

Media Release –ADRA Project EFC011

**An Australian Development Research Award (ADRA) 2007 Research Project awarded to UNSW:
*Overcoming Barriers to Renewable Energy in Rural Indonesia by Community Capacity Building***

Project Timeline: January 2008 – December 2010

UNSW Research Project Team:

- Prof. Hugh Outhred – Principal Investigator
- Dr. Maria Retnanestri – Research Leader, Indonesia researcher
- Dr. Stephen Healy – Research Supervisor
- Dr. Muriel Watt – Research Supervisor
- Ms. Long Seng To (PhD Research Student) – China researcher

Research Project Collaborators in Indonesia and China:

Negotiations underway

Project Funding: AUD 310,000 over three years

Research Project Description and Background of the Research – The ADRA EFC011 Project is an interdisciplinary research project involving UNSW staff in conjunction with Indonesian collaborators. The funds also partly support a related project in China. The research project is funded by AusAID, totaling AUD 310,000 over three years, through its 2007 ADRA funding round. Additional funding is being sought and to date a commitment of up to AUD 40,000 has been secured from two solar photovoltaic (PV) companies based in Australia and Indonesia.

The objective of the research project is to identify and disseminate ways to overcome barriers to the use of photovoltaic energy systems (PVES) and other renewable energy resources to facilitate sustainable development for communities in rural Eastern Indonesia that do not have access to conventional electricity supply. In particular, the project aims to develop a better understanding of why some PVES projects succeed while others fail to facilitate sustainable rural development, and to transfer the practical know-how generated to policy makers, to those involved in project design and implementation and to rural communities.

In 2005, almost 50% of Indonesia's population had no access to electricity supplyⁱ and Indonesia's archipelagic nature constrains further grid extension. Of the 33 Indonesian provinces, Papua and NTT in Eastern Indonesia have the lowest electrification ratios as well as low Human Development Indices (HDI) and high Human Poverty Indices (HPI). Since the 1980s, approximately 10 MWp of PVESⁱⁱ have been installed in Indonesia for lighting, water pumping, telecommunications, health clinics etc. However, many renewable energy projects have failed and basic electricity supply remains inaccessible to many remote Indonesian communitiesⁱⁱⁱ. In China, widespread rural electrification using micro-hydro has been successfully undertaken and PVES projects are now being implemented using institutional frameworks that aim to address long recognized implementation failures^{iv}. In Australia, the Bushlight project^v has learned from past experience with PVES in Aboriginal communities to develop innovative community consultation processes and appropriate system designs^{vi}.

The project will focus on PVES Accessibility, Availability and Acceptability (3A), the three energy goals proposed by the World Energy Council^{vii}. The project will use the I3A (Implementation, 3A) Sustainable PVES Delivery framework^{viii} to investigate the extent to which local communities can continue to socially innovate to meet their evolving needs beyond initial project completion, considering the institutional, financial, technological, social and ecological aspects of PVES delivery. **Implementation** looks at the PVES social system: the stakeholders and their objectives, skills, interrelationships and roles in PVES delivery. For good PVES project outcomes, it is necessary to create a civic network that acknowledges the interests of stakeholders, encourages their active participation and promotes self reliance. The enabling environment describes external factors that may affect PVES delivery. **Accessibility** (financial, institutional and technological) deals with addressing PVES equity issues from the financial, institutional and technological perspectives (PVES affordability, profitability, financing, skills and networks). To improve PVES accessibility and the ability of rural communities to meet their future energy needs in autonomous

fashion, facilitators need to understand the communities' prior socioeconomic situation and technological capability. **Availability** (technical quality and continuity) focuses on the quality and continuity of energy supply necessary to maintain user trust and confidence in PVES systems and their providers. Users may discontinue the use of PVES if availability is too low. Robust PVES hardware is essential to withstand various physical conditions in the field. Equally important are sound local institutions, local capable agents and well-informed users to maintain PVES availability throughout its technical lifetime. **Acceptability** (social and ecological) focuses on the social and ecological perspectives, identifying the extent to which PVES can acculturate into local life, strengthening rural socioeconomic culture and promoting ecological care to facilitate Sustainable Rural Development (SRD).

The overall objectives of the I3A framework are to acknowledge the interests of all stakeholders, maximize equity, assure PVES continuity and institutionalize PVES by utilizing and enhancing pre-existing community resources to leave the host communities with the capacity to meet their evolving needs. The I3A Framework has been tested in three Indonesian PVES case studies as part of Ms. Maria Retnanestri's PhD project and based on the outcomes of those case studies, it can be concluded that to be sustainable and equitable, off-grid PVES projects should be implemented in an institutional framework that provides sound project management and addresses PVES accessibility, availability and acceptability. Under the ADRA EFC011 project, the I3A Framework will be disseminated and tested further by investigating more case studies, both in Indonesia and China, and expanded further to include policy formulation, sustainable manufacturing of PV at local level, as well as PV waste recycling.

Research Activity and Methodology – The research activities include collaborative research between UNSW and Indonesian project collaborators, fieldwork, workshops and seminars in Indonesia and China. The methodology of the project will involve:

- Primary data collection including a literature survey
- Secondary data collection including in-depth/semi-structured interviews of PVES stakeholders (policy makers, manufacturers, distributors, research agency, end users)



Left: Standalone PVES installed at a fish farming hut at Cirata Lake in West Java for lighting, infotainment and communication to support the fish farming economic activities (March, 2003). **Right:** An interview with users of a PV water pumping system in the NTT province, Eastern Indonesia (May 2005).

ⁱ PLN, (2006), PLN Statistics 2005, PT PLN (*Perusahaan Listrik Negara/The Indonesian National Electricity Utility*), Jakarta

ⁱⁱ BPPT, (2006), The Strategy for PV Industry Development to Achieve the Target for PV in the National Energy Mix in 2005, Symposium, Jakarta, 23 November

ⁱⁱⁱ Retnanestri, M., Outhred, H., Healy, S., (2007), Off-grid Photovoltaic Applications in Indonesia: An Assessment of Current Experience, Proc. ANZSES Annual Conference, Dunedin, NZ, 28-30 November, ISBN 0-473-10937-9

^{iv} To, L.S., (2007), Approaches to Using Renewable Energy in Rural Areas of China, ISES World Congress, Beijing, September

^v www.bushlight.org.au

^{vi} To, L.S., Watt, M., Stapleton, G., (2006), Photovoltaics in Remote Indigenous Australian Communities: An Assessment of the Bushlight Community Energy Planning Model, in AA M Sayigh (ed) WREC IX, Florence, 19-25 August

^{vii} World Energy Council, (1999), Achieving Equitable Access to Sustainable Energy, www.worldenergy.org/wec-geis/

^{viii} Retnanestri, M., Outhred, H., Healy, S., (2007), The I3A Framework – Enhancing the Sustainability of Of-Grid Photovoltaic Energy Service Delivery in Indonesia, WRERCE 2007, Jakarta, 5-7 November