



Joint Groups of PPRE 2004/06 and EUREC-REMA 2004/05

CARL
VON
OSSIETZKY
universität OLDENBURG



No. 2005 – Vol 24

Dear Reader—another very busy study year with respect to renewables in general and particularly regarding PPRE in Oldenburg did pass and it is time to spread some news from Oldenburg and – even more important – from the PPRE alumni out there in the world.

As far as it comes to news from Oldenburg, the implementation of the new PPRE course structure (see info-leaflet enclosed) and the first combined programme for PPRE- and EUREC students in the recent winter term really kept the PPRE staff busy. Details and first experiences gained are given in the following. In this issue of the PPRE newsletter we gathered some 60 contributions from alumni in form of reports, news and notes. PPRE's standing is increasing with the success of its alumni.

Remarkable occurrences faced by PPRE alumni since the last issue of this newsletter have been:

- the Ashden-Award (the so called 'Green Oscar') for Binu Parthan, India, who even shook hands with Prince Charles during the ceremony,
- that Olivier Andriamahefaparany became Energy Minister in the Government of Madagascar recently, and
- that Mr. Awa Celestine Anyam was appointed Director of Electricity in his ministry in Cameroon last year.

But next to these outstanding events the variety of inputs from so many of our alumni really make a difference! The PPRE-Network seems to be steadily growing along with the worldwide acceptance of renewable energy technology. But we are still looking forward to enhance our activities and are relying on the active cooperation from our alumni, who are asked to use the PPRE-L online discussion list and of course join our online data base, in which already 1/3 of our alumni are engaged.

So, check out www.ppre.de once in a while, contribute actively, share experiences and most of all enjoy this issue of the newsletter!

CONTENTS

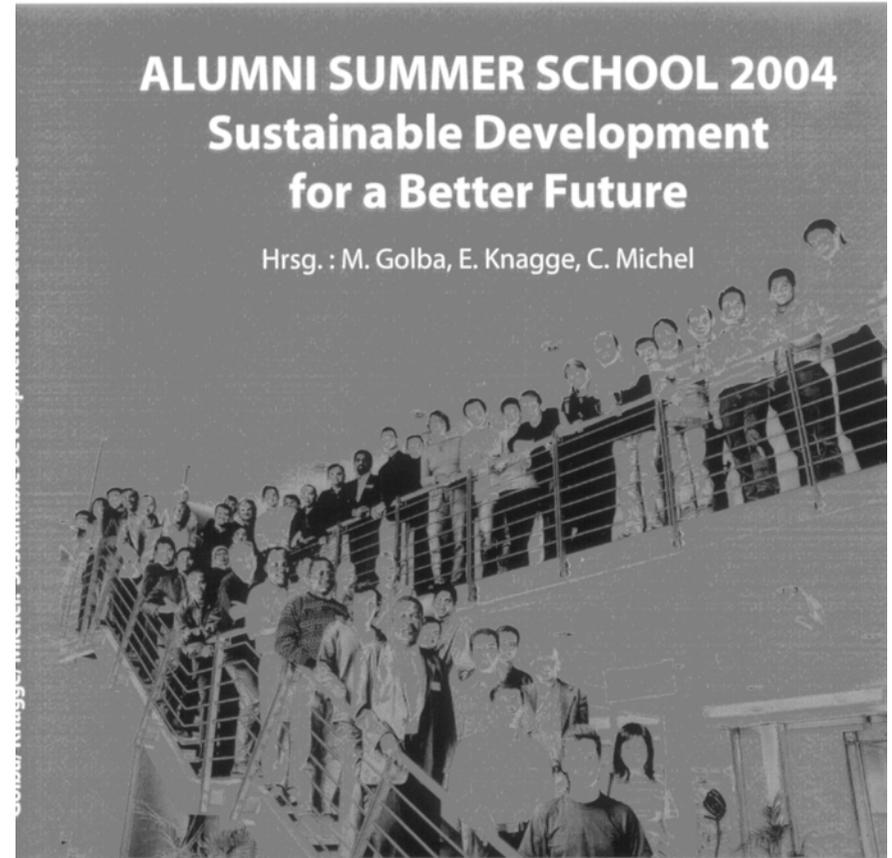
NEWS FROM OLDENBURG	3
NEWS FROM PPRE ALUMNI	13
CONTRIBUTED ARTICLES	26
Micro-hydro Power Development: Past and Present Status in Nepal	26
Transformation of Rural PV Market in Tanzania	32
A Very High Efficiency Wood and Dung Mogogo in Eritrea	34
WEB LINKS	41
LIST OF ABSOLVENTS & PARTICIPANTS	45
LIST OF STAFF & USEFUL LINKS	49

