# The WA Renewable Energy RAPS Rebate Scheme, the RAPS Display and a User Guide and Maintenance Manual for RAPS Systems

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## *Abstract*

The State Government of Western Australia launched the Renewable Energy Remote Area Power Systems (RAPS) Rebate Scheme on September 23, 1996. Under this scheme successful applicants receive a rebate of 75% of the cost of new renewable components and 25% of the cost of new batteries up to a maximum of $8,000. This scheme has provided assistance totalling over $400,000 as of 1 August 1997.

In conjunction with this scheme the RAPS Display at Murdoch University Energy Research Institute (MUERI) provides a technical advisory service to people interested in using Renewable Energy RAPS systems.

Both of these initiatives have provided excellent help to potential renewable energy users in remote areas. Further to this a User Guide and Maintenance Manual which addresses the operation of systems and more importantly the maintenance has been developed for the Office of Energy by MUERI.

## 1 INTRODUCTION

In 1987, New South Wales became the first state to introduce a fiscal mechanism encouraging the adoption of renewables in remote areas. Victoria and Queensland introduced similar schemes in 1995, although the Queensland scheme was limited to people living in certain locations. South Australia and Western Australia commenced examining rebate schemes in 1995 and WA has now introduced a rebate scheme. The schemes in the other states' no longer operate and the Western Australian scheme benefited greatly by having consultants ACIL examine the other states schemes to develop the most appropriate guidelines and procedures for WA.

Promotion and information provision are important complementary aspects of any program to increase the use of renewables in remote areas. The RAPS display at Murdoch University has been useful in familiarising people with renewable components and invaluable in providing independent advice to prospective buyers. It has also been identified that maintenance aspects of renewable energy RAPS systems are important and as a response a generic maintenance manual has been developed to provide this information.

# 2 THE RAPS REBATE SCHEME

The Alternative Energy Development Board (AEDB) is the focal point for the promotion, research and development of the alternative energy sector in Western Australia. The AEDB commissioned a report, 'Study into Power Provision Policies for Remote Areas in Western Australia' in March 1995. Murdoch University Energy Research Institute (MUERI) completed this report at the end of May 1995 (Wyder, et al, 1995). Analysis of various remote area power supply (RAPS) systems using the RAPSIM computer model developed by MUERI was undertaken and the results showed that renewables were a cost effective method for reducing power generation costs in remote households.

Householders in remote locations, who have to generate their own power, have power costs significantly higher than the 'uniform tariff' available to people who are grid connected. Typically they are reliant on a diesel generator system to provide power and the limited data available indicated that less than 10% of remote households in WA utilised renewables as part of the household power generation system. A previous survey (Harman, et al, 1991) of pastoralists identified the three main barriers to wider use of renewables as the initial capital cost, lack of confidence in their performance and lack of service for maintenance. The 1995 report recommended, for reasons of equity, improving the quality of rural life, reducing uneconomical grid extensions and environmental pollution, that a capital cost subsidy be introduced to assist remote householders purchase renewable energy generation equipment, inverters and batteries.

## *2.1 The Rebate Scheme*

In September 1996 the Western Australian Government announced the Renewable Energy Remote Area Power Systems rebate scheme, with a budget of $2 million over four years, to support the installation of stand alone household power supplies incorporating renewable energy. The scheme is designed to assist people living in remote areas obtain a renewable energy based power supply and ensure that RAPS system designs and installations conform to the latest technical standards. The scheme is run by the state government agency, the Office of Energy (OOE).

The scheme offers a rebate of up to $8,000 per household, comprising 75% of the cost of photovoltaic modules, wind turbines and control equipment, and 25% of the cost of the batteries. Other eligibility criteria include a minimum grid connection cost of $50,000 (2 - 5 km depending on terrain) and that the house is permanently occupied and the principal place of residence. There is a minimum renewable energy contribution of 30% for systems designed for less than 15 kWh / day and this is reduced to 15% for larger systems. The RAPS system must also be designed by a person holding provisional or full accreditation from the Solar Energy Industry Association of Australia or a person approved by the OOE. The scheme is primarily designed to provide assistance to householders and stand alone commercial premises are not eligible for funding.

## *2.2 Application Process*

Approval under the scheme is a two stage process. Initially a Pre-purchase Application Form is submitted detailing the existing and proposed system. The eligibility criteria are checked at this point and the rebate calculated. The intending buyers are then informed of their entitlements before they are committed to any purchases.

After the system has been purchased and installed, a Rebate Application Form is sent in with accompanying documentation and at least one photograph of the installation. The OOE checks this and then posts out a rebate cheque. Details are sent to the OOE's Technical and Safety division at this stage so that an inspection can be carried out when the inspectors are next in the area.

