



UNEP-IETC
**Environmental
Technology
Centre**

at
Murdoch University

Capability Statement



Centre of Excellence for Industry Focused Research &
Development in Environmental Technology

UNEP-IETC Cooperation Centre for the Asia-Pacific Region



Above, Premier Geoff Gallop learns about the latest wastewater research from ETC's Gregory Priest.



Below, L-R: Dr Steve Halls, Director of the UNEP-IETC with Dr Kuruvilla Mathew, Director ETC, Professor Goen Ho, Chair ETC Board and Dr Martin Anda, ETC Research Manager.



**MURDOCH
UNIVERSITY**
PERTH, WESTERN AUSTRALIA



UNEP
Division of Technology, Industry and Economics
**International Environmental
Technology Centre**



the Environmental Technology Centre

at Murdoch University is the
United Nations Environment Programme
International Environmental Technology Centre
Asia Pacific Cooperation Research Centre

The Environmental Technology Centre at Murdoch University is a nexus for state of the art research in environmentally sustainable technologies and practices. With an ever growing list of Industry Partners the ETC is committed to working with industry to refine products, carry out monitoring and product development. The ETC also maintains close links with government affecting policy making and implementation. The ETC is committed to working in remote indigenous communities throughout Australia, and in developing countries delivering training packages, community development plans and supporting community capacity building.

The ETC was established in 1992, and officially inaugurated in 1994 during the National Conference on Technology Transfer in Remote Communities. It received a Centre of Excellence status in 1999 from the Western Australian Centres of Excellence programme. The ETC became a United Nations Environment Programme International Environmental Technology Centre Cooperation Centre in 2002 having collaborated with them since 1996. The aim of the ETC is to research, develop and demonstrate environmental technologies, conduct education and training, provide consultancy services to industry, and raise community awareness of environmental technologies. Its facilities are open to local industries wishing to test and monitor products within the university infrastructure.

Based on the Murdoch University Campus in Perth, Western Australia the ETC occupies a 1.7-hectare site at which over forty environmentally sustainable technologies have been combined to form an integrated operating demonstration system. The technologies used and researched at the site include:

- *Climate-sensible buildings;*
- *Renewable energy systems for power supply and water pumping;*
- *Aquaculture systems;*
- *Organic waste management;*
- *Vermicomposting;*
- *Water recycling*
- *Permaculture.*

The integrated approach allows research to be carried out on the important interactions between different technologies, rather than just the effect of a single technology. This gives the ETC a considerable advantage over other research institutions, which focus on single technologies in relative isolation. The ETC is able to offer holistic and flexible solutions to environmental needs. The ETC's focus is on small-scale



environmentally sustainable technologies, which are cost-effective to produce and establish, robust, efficient, and easy to operate and maintain. The aim of this is to maximise the opportunities for user communities to "own" the technology, resulting in greater and more sustained uptake of the technology, higher levels of community awareness and involvement, and ultimately a more successful operation. This approach has been successful in remote areas in Australia, and is highly applicable to communities in developing countries, as well as to urban communities worldwide, particularly when applied in collaboration with industry and government.

The ETC concentrates on four broad areas with an emphasis on the integration of these areas to achieve sustainability:

- **Water**
- **Food**
- **Energy**
- **Building and shelter**

Current projects include:

- *appropriate sustainable technology for developing countries (eg. Indonesia);*
- *desalination by reverse osmosis using solar energy;*
- *processes for testing the quality of drinking water;*
- *removal of nutrients from sewage effluent;*
- *water efficient irrigation techniques;*
- *production of high quality art paper by recycling waste paper;*
- *bush products and revegetation techniques via ethno-botanical analysis;*
- *composting techniques for organic wastes;*
- *wastewater recycling systems*
- *delivery of training via E-learning products*
- *technology transfer via the UNEP-IETC web-based data bases*

The ETC's research program has two elements: basic research initiated and conducted at ETC by university staff and visiting researchers; and research collaboration with industry and other organisations. The ETC has a strong track record of research and development collaboration with industry.

