reference.
- Such a CD-ROM could be distributed by tucking a copy into the back of the hardcopy manual.
- Students in plumbing colleges could use this CD-ROM on computers in their college for study between classes.
- College lecturers could use it to prepare for classes.
- Not everyone likes looking at material on computer screens – several plumbers said they preferred to receive information in book form.

4.3.10 The following feedback was received on the idea of putting the manual on a web-site:

- Those who liked the idea of putting the manual on CD-ROM were even more enthusiastic about putting it on a web site.
- The advantage of a web site is that the manual can be kept continually up-to-date.
- The web-site could usefully contain a list of component suppliers and the address of the trade association and have a facility that allows plumbers to ask technical questions which can be answered by e-mail.

4.3.11 With regard to the impact of the course, the following feedback was obtained:

- Everyone left the course feeling they could sell solar water heating.
- Everyone was more enthusiastic about solar water heating than they had been before the course.
- The more junior plumbers (eg inexperienced people not qualified beyond NVQ Level 2) considered that they would still need help in design. They thought they would get round this by turning to their managers (assuming they have one), system designers or component manufacturers for support.
- Nearly everyone who had not done any solar work before the course considered they would be slow in making their first few installations. They would need to turn to someone for help. Most said that the normal thing to do under such circumstances would be to ask for technical support from component suppliers and they said that they would like to be given a list of such firms.

- Three interviewees had between them installed (or arranged to have installed) seven solar water heating systems since the course. Several people had been more proactive in selling and were actively pursuing specific jobs. The majority, however, had neither put in systems nor tried actively to seek them – they were very busy with their traditional work and ran reactive, rather than proactive, businesses anyway. These people saw the market for solar water heating as coming in the future and had gone on the course so that they would be more ready when the market took off. They did not, however, see themselves as playing a role in creating that market.

4.3.12 Feedback was also received in relation to the need for help in selling systems as follows:

- A large number of those interviewed spoke of the need for material to help put a case for solar to potential customers.
- There was a strong plea for a set of pictures of installations on houses to be put at the beginning of the video for showing to groups of potential customers and those interested in self-build/DIY.
- A number of people thought there was also a need for another CD-ROM in addition to the one containing the manual. This should contain pictures of installations and provide technical and costs information. A practicing plumber could take this CD-ROM on a laptop to the homes of potential customers.
- Virtually everyone mentioned the need for help in obtaining leads. Only a couple had been given leads from the project's helpline and none of these had come to anything. One thought the council that had hosted his course would be sending him leads and was disappointed that none had been forthcoming. A number of people felt that it was up to the component manufacturers to generate a market and pass leads to installers.

4.3.13 With regard to future training courses and the course fee:

- Everyone said that, if they had employees and the market warranted it, they would send employees/colleagues on future courses.
- One person suggested it might encourage more people to attend if the course organizers found out how many Continuous Professional Development (CPD) hours the course is worth.
- Participants quoted fees in the range of £20 to £150 as being acceptable. Figures of £70 to £150 would only be acceptable if participants could be sure of getting real leads afterwards. One person suggested a sliding scale with sole traders paying a minimal amount and supervisors in bigger firms (who will pass the information to junior staff) paying more.
- High fees would be difficult to justify since plumbers have to pay out large sums for courses (such as ACOP gas fitting courses) that they are legally obliged to attend.
- Many people felt that the component manufacturers should subsidise the course and give discounts to course attendees.
- Saturdays were recommended as a good day to run courses for busy plumbers.

4.3.14 The plumbing trainers interviewed thought their fellow teachers would learn best if they attended a formal course; it was noted that trainers rarely have time to learn new techniques on their own. They all felt that it was not necessary (or a good idea) to run special courses for trainers, suggesting instead that it was better to mix trainers with practicing plumbers. Course fees of £25 to £300 were mentioned as being possibly appropriate. One senior lecturer said that plumbing departments have to spend a lot sending lecturers on ACOP gas fitting courses so have little left over for extra training; the fee for a solar course therefore needs to be low.