Published by:
Carl von Ossietzky
University of Oldenburg,
Faculty of Physics,
Department of Energy and Semiconductor Research,
Postgraduate Programme
Renewable Energy—PPRE,
D - 26111 Oldenburg
phone: +49-441-798.3775,
fax: +49-441-798.3990,
e-mail: edu@uni-oldenburg.de

Editors of this issue:
Edu Knagge & Konrad Blum
Typesetting&Layout: \LaTeX
Printing by Printing Office
of the CvO University

ALUMNI SUMMER SCHOOL 2004 Sustainable Development for a Better Future

Hrsg. : M. Golba, E. Knagge, C. Michel



Postgraduate Programme Renewable Energy

Department of Energy and Semiconductor Research
Faculty of Physics, University of Oldenburg, Germany

PLEASE ORDER NOW!!!

NEWS FROM OLDENBURG

Winds of Change
(Update from last Newsletter)

by Edu Knagge

First experience

In October 2004 the new programme structure of PPRE went into operation. Beside 15 PPRE students we welcomed 14 incoming students from the EUREC programme, who did their core course here in Oldenburg in the winter term 2004/05. The latter are enrolled in the **REMA** programme (Renewable Energy Master) at Oldenburg University. So overall 29 students from 20 countries (14 from Europe, 7 * Asia, 3 * L.A., 2 * Africa and 2 * Germany) formed a lively and interesting group during the winter term.

In brief the restructured, respectively newly established programmes are outlined in the following:

PPRE: The programme was extended to 3 terms, i.e. 16 months. The end of the current PPRE is scheduled for 31.1.2006! Except for DAAD scholarship holders a tuition fee of 1.000 Euro has to be paid per term. Additionally the curriculum is organised in modules in accordance with the standards given by the European Credit Transfer System (ECTS).

The Modules are:

- Bridging Module
- Wind Energy Meteorology
- Biomass, Hydro Power Fuel cells
- Energy Projects / Case Study
- Energy Economics & Systems
- Photovoltaic
- Solar Thermal Meteorology

All modules are stretched over 2 terms (except the introductory bridging module), where in the **1st term** (October to January) the core courses provide a solid foundation of scientific principles in Renewable Energy Technologies, followed by a 2 month **external practical training** (February – March). The **2nd term** (April – July) comprises of more applications of RE (case study, solar lab, etc.) and more specialised continuation of the core modules.

Each module consists of various lectures, laboratory work, tutorials, excursions; At the end of each term there is an examination in every subject taught. End of January 2005 for instance the students had to sit in 12 different exams.

After successful completion of the first two terms students are admitted to the final Master thesis project. They are working in research units at Oldenburg University or in external research institutes / companies.