The ETC has an extensive and growing list of Industry Partners, many of which are small to medium sized local companies

who have provided research and development funding and collaborated to commercialise the results of research projects. A number of these projects have resulted in new products and services. These include:

- *the SOLARFLOW solar-powered reverse-osmosis desalination unit, now under manufacture by Solar Energy Systems Ltd;*
- *an evapotranspiration wastewater disposal system, now widely used by remote communities in WA;*
- *an on-site bacteriological water quality test kit, presently being used by communities throughout Australia and the Asia-Pacific region.*

Our Industry Partners have also made major contributions to the ETC itself by supplying building materials, technologies, labour and skills to make the Waalitj complex a cutting edge demonstration site. Numerous strategic alliances have been developed between the ETC and Industry Partners exemplifying the Centre's commitment to commercialisation of new innovations.

The ETC welcomes visiting researchers, government officials, policy makers, NGOs and delegates from developing countries and indigenous communities.

The ETC is also home to the Remote Area Developments Group (RADG): a specialist research group.

The RADG was established in 1985 and was the forerunner to the ETC. Its aims are to investigate the problems of small communities in remote areas of Australia, and to develop appropriate technologies to solve those problems and improve the living conditions for people in those communities. Some key areas of research and development include appropriate technology for water supply and sanitation, revegetation, bush food and communications. The RADG Advisory Committee consists of industry and community representatives. RADG organised the 1994 National Conference on Technology Transfer in Remote Communities at Murdoch University. The RADG's activities have expanded since its establishment to include research into application of environmental technologies to developing countries and urban communities as well as remote areas; thus the birth of the ETC.

Selected ETC Projects

On-site Bacteriological Test Kit for Remote Community Drinking Water

Department of Health, WA

Developed by Dr Jaya Nair this simple kit is designed for environmental health workers or community members to test local water supply for the presence of pathogens. Positive results indicate that further testing by relevant local authority should be carried out. The kit comes with a training package aimed at empowering community members to take control of basic water testing.

Development and Field Trials of a Solar Powered Reverse Osmosis Desalination Unit

Alternative Energy Development Board

The solar powered desalination unit, developed in conjunction with SES Pty Ltd is now used throughout northern Australia. This easy to maintain unit uses a reverse osmosis process to purify contaminated or brackish water to WHO standards for drinking water.

Kija Community Development & Permaculture Training

Argyle Diamond Mines

Working closely with Argyle Diamonds staff from the ETC visited the Kija Community to assist the community in constructing a nursery facility and developing bush regeneration and food production projects around the Argyle Diamond mine site.

International Source Book Sustainable Wastewater Management

UNEP/IETC

After 12 months of intensive research and consultation around the world, Prof. Goen Ho has compiled this highly informative compendium of EST's for water and wastewater management.

Energy Efficiency Education in 40 WA Aboriginal Communities

ATSIC and WA agencies

A team from the RADG visited numerous Aboriginal communities and delivered a basic training program aimed at reducing energy consumption and saving money. Community members gathered to take part in a workshop which was followed up with materials to be used throughout the community (including videos, stickers, posters etc.)

Community Settlement Planning in Bow River Community

Argyle Diamond Mines

RADG prepared a culturally relevant town plan which formed the basis of future housing and infrastructure developments.

Water Intake, Needs and Consumption patterns in Remote Indigenous Communities in Central Australia

Power & Water Authority of Northern Territory

This study investigates water usage in three remote Indigenous communities located in Central Australia. The first step involved a pilot study on various methods for estimating average and peak drinking water intake. A water usage study was also conducted to investigate water consumption patterns for both potable and non potable uses on a household and community level.

Community Development Strategy for Parnpajinya Housing Project

WA Department of Housing and Works

The WA Minister of Housing commissioned RADG to develop a CD strategy for the community prior to commencing a major new housing project.

Workshop on Cities as Sustainable Ecosystems

UNEP/IETC

Bringing UNEP identified delegates from developing countries to the ETC allows us to deliver state of the art training programs and to capacity build participants ready to implement sustainable technology solutions in their own country. The ETC then follows up on work by taking advantage of the UNEP network.