5 THE DEVELOPMENT OF MODELS FOR REGIONAL CO-OPERATION

5.1 The experiences gained within the project

- 5.1.1 Within each area in which a pilot training course was being held, the project partners sought to assemble a co-operative regional partnership.
- 5.1.2 It was found that the success and nature of cooperative regional partnership varied significantly from area to area. The critical factor was the identification of a project “champion” within an appropriate organisation within the region. For this role to be completed successfully the individual concerned requires to have a commitment to driving the project in the region and plentiful resources of energy and persuasion.
- 5.1.3 Conversely it was found that prospective regional partners that might prima facie seem appropriate contributors to a regional solar water heating action sometimes do not engage in activity as they might. This can be a result of the personalities and agendas involved in such organisations.
- 5.1.4 The principal experiences within the project were:
- Local agencies (local authorities, energy agencies or other local environment bodies) can play a leading role in marketing solar water heating training to plumbers (refer also to section 6).
 - The attitudes, energy and enthusiasm of key personnel within local agencies will be critical to successful implementation of a regional partnership.
 - The enthusiasm of plumbers to engage in a regional training initiative will depend largely on the perceived commercial benefits of doing so. Plumbers are therefore most likely to want to participate if there is a commitment by local agencies to stimulate the solar water heating market in the region.
 - Where local agencies do communicate a positive interest in solar water heating, attracting plumbers onto courses becomes relatively simple.
 - Due to the delivery mechanism developed for the training course, the training can be delivered within a room made available by a local agency. This can both reduce the cost of running the course and can help demonstrate the interest of the local agency in the regional training activity.
- 5.1.5 It is also important to recognise that the establishment of successful regional partnerships that can develop and implement significant solar water heating programmes requires specific funding and time not available within the scope of the project. The project managers, therefore, have been able to identify positive factors that can be built upon rather than demonstrate total solutions that can be replicated.

5.1.6 The project has, however, both informed and helped stimulate ambitious regional partnerships that have subsequently been launched. These partnerships, together with the process whereby the project has provided assistance to them, are described in 5.2.below.

5.2 Stimulation of further regional initiatives

5.2.1 One of the most significant outputs of the project has been the assistance, through the sharing of ideas and experiences and the organisation of training, of two regional solar water heating initiatives. These are the Kirklees and Calderdale Solar Partnership (in the Huddersfield area) and a scheme run by RENU (Renewable Energy in the Urban Environment) in South West London.

5.2.2 The Kirklees and Calderdale Solar Partnership is offering grants to householders in the region of £700 each towards the installation of solar water heating systems. The funding for the grants is provided by the Energy Savings Trust and the two local authorities. The partnership aims to stimulate the installation of 200 solar water heating systems within the year to 31st March 2002.

5.2.3 Following discussions with the project managers, Filsol, the Kirklees and Calderdale Solar Partnership is combining training of local plumbers with a regional solar water heating promotional campaign. Experience gained within the project on promoting training to plumbers, promotional materials design and regional promotional activities has all been used to help design the Partnership's work programme.

5.2.4 The RENU project in South West London (Merton) has also been designed to combine training of local plumbers (based on the training materials developed in this project) with regional promotional activity.

5.2.5 Both regional schemes are therefore set to provide local plumbers with new business opportunities in the installation of solar water heating systems. There is significant potential for many more such regional schemes around the UK and the new training materials developed within the project can support these.

6 DRIVING DEMAND FOR LEARNING

6.1 Methods of driving demand tested

- 6.1.1 During the project the following methods for promoting solar water heating training to plumbers were tried:
- Direct contact with plumbers (via post and telephone) by project staff.
 - Encouraging local authorities and other agencies to make contact with plumbers themselves.
 - Advertising (together with editorial) in the plumbing trade magazine “Heating and Plumbing Monthly” and editorial in the magazine “Professional Heating and Plumbing Installer”.
- 6.1.2 When seeking to contact plumbers, the project team used databases maintained by the APHC covering both association’s members and non-members. Where available, lists of local authority approved plumbing contractors were also used.
- 6.1.3 In certain regions the local agencies that participated in the regional activity were more proactive than in others (refer to 5.1.2).

6.2 Results of actions to drive demand for training

- 6.2.1 The least successful of the measures tried was direct contact with the plumbers by project team staff.
- 6.2.2 The advertisement in Heating and Plumbing Monthly together with the related editorial, achieving in total a two page spread, created a significant response with approximately 200 respondents, of which five attended pilot courses. Similarly, the editorial in Professional Heating and Plumbing Installer stimulated a good level of demand for training.
- 6.2.3 The most successful initiative, however, was direct contact by local agencies in those regions in which the local agency staff took a proactive approach.
- 6.2.4 From the results of the actions, it can be concluded that initiatives to promote training will be most successful where the plumbers perceive that the training is promoted by an independent organisation and where the plumbers believe that they may obtain future business from their new skills.

7 CO-OPERATION WITH OTHER EUROPEAN MEMBER STATES

7.1 Forms of co-operation

7.1.1 The project featured the following forms of co-operation with other European member states:

- Liaison with Energy Centre Denmark to learn how solar water heating training is provided in Denmark.
- Provision of assistance to relevant organisations in Ireland to disseminate the solar water heating training knowledge and materials developed within the UK.

7.1.2 The aims of the co-operation were therefore to benefit from lessons to be gained from experiences in Denmark (where the market for solar water heating installations is more established than in the UK) and to share the knowledge being developed within the project with Ireland (where the market for solar water heating is less developed).

7.2 Liaison with Energy Centre Denmark

7.2.1 A delegation from the project team visited Energy Centre Denmark and met with key persons with regard to solar water heating training and certification in Denmark and toured relevant facilities.

