Renewable Energy Roadshow – A Training Project in Renewable Energy Power Systems for Remote Areas of Western Australia

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Abstract

The Renewable Energy Roadshow was a series of five one-day training courses covering Introduction to Remote Area Power Supply (RAPS) systems, Energy Management for RAPS, RAPS Installation & Maintenance, RAPS Standards and Solar Water Pumping. The project was supported and funded by the Sustainable Energy Development Office of Western Australia (SEDO) and the Australian Greenhouse Office (AGO) under the Renewable Remote Power Generation Program (RRPGP). The Australian Co-operative Research Centre for Renewable Energy (ACRE) implemented the project in conjunction with Central TAFE. These courses were offered in Perth, Broome, Port Hedland, Carnarvon, Esperance and Kalgoorlie during October 2002 – March 2003.

These one-day training courses were developed to address important needs of users of renewable energy based power and water pumping systems and members of the local renewable energy industry. The aim was to raise awareness and improve expertise amongst installers, designers, maintainers and users of Remote Area Power Supply Systems (RAPS) in order to improve reliability and performance of these systems. The courses were tailored to suit the individual needs of expected participants. The RAPS Standards course was based on guidelines developed by the Business Council for Sustainable Energy (BCSE). All of the courses were successfully delivered by Central TAFE staff with support from ACRE's education team in Perth. The courses were carefully evaluated and the feedback from the remote communities was collected and analysed. This paper presents the objectives of this training project, the content of the training courses, the constraints experienced in course delivery and the lessons learnt from the project.

INTRODUCTION

Renewable energy systems are increasingly being used to supply electricity and water in remote areas of Western Australia aided by rebates available through the RRPGP funded RAPS and Renewable Energy Water Pumping (REWP) Programs. Past experience has shown that these systems perform best when they are designed and maintained by appropriately trained personnel. Increasing awareness amongst existing and potential users and improving the capabilities of designers and installers will therefore help to ensure that appropriate and good quality systems are installed, that they are operated and maintained correctly, and ultimately that they continue to be used in the long term.

The Renewable Energy Roadshow was a series of five one-day courses covering Introduction to RAPS, Energy Management for RAPS, RAPS Installation & Maintenance, RAPS Standards and Solar Water Pumping. ACRE developed and implemented the project with support from Central TAFE. This project received Commonwealth funding of $86,750 through SEDO and AGO under the RRPGP program. The total project cost was approximately $150,000 including ACRE/TAFE in-kind support.

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OBJECTIVES

The Roadshow was designed to increase awareness amongst existing and potential users of RAPS systems in remote areas of the options for the use of solar and wind power in these systems. Designers and installers of RAPS systems were also a key group, with the courses designed to improve their knowledge and skills in the use of solar and wind energy to replace diesel generators for the provision of power to isolated users. The main objectives of the project were:

- Promote the use of renewable energy systems and funding available under the RAPS and REWP Programs;
- Increase understanding of renewable energy based power and water pumping systems amongst existing and potential users;
- Further develop the capabilities of designers and installers of renewable energy based power and water pumping systems;
- Help ensure that systems installed as part of the RAPS and REWP Programs meet users’ expectations, are operated and maintained correctly and are designed and installed to operate well in the longer term;
- Help ensure the long-term use of renewable energy systems in remote areas of Western Australia.

PROJECT IMPLEMENTATION

Five one-day training courses were developed to address important needs of users of renewable energy based power and water pumping systems and of members of the local renewable energy industry. The course materials were mostly developed from existing ACRE and TAFE courseware and were modified to suit the individual needs of expected participants. The RAPS Standards course was based on the BCSE course material. Course development work included preparing written training materials. The content of each training course is described below in Table 1.

<table>
<thead>
<tr>
<th>Course</th>
<th>Target groups</th>
<th>Subjects covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to RAPS</td>
<td>RAPS users, potential designers and installers</td>
<td>RAPS components, design, costs, funding options, basic operation and maintenance</td>
</tr>
<tr>
<td>2. Energy management for RAPS</td>
<td>RAPS users, designers, installers</td>
<td>Importance of energy management, managing peak demand, reducing energy use, energy efficient appliances, appropriate energy sources for different purposes</td>
</tr>
<tr>
<td>3. RAPS installation and maintenance, batteries</td>
<td>RAPS designers, installers, maintenance staff</td>
<td>ELV wiring, location of components, safety issues, system maintenance, battery selection and maintenance</td>
</tr>
<tr>
<td>4. RAPS standards</td>
<td>RAPS designers and installers</td>
<td>Design practices AS4509.2 (RAPS design), overview of AS4509.1 &amp; 3 (RAPS safety, installation, maintenance), review of AS4086.2 (RAPS batteries)</td>
</tr>
<tr>
<td>5. Solar water pumping</td>
<td>Solar pump users, designers and installers</td>
<td>Options for water pumping, solar pump components, design, installation and maintenance, funding options</td>
</tr>
</tbody>
</table>

All five courses were offered in the WA regional centres of Broome, Port Hedland, Carnarvon, Esperance, Kalgoorlie and Perth during October 2002 – March 2003. The courses offered in Perth were intended to cater for people who missed the regional sessions and to potential users and industry members in the Perth area. The dates chosen for the Perth courses were in accordance with two major annual events mostly attended by people coming from the remote areas i.e. Perth Royal Show and Pastoralists and Graziers’ Association (PGA) conference week. Table 2 shows the schedule of courses offered at each location. A total of 197 participants attended these courses.
Table 2: Training course schedule