Best Practice Model for Remote Area Sustainable Tourism Facilities

CRC on Sustainable Tourism

ETC is currently developing a user-friendly assessment tool for the relicensing and development of sustainable tourism facilities in remote areas that ensures sound water, sewerage, power and solid waste management.



Above: The Solar Reverse Osmosis Desalination Plant on display at the ETC, supported by Industry Partner: Solar Energy Systems P/L



Above: Members of the Kija Community with Derek Hobbs inspecting the Solar Cooker

Independent Audit of the Department of Environment Water and Catchment Protection's Emergency Response Processes and Protocols

Department of Premier and Cabinet, WA

Following on from the considerable community concern over the Bellevue Chemical Fire the ETC was contracted by the Western Australian Department of Premier and Cabinet to investigate best practice models for dealing with chemical emergencies, and to recommend an action plan for dealing with such events

Wastewater Disposal Options Study for Bobieding and Pandanus Park

Australian Commonwealth Department of Defence

RADG investigated the feasible options for wastewater management at these two communities where difficult environmental conditions existed and made recommendations to be implemented as part of large housing upgrade works.

International Workshop on Sustainable Sanitation, Costa Rica

IWA Foundation, UNEP-IETC

Staff from the ETC travelled to Costa Rica to present a major workshop on sustainable sanitation for participants from throughout South America.

Development of Environmentally Sound Technology Data Base and Server

UNEP/IETC

As part of the UNEP-IETC information sharing initiative the ETC has developed a database of Environmentally Sustainable Technologies accessible via a simply internet interface. The ETC component is part of the world's largest ever information sharing and technology transfer project. The ETC has a strong commitment to education, training and information sharing and technology transfer.



The ETC Industry Partners

Alternative Energy Development Board, Perth
Anderton Enviro Corp, Bibra Lake
Arismac, Neerabup
Astro-Foil (Aust) Pty Ltd, Osborne Park
Biomax Wastewater Recycling Systems, Cloverdale
Boral Besser Masonry, Cannington
Boral Construction Materials Group, Belmont
Boral Plasterboard, Landsdale
Caroma Industries, Osborne Park
Concreto, Perth
Consortium Builders Pty Ltd, Nedlands
Courtyard Brick Co & Landscape Supplies, Welshpool
CSR Bradford Insulation, Welshpool
Downmus Resource Recovery Pty Ltd, Geebung
Earthhouse, North Fremantle
Ecoscape, North Fremantle
Feri Pumps, Geraldton
GE Polymer Shapes, Osborne Park
Healey Engineering, Victoria Park
Insulwest, Carlisle
Jason Windows, Welshpool
Little Creatures Brewery Ltd, Fremantle
Major Appliance Group - Sales Division, Belmont
Midland Brick, Middle Swan
Netafim, Malaga
New Earth Enterprises, Wattleup
Perth Stabilised Earth, Fremantle
Pilkington (Australia) Ltd, Myaree
Planet Ark, Fremantle
Plumbing And Painting Training Centre, Maylands
QED (Australia) Pty Ltd, Kallaroo
Rammed Earth Alternatives, Cottesloe
Recycling Company of WA, North Fremantle
Faculty of Architecture, Landscape & Visual Arts, UWA
Solahart Industries Pty Ltd, Welshpool
Solar Energy Systems Osborne Park
Solar Engineering Services, Willetton
Stegbar, Booragoon
TAC Pacific Control Systems, Osborne Park
Tankswest, Canning Vale
TEAP, Wangara
Unimould, Altona North
Universality of The Sun, Palmyra
Venco Products/Westwind, Kelmscott
W.D. Moore & Co, O'Connor
WA Glass & Glazing Association, Subiaco
Walsh's Glass & Glazing Service, Canning Vale
Wastestream Management, Rockingham
Western Power Corporation, Perth



Dr Jaya Nair demonstrates the water testing kit aimed at community users.



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