## *2.3 First Year's Operation*

In the first 12 months that the scheme has been operating $446,987 has been paid out to 62 householders. A further $244,660 has been committed to householders who have had their system approved and are awaiting installation. In the first year close to one million dollars was invested in renewable energy RAPS through this scheme. The majority of the rebates have been paid out to people in extremely isolated locations in the Kimberley, Pilbara, Gascoyne, Mid West and Goldfields / Esperance regions.

About 50% of the successful applicants have used the rebate to upgrade a diesel generator only system to one incorporating renewables, inverter and batteries. Approximately 17% of successful applicants had a diesel generator, battery, inverter system and have used the rebate to add renewables to their generating mix. The remaining portion already had some renewable contribution to their household energy needs and used the rebate to increase this.

The majority of applicants are incorporating photovoltaics and so far the subsidy scheme has only supported the purchase of 3 wind turbines although some of the applicants already had a wind turbine in their existing system. Approximately 45 kW of photovoltaics has been installed and a further 16.5 kW is in the process of being installed.

### *2.4 Scheme Feedback*

A customer and supplier survey was sent out on the 5th September 1997. Presently almost half of the customers have responded with the response being overwhelmingly positive. All customers said they would recommend renewables to their friends and neighbours. Sample comments include, 'Please increase the rebate so I can reduce my diesel reliance further', 'I now have the luxury of 24 hr power', 'Amount of renewable hardware required was higher than I expected' and 'Produce a booklet of guidelines regarding installation, storage and maintenance.'

Issues that some customers brought up that need addressing include lack of customer service, in particular after sales service from some suppliers, unexpected financial impact of electrical inspectors requiring safety upgrade of existing installations and difficulties in getting skilled installers to remote locations.

Only three industry responses have been received so far and they have all indicated that they believe the $50,000 grid connection cost is too high. Other comments were also received and the OOE is currently reviewing the scheme with the aim of optimising its benefits within its financial limitations.

## 3 THE RAPS DISPLAY

The Remote Area Power Supply display at MUERI was established under the Renewable Energy Promotion Program in 1993, with funding supplied by the Commonwealth Department of Primary Industries and Energy. The RAPS Display was officially opened on the 20th May 1994. The DPIE funding for the maintenance of the display and the advisory service continued until June 1995. Since September 1995 the Office of Energy and the Alternative Energy Development board have provided funding for the continuation of the display and the advisory service.

The RAPS Display aims to make renewable energy better understood and known among Western Australian remote area power users. Greater use of renewable energy is seen to be a way of providing improved standards of living by producing grid quality power for remote users. The initial funding provided for the establishment of two RAPS systems typical of the Western Australian RAPS market in 1993 and the provision of an advisory service for people interested in using renewable energy in their homes. A third system was installed in 1996 and demonstrates a small system suitable for a caravan. The display incorporates mainly Australian made products available from local Western Australian suppliers.

### *3.1 Operation of the Display*

The display is open to the public Sunday to Friday from Noon to 4 pm, except for public holidays and periods when Murdoch University is closed (typically the Christmas - New year period). The technical advisory service is provided by the Advisory Officer (Nigel Wilmot) during normal business hours. Visitors interested in solar and wind power technology are shown each of the systems and where appropriate types of applications suitable to their needs are discussed. Available at the display is information about RAPS, other available components and associated technologies. People unable to attend the display can call the advisory service and discuss their needs with the advisory officer or have a general RAPS information pack mailed. No sales are made from the display and consequently the information is seen to be impartial and unbiased, interested visitors are provided with a list of Western Australian suppliers

The RAPS Display provides information relevant to three groups which comprise the potential Renewable Energy RAPS market in Western Australia:

1. The large pastoralist homestead with high energy demand and load.

2. The remote country home and farmer with modest energy needs.

3. The smaller scale holiday shack/caravan with basic requirement for lighting and refrigeration.

The Building at MUERI consists of two rooms powered completely by the solar and wind energy:

i. The Low Energy User Room: This room contains the two smaller systems. The smallest system provides power to a portable refrigerator and a range of 12 Volt lights, and is suitable for a caravan/camping situation. The second system provides the general power requirements of this room; the DC lighting, and AC appliances such as radio, small television and video. It can also provide power for appliances such as vacuum cleaners and washing machines.

ii. The Typical Modern House Room: This displays the situation in a modern house, and has 240V AC appliances such as refrigerator, microwave, computer, water pressure pump, television, evaporative cooler, kitchen appliances etc. This system is representative of the second category of user listed above.