REMA-EUREC: Students of this programme apply directly to the EUREC Agency in Brussels, who coordinate this programme. Nine European university are involved in the European Renewable Energy Master programme. In October 2004 about 40 students entered the EUREC Master programme. The tuition fee for the whole programme amounts to 6500 Euro for students with the nationality of an EU Member State and EUR 10000 for students from non-EU countries. This 15-month programme is divided in three parts: 4 European universities are offering the so-called **core course**, which provides a solid foundation in the key renewable energy technologies (wind, solar, biomass hydropower). This 1st term lasts for 4 months (October – January). The 2nd part also takes 4 months (February – June) and is dedicated to the **specialisation** chosen by the student. The following specialisations are offered:

- Biomass – Zaragoza University, Spain
- Hybrid Systems – University of



Solar Food (Memories...)

Kassel, Germany

- PV – Northumbria University, UK
- Solar Energy in the built Environment – University of Athens, Greece
- Wind – Technical University of Athens, Greece

The **final project** is usually done at a renewable energy company or a research centre and ends with a technical report and a final project presentation. www.eurec.be

Experienced gained during the 1st combined PPRE/EUREC winter term

It has been quite a task to host 29 students instead of 16-17 students, which was the average number of PPRE students during the last years: all students were looking for appropriate accommodations with fair rents, needed to settle down smoothly within a very short period, so that they could concentrate on their quite dense study program, and of course had to be tutored nicely while facing various bureaucratic barriers at the beginning of their stay in Oldenburg. Also the infrastructure of PPRE required some upgrading. The main lecture room in the Energielabor building for instance needed new facilities. After exchanging the desks and re-arranging the equipment now up to 36 students find a place in the audience. Additionally all laboratory set-ups were revised and updated. The changes in the curriculum (modular design, etc. – see above) were accompanied by final exams in every single subject taught during the winter term.

After these very concentrated 17 weeks, the first resume is that this combined course has been quite a success. Not only for the organisers but mainly for the students as well. It took some time in the beginning of the term for the two different groups of students – Europeans just after their first university degree and fairly young on the one side and non-Europeans already with field

experiences and partially familiar with RE technology on the other side – to grow into one, in the end even stronger group.

Here are some extracts of the various mostly encouraging feedbacks we received from the students:

It is just to say that I think too, that 4 months is too small a time to spend with everybody.

I learned a great deal from everyone of you – Joao Paulo, Portugal

4 months it's definitely too short, I just started to enjoy it and to know all of you. I had great time, sharing culture, knowledge, fun and friendship with you, you and you also!!!. It was a pleasure to meet you and I only hope one thing right now, it's to keep in touch and see you all very soon – Estelle, France

It was a really nice time shared together and I'll remember all my life this special worldwide mixed class. Now we have many addresses all around the world – Laurent, France

It was a real pleasure to study with you guys. I only wish that we were together earlier. It would have been more fun. But nonetheless, I am honoured to have been studying amongst you guys – Boon Jin, Malaysia

I must admit that it was a great pleasure knowing you and doing all that brought us together. The bond took some time to build, but as it was becoming much stronger you have to quit. We live in a small world and sooner or later I hope to see you again, and enjoy the nice moments we shared together – Dave, Kenya

All was really fantastic!! it was nice to know all of you!! I have enjoyed sharing our different cultures and letting us be free for doing and saying whatever we wanted!! I have learned things of each one, specially some particulars in your different and really good way to see the life – Christian, Peru

Conclusion: The world is growing together via internet, international travels and of course in the Energielabor at Oldenburg University.

