

## ELECTRICAL & SOLAR TRAINING WORKSHOPS FOR PASTORALISTS

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In the aftermath of Cyclone Vance in March 1999, much of the water infrastructures across the Pilbara, Gascoyne and Murchison districts were totally devastated. As part of its emergency relief support, the government heavily subsidized the replacement of infrastructure on all affected stations. Although several producers moved into solar, a significant number chose to reinvest in wind mills, based on their better understanding of this traditional technology. Had more people been better informed about photovoltaic (solar or PV) systems, a greater shift towards this more reliable and safer source of powered water delivery may have resulted. Consequently, the Gascoyne Murchison Strategy (GMS) commissioned the Department of Electrical Engineering at Curtin University of Technology to custom build an electrical and solar power training program for rangeland producers.

The program is delivered by Curtin Associate Professor Bill Lawrance through a two hour "hands-on" workshop. At the end of the workshop, participants receive a set of four VHS tapes, valued at \$82, as take-home reference material, compliments of the GMS.

<i>Module 1</i> <b>AVOIDING ELECTROCUTION</b>	A discussion of common electrical hazards on a station and practical methods to ensure safety.
<i>Module 2</i> <b>MULTIMETERS</b>	A detailed presentation of the various types of multimeters currently available, how they work and what the information they provide actually means.
<i>Module 3</i> <b>SOLAR POWER</b>	A highly informative introduction to solar technology that explains the various components and their functionality in easy to understand layman terms.
<i>Module 4</i> <b>SOLAR PUMP TROUBLE SHOOTING</b>	A demonstration of the most popular types of water pumps and covering how they work, what can go wrong and what can be done to fix them on the station.

The first workshops were held in the Goldfields in mid July. The format included a talk covering multi-meters, PV technology and pumps, followed by a demonstration of PV and the use of the multi-meter. Finally there was a discussion where participants told of their experiences (and problems) with PV systems. Those that attended found the workshops a unique opportunity to engage with a reputable expert who actively contributed to discussions and provided objective answers to their questions. A sample of these is tabulated below.

In June 2003, each of the LCDC secretaries in the Gascoyne Murchison region were provided with a copy of the course videos and invited to indicate their interest in hosting a workshop. The next workshops will be conducted in the Pilbara towards the beginning of November (Contact Hayley Tuner at 9144 2065 for details) and the Shark Bay LCDC have indicated their preference for May June workshop next year. Any practicing pastoralist unable to attend the workshop but interested in receiving their one complimentary set of videos should complete the form below. Additional copies are available through DAWA offices at \$55 a set (includes GST, postage & handling). A new workshop series for the Kimberley (Contact Shireen Jung at 9191 1555 for details) and agricultural areas is currently being considered for 2004. Farmbiz assistance may be available.

The GMS has also commissioned Dr Lawrance to develop water infrastructure design software for rangeland applications. This scheduled for release in October 2004.

This current training is a “must do” for all those using electricity on their stations and/or are contemplating the upgrade of their station water infrastructure in the not too distant future. It is considered a pre-requisite for the better utilisation of the water infrastructure design software.

Question/Issue Raised	Dr Lawrance’s Response
<b>Cost.</b> High initial investment costs deter producers from investing in PV systems	Pastoralists need to consider costs over the lifetime of the system. PV modules are guaranteed for 25 years and will continue to function at reduced efficiency after this. PVs need less maintenance than windmills and there currently is a substantial government subsidy for PV systems
<b>Quality of the installations</b> Suppliers and installers charge top prices for PV systems but after-sale service is poor or non-existent	Initial planning using best practice guideline is imperative. Many small hybrid solar home systems are incorrectly sized and improperly installed. Not surprisingly, such systems are prone to frequent failures. It is essential systems be correctly designed for a given application. System design should be as modular as possible to facilitate fault location and replacement of faulty components. A design software package is being developed. A good multi-meter is indispensable for tracking down faults but there needs to be some guidance for the non-technical user.
<b>Mechanical tracking systems</b> Mixed experiences from users	I agree with the users who contend it is more reliable to use a fixed array and add modules to increase output to the required level. Some users are happy to use a rigid frame, adjustable for summer (10 <sup>o</sup> ) and winter (50 <sup>o</sup> ) conditions. This increases the PV output but it would be less than what could be gained by a mechanical tracker (approx 40%).
<b>Compatibility of different sized PV modules</b>	It is best to use modules of the same size (same power rating). It is still possible to use modules of different sizes in an array however performance (for series connections) will be reduced. Try to avoid having series strings which contain one smaller module, as this will limit the output of the other modules in the string
<b>Module security</b> Since the modules are expensive items and often located in remote locations they are susceptible to theft	The obvious but costly solution would be the erection of a physical barrier. An alternative solution may be to incorporate an electronic ID tag to identify stolen property but these will require some R&D
<b>Availability of multi-meters with a current clamp</b>	The instrument demonstrated was a Digitech QM1562 with ranges of 0-200A (ac and dc) and 0-600V (ac and dc). A convenient feature is that current can be measured directly via the current clamp (hence it is not necessary to break the circuit) and frequency can also be measured with this meter. The meter is available from retailers such as JAYCAR and costs around \$150.

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## REPLY SLIP

PLEASE SEND MY COMPLIMENTARY SET OF SOLAR & ELECTRICAL INFOVIDEOS TO MY ADDRESS PROVIDED BELOW.

Station Name:.....

Mailing Address:..... Post Code.....

Signature.....

**ONCE FILLED IN, FAX TO DR ROBERT ROUDA AT 08 9088 6034.**