The RAPS display has been well utilised for the demonstration of these systems to the target market. The initial market was people in remote locations who were responsible for supplying their own energy needs. In addition to this the RAPS display has been used as a teaching resource for lecturers, teachers and students from primary to tertiary level. The display has been used for professional development courses in conjunction with the Science Teachers Association WA(STAWA). Visiting the display has been included as a practical part of the TAFE certificate of Renewable Energy Technology and also as a field visit for students studying at the Muresk Agricultural College in WA. Other groups that have visited the display include; various ATSIC delegations/representatives, United Nations delegations, and various study groups from Africa and South East Asia. The display has also been used in training and familiarisation of the Office of Energy's Electrical Safety Inspectors as part of the Rebate Scheme.

## *3.2 Advertising and Visitor Data*

The RAPS display has been advertised since it was opened in May 1994. The advertising is directed at people in remote areas and people who are interested in using solar power and/or generators. Various means of advertising have been used including; simple low cost line advertisements in classified sections of newspapers, small display advertisements(approximate size 6 cm by 10 cm) in country community newspapers, specialist papers such as the Countryman and Farmers Weekly, and the country edition of the West Australian, and 30 second radio spots on country radio stations. In all the approaches taken to advertising the display the most consistent response has come from the advertisements inserted regularly in the classified sections of papers such as the West Australian, Sunday Times, The Countryman and The Trading Post. The display type adverts are more likely to be cut out and placed on the fridge and followed up on the next trip to Perth by people in remote areas.

Since the opening of the Display to 30/9/97, 3097 visitors have signed or were noted in the visitors book. Not all visitors have signed or have been recorded in the visitors book. Figure 1 graphs the number of visitors to the Display each month. The visitors recorded in the visitors book are classified according to the address given. The classifications used are; Metropolitan, Country, Interstate or International. The distribution of the visitors during the above period is given in Figure 2.

Several reasons can be identified as the purpose of a visit to the display. Some typical reasons for a visitor from a metropolitan address include; "wanting to reduce their energy consumption by using renewable energy", "general interest brought about by media reports of new developments in renewable energy", "planning for retirement(or move) to a country location", "setting up a caravan or camper system for holiday journey" or "interested in how solar panels work". A visitor from the country will have similar reasons for visiting the display. However people who live in remote areas generally are more aware of renewable energy systems and will require more detailed explanations, possibly going into detail about their particular location and application. Country visitors are also interested in other applications such as water pumping, remote lighting and electric fences.