LIST OF STAFF & USEFUL LINKS

Name	mail - address
Ronald Frels (secretary)	ronald.frels@uni-oldenburg.de
Andrea Geisler (technical assistant)	andrea@ehf.uni-oldenburg.de
Hans Holtorf (aka Bloos) (lecturer)	hans.holtorf@uni-oldenburg.de
Edu Knagge (co-ordinator)	edu@uni-oldenburg.de
Udo Kulschewski (lecturer)	kulschewski@uni-oldenburg.de
Dr. Konrad Blum (lecturer)	kblum@uni-oldenburg.de
Dr. Detlev Heinemann (lecturer)	detlev.heinemann@uni-oldenburg.de
Dr. H.P. Waldl (Igor) (lecturer (extern.))	igor@overspeed.de
Dr. Jürgen Schumacher (lecturer (extern.))	schumacher@zafh.net
Michael Golba (Head of PPRE)	michael.golba@uni-oldenburg.de
Prof. Dr. J. Peinke (lecturer)	joachim.peinke@uni-oldenburg.de
Prof. Dr. J. Parisi (Head of EHF-group)	parisi@ehf.uni-oldenburg.de
Prof. Dr. W. Pfaffenberger (lecturer)	pfaffen@uni-oldenburg.de
Prof. Dr. M. Meyer-Renschhausen – FH Darmstadt (lecturer)	Meyer-r@fbw.fh-darmstadt.de
Prof. Dr. G. Bauer (lecturer)	gottfried.bauer@uni-oldenburg.de
Dr. Joachim Götsche - Solar-Institut Juelich, FH Aachen	goettsche@sjf.fh-aachen.de
Dr. Sibylle Petrak - lecturer	sibylle.petrak@uni-oldenburg.de
Prof. Dr. Weiler, Polytechnic Emden	weiler@nwt.fho-emden.de
Prof. Dr. Sigrid Janssen	janssen@ise.fhg.de
Dr. Ulrich Graf - University of Bremen	graf@zfn.uni-bremen.de (or: graf@uni-bremen.de)
Prof. H.G. Beyer - Polytechnic in Magdeburg	hbeyer@emc.ufsc.br
Dr. Thomas Degner - ISET	tdegner@iset.uni-kassel.de
Pedro Kraemer - BORDA	Blattellagermani@web.de
Dr. Franz Trieb - DLR, Germany	Franz.Trieb@dlr.de
Dr. W. Schlez - GARRAD HASSAN LTD.	schlez@garradhassan.co.uk
Marita Palmer - DAAD	palmer@daad.de
Anke Stahl - DAAD	a.stahl@daad.de
gate (gtz - question answer information)	GATE-ISAT@GTZ.DE
IASEE-L (Discussion List on Solar Energy Education)	IASEE-L@LISTSERV.DFN.DE
PPRE-L (PPRE-alumni-network-list)	ppre-l@listserv.dfn.de