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
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<tbody>
<tr>
<td>2. Port Hedland</td>
<td>18-22 Nov 2002</td>
</tr>
<tr>
<td>3. Carnarvon</td>
<td>02-06 Dec 2002</td>
</tr>
<tr>
<td>5. Kalgoorlie</td>
<td>17-21 March 2003</td>
</tr>
<tr>
<td>6. Esperance</td>
<td>24 March 2003</td>
</tr>
</tbody>
</table>

The courses were delivered by Central TAFE instructors, Ian Dawson and John Paskulich, who are two of the most experienced renewable energy trainers in WA, with over 15 years of experience in training installers and designers of renewable energy systems between them. Courses included practical, hands-on training using TAFE’s portable RAPS training and demonstration facility. This portable training facility is a fully operational double bogey trailer RAPS system, with a 450W PV array (capable of being switched to individual modules for training work), two inverters, two battery systems, standard and maximiser regulators, and auxiliary battery charging. Full monitoring and test points allow most PV and RAPS related training and experiments to be performed. Solar water pumping equipment is also included on this facility.

The courses were advertised and promoted widely through diverse media including local/country newspapers, direct mail, trade/rural magazines, associations and government agencies. Local media support, particularly through ABC regional radio, was also a valuable source of promotion.

On one occasion (Kalgoorlie), a fifteen minute interview/presentation was made at the local ABC radio station by the presenter, Ian Dawson, on Thursday afternoon, and aired that evening – “Promotion of the possibilities of renewable energy use in mining, and of the MRET program”. Also, at the same venue, an evening presentation was included during the training course which was attended by approximately forty people from the “Goldfields Electrical Group”, an association of electrical contractors in the Goldfields area. Both of these publicity events made the training course more popular among the local community. A radio interview was also a part of the Port Hedland visit.

A nominal fee from each participant was charged to cover the cost of venue hire, notes and refreshments. Local TAFE colleges and staff were very supportive in providing venues and other logistical support for the successful organisation of these courses. Also, ACRE provided a limited number of scholarships to interested TAFE/Murdoch students to participate in these courses. As initially proposed in the project, ACRE and TAFE made generous in-kind contributions in the form of access to existing courseware, planning, organising and executing the project.

**PROJECT OUTCOMES**

Feedback from the participants about course material, delivery method etc was collected after each training course. The input obtained from the attendees was evaluated and the coursework was modified where necessary, to achieve the desired objectives of the training project. The key achievements of this project are summarised as below:

- In general, feedback indicated that the project was “very useful” and participants expressed a desire for an annual repeat of the courses with more “hands on” work, more specific details about the local region and some adjustment in the format.
- The TAFE demonstration trailer with fully operational systems was of great benefit.
- Videos and worked design examples were greatly appreciated by participants.
- There was considerable two way information transfer among the participants and instructors which kept the entire project interactive and interesting.
• The presentation material (training manual, brochures, powerpoint slides etc) was rated by participants as being of high quality and at an appropriate technical level.

• There was a great demand for more information about rebate programs and the accreditation process.

• Local TAFE lecturers showed great interest and participated well in most of the training courses.

• The Standards course was of interest to only industry people.

• This project has produced a large amount of intellectual property in the form of courseware, which will be jointly owned by ACRE and the AGO. The course material developed as part of this project could be utilised for similar training projects and as educational material in future.

LESSONS LEARNT AND SUGGESTIONS FOR THE FUTURE

As this type of training course was offered for the first time for the remote communities of WA, it provided a great learning experience for the organisers and presenters. Following are the key achievements of this project and suggestions for similar projects in future;

• A greater focus should be given to awareness raising or entry level courses such as Introduction to RAPS and Solar Water Pumping.

• The five day training course with no break was considered “heavy” by some participants. Possibly future sessions may be better spread over a weekend which will allow more industry people to attend. Consideration of the availability of potential audience is critical. Course offerings should be flexible to take into account their work commitments.

• A number of courses had active participation from the local indigenous organisations and government departments. To further spread the application and usage of renewable energy in the remote communities, more involvement from the indigenous communities and government departments is essential.

• Local high schools and training colleges could also be involved in such projects, by linking in with the existing BYO RAPS or PV: Electricity from Sunlight workshops developed for such groups by ACRE.

• If possible, conducting a “public welcome/information evening” session on the day before the start of training course may be very useful in future. Open days or information sessions prior to the commencement of training courses offers the public an opportunity to investigate renewable energy technologies prior to them participating in training and can act as a door opener.

• Careful consideration of the marketing strategy is essential. In this project, newspaper advertising did not reach the market as well as expected.

• There were smaller attendances than expected, especially from industry members during the Perth training course.

• There definitely is a feeling of optimism about the increased use of renewable energy in the mining sector and an increase in renewable energy applications initiated by electrical contractors and others working in this field. Although this was not a focus of this project, but should be considered in the future.

• Strong interest was expressed in areas where RAPS systems are located. This project focused on delivering in locations with a significantly sized regional centre with industry support, although little industry involvement occurred.
SUMMARY

The outcomes of this training project can be summarised as follows;

- Use of renewable energy in remote areas received a significant boost with this series of training workshops called the “Renewable Energy Roadshow”.
- The objectives of providing training for users, designers and installers of renewable energy systems in various parts of the State were achieved.
- The funds spent on this activity through SEDO/AGO have been well utilized to meet its desired goals of the RRPGP.
- Good quality training course materials have been developed which can be used for similar future projects.
- Awareness raising projects such as Renewable Energy Roadshow are a key step towards the adoption of renewable energy technologies in remote areas.
- This project has generated great interest in renewable energy systems and applications in various parts of the State, among industry as well as users.
- Follow up training is needed to maintain this momentum.

ACKNOWLEDGMENTS

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