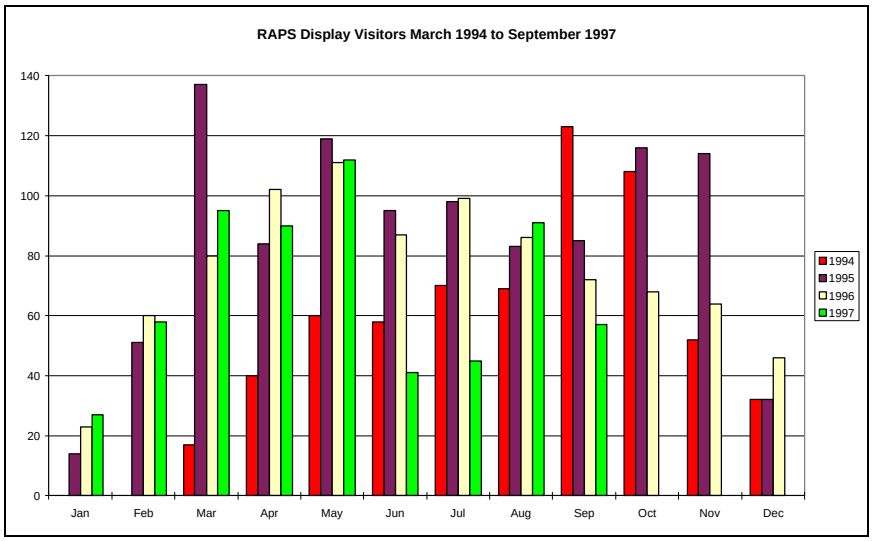


Figure 1 Visitor number to the RAPS Display as recorded in Visitors book

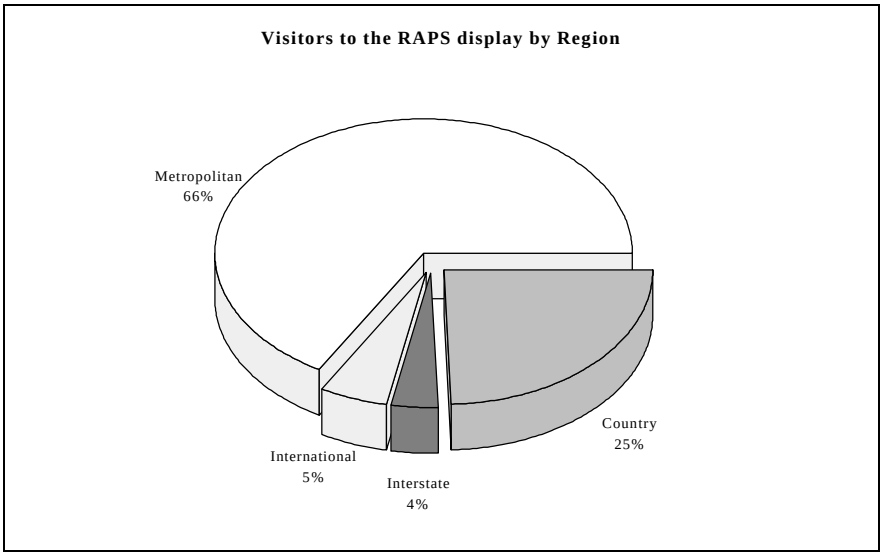


Figure 2 Visitors classified into regions as recorded in the Visitors book

The focussed advertising has possibly limited the total number of visitors to the display. However this has enabled a quality information and technical advisory service to be provided to people who are most likely to purchase a renewable energy system. This is reflected in the large number of country visitors. 25% of all recorded visitors are from country locations (see figure 2). Visitors who are interested in utilising renewable energy will, in general, carefully choose which brochures and information sheets they will take from the information available at the display. System suppliers have been supportive of this approach and have provided various equipment brochures and data for display and distribution.

# 4 THE USER GUIDE AND MAINTENANCE MANUAL

The “User Guide and Maintenance Manual for RAPS Systems in Western Australia” is in final draft stages and will be available shortly from the Office of Energy and MUERI. The purpose of the Guide is to provide “generic” advice for people who use renewable energy systems in WA. In particular it is to be given to people who have received a RAPS Rebate from the Office of Energy. It will reinforce the need for maintenance and correct use of the system. Correct maintenance of a system will help ensure long life of all components and hence maximise the benefit to the user from the RAPS Rebate scheme.

The guide will be in the form of a booklet, and in a succinct style which is easy to read and use when maintaining a system. The guide gives some general guidelines for the use and maintenance of RAPS. Particular attention is paid to the maintenance of the battery bank and the monitoring of the battery charge level. The guide is not designed to replace

any user manuals or maintenance manuals provided by system installers and manufacturers. Where a task is specific to a component the reader is referred to information that should have been supplied with the system by the system supplier. An example of this is the instructions concerning wind turbine maintenance. General guidelines are given concerning maintenance of wind turbines and the user is instructed to refer to the manufacturer's information for lowering (or raising) a turbine tower. It also has a general maintenance checklist which can be utilised in the regular maintenance of most systems. Throughout the guide the use of a system logbook is recommended. In a logbook the type and frequency of maintenance and who performed the maintenance should be recorded. If kept up to date a log book can be used to provide a history of the system which then can be used in fault diagnosis.

It is hoped that the guide will be utilised by system users in conjunction with manufacturer's information to regularly service and maintain their systems. The guide will also be of benefit to people interested in the use of renewable energy systems and the maintenance of these systems.

# 5 CONCLUSIONS

The initial capital cost of renewables is still a major barrier for many people seeking to invest in this technology to reduce their diesel fuel consumption. The WA government's rebate scheme is increasing the take up rate of renewables in remote areas. Recipients of the rebate are grateful for their new systems and many aim to increase their renewable energy generation capacity as finances allow. The WA rebate scheme is achieving its objectives due to the rebates mainly going to people in extremely isolated locations, extensive and ongoing consultation with suppliers and because the scheme ensures that systems conform to the latest technical standards.

The RAPS Display at MUERI has been a well utilised resource for Western Australia. The promotion and information provided by this facility and the associated expertise is an important resource which compliments any scheme which is designed to promote renewable energy and associated technologies. The "User Guide and Maintenance Manual for RAPS Systems in Western Australia" is a product which was made possible by the expertise at MUERI in this field. The Guide will be of use for recipients of a RAPS rebate and others interested in the use of renewable energy systems.

# 6 ACKNOWLEDGMENTS

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# 7 REFERENCES

Harman, F., Stocker, L., Walker, I., Stirling, M. (1991) *Barriers to the use of Renewable Energy in Western Australia*, Institute for Science and Technology Policy. Murdoch University.

Wyder, J.P., Fraser R., Pryor T.L. (1995) *Study into Power Provision Policies for Remote Areas in Western Australia* Report commissioned by the AEDB. (Available from the Office of Energy).