216	2001-02	Shah	Sayed Faruque	Mr.	Bangladesh/German	shahsayed65@hotmail.com
217	2001-02	Komilov	Asiddin	Mr.	Usbekistan	a_g_komilov@yahoo.com
218	2002-03	Asaah	Alice Ghopai	Ms.	Cameroon	asaah70@yahoo.com
219	2002-03	Saha	Jhantu Kumar	Mr.	Bangladesh	jksaha_2001@yahoo.com
220	2002-03	Tafesse	Anteneh Gullilat	Mr.	Ethiopia	antenehgu2002@yahoo.com
221	2002-03	Vega	Fernando Alberto	Mr.	Honduras	vegaf69@hotmail.com
222	2002-03	Irasari	Pudji	Ms.	Indonesia	pirasari@yahoo.com
223	2002-03	Lee	Joo Yeol	Mr.	Korea	joo_yeol.lee@lahmeyer.de
224	2002-03	Manoj	Kumar Khadka	Mr.	Nepal	manojkhadka419@yahoo.com
225	2002-03	Mishra	Subhash Kumar	Mr.	Nepal	Sbhishra@hotmail.com
226	2002-03	Shao	Jie	Ms.	China	shao_xjie@hotmail.com
227	2002-03	Trujillo Quintero	Juan José	Mr.	Colombia	juanjosetrujillo@hotmail.com
228	2002-03	Peter	Marco	Mr.	Germany	peter.marco@gmx.net
229	2002-03	Nacci	Gianpiero	Mr.	Italy	gnacci68@hotmail.com
230	2002-03	Choudhry	Ihtsham Farooq	Mr.	Pakistan	shamf77@yahoo.com
231	2002-03	Bango Cascon	Alejandro	Mr.	Spain	bangofr@yahoo.fr
232	2002-03	Galsan	Sevjdsuren	Ms.	Mongolia	sevjee2000@yahoo.co.uk
233	2003-04	Veneranda Mola	Nicolás Enrique	Mr.	Argentina	nicolasveneranda@yahoo.com.ar
234	2003-04	Ahmed	Firoz Uddin	Mr.	Bangladesh	firozeba@yahoo.com
235	2003-04	Aman	Julia	Ms.	Bangladesh	firozeba@yahoo.com
236	2003-04	Ferdinand	Ajamah	Mr.	Cameroon	ajamahl@yahoo.com
237	2003-04	Sanchez Contreras	Julio Rene	Mr.	Colombia	julioabraxas@hotmail.com
238	2003-04	Mitra	Indradip	Mr.	India	mitraindradip@yahoo.com
239	2003-04	Lawless	Richard	Mr.	Ireland	Richard_p_lawless@hotmail.com
240	2003-04	Han	Seong-sook	Ms.	Korea	razliv17@yahoo.com
241	2003-04	Trinh Viet	Hieu	Ms.	Vietnam	vhieu710@yahoo.com
242	2003-04	Sarran	Mathieu	Mr.	France	msarran@hotmail.com
243	2003-04	Bröer	Torsten	Mr.	Germany	tbandcr@web.de
244	2003-04	Michel	Andreas	Mr.	Germany	michelandi@gmx.de
245	2003-04	Bandlamudi	George-Chakravarthy	Mr.	India	george_b_c@yahoo.co.uk
246	2003-04	Husainova	Farida Damirovna	Ms.	Kyrgyzstan	fadu@mail.ru
247	2003-04	Dosmailov	Meirzhan A.	Mr.	Kazakhstan	mei@ok.kz
248	2003-04	Possamai	Everson	Mr.	Brazil	epossamai@hotmail.com
249	2003-04	Palle Badalge	Iresha Somarathna	Mr.	Sri Lanka	iresha123@yahoo.com
250	2003-04	Bajracharya	Prashun Ratna	Mr.	Nepal	prashun71@hotmail.com
251	2003-04	Yandri	Erkata	Mr.	Indonesia	erkata_yandri2003@yahoo.com
252	2004-06	Chowdhury	Md. Shahriar Ahmed	Mr.	Bangladesh	shahriar_ac@yahoo.com
253	2004-06	Zobayer	A.N.M.	Mr.	Bangladesh	zobayer72@yahoo.co.in
254	2004-06	Pena Diaz	Alfredo	Mr.	Colombia	elbigkonan@hotmail.com
255	2004-06	Toropov	Maksim	Mr.	Kyrgyzstan	maksimtoropov@mail.ru
256	2004-06	Sapkota	Prakash	Mr.	Nepal	psapkota46@yahoo.com
257	2004-06	Aderinto	Suraju	Mr.	Nigeria	ajibolaaderinto@yahoo.co.uk
258	2004-06	Henriquez Prevoo	Christian	Mr.	Peru	heprevoo@hotmail.com
259	2004-06	Mekki	Nada Mohamed	Ms.	Sudan	nadarikabi@yahoo.com
260	2004-06	Limsontorn	Tubtim	Ms.	Thailand	tubtim_siam@yahoo.com
261	2004-06	Ochieng	David Otieno	Mr.	Kenya	dave_otieno@yahoo.com
262	2004-06	Akhtar	Naveed	Mr.	Pakistan	navtar433@yahoo.com;
263	2004-06	Brudler	Evelyn	Ms.	Germany	evelyn.brudler@web.de
264	2004-06	Hermann	Sebastian	Mr.	Germany	Bas77@gmx.de
265	2004-06	Tek	Boon Jin	Mr.	Malaysia	tekbj@yahoo.com
266	2004-06	Moreno M.	Juan Carlos	Mr.	Venezuela	jcm969@yahoo.es
EUREC						
1	2004/05	AYMARD	Caroline	Ms	France	kro_kodlie@hotmail.com
2	2004/05	THOMAS	Denis	Mr	Belgium	denis.thomas@gmail.com
3	2004/05	LERMITTE	Tristan Eugene William	Mr	England	t_lermitte@yahoo.com
4	2004/05	CLAUZONNIER	Adrien	Mr	France	clauzonnier@yahoo.fr
5	2004/05	ANSELL	Duncan Peter	Mr	England	duncanansell@hotmail.com
6	2004/05	ADLER G. DA COSTA	João Paulo	Mr	Portugual	joaopagc@yahoo.com
7	2004/05	LECESVE	Laurent	Mr	France	tidjani_jah@yahoo.fr
8	2004/05	AVRAAMIDES	Stelios	Mr	Cypruss	avraamidesstellios@gmail.com
9	2004/05	CORREIA	Stélio	Mr	Portugual	steliocorreia@hotmail.com
10	2004/05	CARRELL	Justin	Mr	England	justcarrell@yahoo.com
11	2004/05	MANTAS	Panagiotis	Mr	Greece	madaspan@yahoo.gr
12	2004/05	DIMPOULOS	Aris	Mr	Greece	arisdem@netscape.net
13	2004/05	STROMBONI-P.	Estelle	Ms	France	estellesp@numericable.fr
14	2004/05	THIEBAUT	ROMARIC	Mr	France	romaric251@yahoo.fr