7.2.2 Energy Centre Denmark presented the project team with a copy of the Danish solar water heating training manual together with a copy of an accompanying training CD-ROM. Energy Centre Denmark also confirmed that images used within their CD-ROM could be used free of charge within the CD-ROM being developed in the project.

7.2.3 The solar water heating training course in Denmark comprises a mixture of training in the class room and practical training in workshops and extends over three days. Demand for a course of this length is stimulated by the structure of grant incentives to customers in the Danish solar water heating market; if a customer wants to benefit from a grant he or she must use a registered installer and to become registered an installer must have undertaken and passed the training course.

7.2.4 In Denmark the training course forms part of a wider programme of promotion and quality assurance. Registered installers, having passed the test, are promoted using the brand name “Solar Kings” and are provided with badges and other materials to help them promote their business. The first system installed by a new registered installer is inspected by an experienced manager within Energy Centre Denmark and subsequently installed systems may be subject to spot-checks. If installers do not install at least one installation within a 12 month period they will need to reapply for registration, which may mean re-attending the training session.

- 7.2.5 The approach in Denmark of utilising training within an integrated solar water heating promotional and quality assurance programme provides a useful example for the development of future programmes within the UK (refer to 8.2).

7.3 Provision of assistance to organisations in Ireland

- 7.3.1 During the project, information on the process of developing solar water heating training materials was shared with Cork City Energy Agency and the Energy Research Group, University College Dublin who together have been working to develop solar water heating market infrastructure in Ireland.
- 7.3.2 The information provided to the Irish partners was conveyed within meetings and by supply of proof documentation.
- 7.3.3 As a direct result of the assistance provided by the project, two solar water heating pilot training courses were delivered within Ireland (though not within the project itself). The partners in Ireland have also made progress in developing a solar water heating training manual for the Irish market based on the materials developed within the UK.

8 RECOMMENDATIONS FOR FURTHER WORK

8.1 Implementation of training programmes

- 8.1.1 The project has resulted in the production of 500 copies of the new training manual, CD-ROM and supporting video. Copies of the CD-ROM and video are ready to be supplied to all colleges providing NVQ training to plumbing students and will start to be used by colleges in the 2001/2002 training year. Valuable experience has been gained with regard to effective delivery of training, promotion of training and development of regional partnerships. A database of over 150 course participants that undertook and passed the assessment test at the end of the pilot training courses has been compiled.
- 8.1.2 The challenge following completion of the project is for these materials to be used to support solar water heating market growth across the UK. At the date of preparation of this report two regional initiatives, the Kirklees and Calderdale Solar Partnership and RENUÉ's training programme in the London Borough of Merton, have already started to benefit from the materials developed and experiences gained within the project.
- 8.1.3 Filsol, as original designers of the project, plan to market actively training services to local authorities and other agencies across the UK. A copy of the database of course participants has been provided to the Solar Trade Association and Filsol has entered discussions with the Solar Trade Association and with plumbing trade associations concerning future training activity.
- 8.1.4 A key recommendation, however, is that local authorities and other relevant local agencies are encouraged to develop and implement regional solar water heating market development programmes, incorporating training alongside promotional activities. The provision of funding assistance to such regional partnerships, possibly including the funding of grants to purchasers of solar water heating equipment, would be likely to stimulate this kind of regional programme. With appropriate promotion plumbers could be easily attracted to take part due to the clear potential business benefits (ie solar water heating system installation work) that would be likely to be derived.

8.2 Development of quality assurance infrastructure

- 8.2.1 The availability of high quality solar water heating training materials forms only one part, albeit an important one, of an infrastructure that can help assure the quality of solar water heating installations in a growing UK market. Experience gained within the Danish market highlights the need for a broader quality infrastructure, including checks of installations, registration of approved installers etc.

- 8.2.2 In the UK the need for the development of quality assurance infrastructure in the solar water heating sector mirrors the need for quality assurance within other related sectors including the plumbing, central heating and building sectors. Across this range of sectors a number of different schemes are being evolved and it will be important to ensure that quality assurance procedures in the UK market are developed so as to best (and cost effectively) dovetail with other related programmes.
- 8.2.3 At the time of writing this report, the Solar Trade Association is working on defining the scope and nature of work needed to establish a quality assurance infrastructure for solar water heating in the UK. It is recommended that this work be carried out with as much urgency as is practicable.

REFERENCES

- [1] Creation of Training Infrastructure for the Installation of Solar Water Heating Systems. Filsol Limited. Report to ETSU S/P3/00248/REP. 1997.
- [2] Labour Market and Skill Trends. DfEE. 1999.
- [3] Assessment of Current and Future Skill Requirements in the Plumbing Industry. British Plumbing Employers' Council. 1998.
- [4] Survey of NVQ Plumbing Candidates. Joint Industry Board. 1998.
- [5] Manpower and Skills in the British Plumbing Industry. British Plumbing Employers' Council. 1992.