PPRE Alumnia Database Online

by Edu Knagge

Some time ago the PPRE team in Oldenburg initiated a small project to develop a comprehensive PPRE Alumni Data Base online, which basically is meant to provide an Internet-Forum for all PPRE alumni to present themselves and their organisations or companies online. This public forum is supposed to enhance and enrich the already existing international PPRE network.

The proposal was acknowledged by DAAD, who support this project in the framework of their “follow-up operations for students from developing countries” programme. End of February 2004 a questionnaire was sent to approx. 220 PPRE alumni worldwide, who were asked to return the filled in questionnaire together with any other information, which they would like to present online.

Basically alumni were asked to provide the following data: Name, Nation, Contacts, Studies, Present Job, Professional Career, other information, like papers, articles published, projects, etc. Besides any business-links or links to any organisations or projects they work for may be added. Next to the questionnaire PPRE Oldenburg also offers free Web space for its alumni – so any alumni who is in need of webspace, but is lacking money or resources to do so, might send us his company profiles, project reports, etc., which will be put online by the PPRE team within a certain period of time needed for data processing.

By August 2005 about 100 alumni joined our online data-base. The project started early 2004 and all PPRE-Alumni with known and functioning e-mail-accounts (about 220) were given a personal login and password, which enables them to put their CV, but even more important their professional experiences, any project reports, papers, publications, company profiles and business links online. The personal logins



Figure 1.1: Screenshot of www.ppre.de/alumni

provided are given for an unlimited period of time to enable the user of the data base to continuously update his/her personal data.

The data base was initially meant to be a kind of internal alumni forum, which may be used by PPRE alumni to inform about who is who and who is where. It was supposed to strengthen the bounds between alumni from one region of the world or between alumni working in a similar field of interest. But after first experiences gained, the data base turned out also to be useful as external information platform, which might be used by third parties, who are searching regional contacts with respect to RE.

Example: PPRE Oldenburg is getting several inquiries from institutions and companies, who are looking for local counterparts in the field of RE in certain regions or countries of the world. Usually we just forward the link to our alumni data base and contacts are built up directly. We think that the online data base is a good opportunity to enrich RE network activities and to present regional capacities. Hence

every PPRE alumni is welcome to make good use of the database.

Procedure: Please open <http://www.ppre.de/alumni/> and click on your region (see fig. 1.1) and then your country on the world map and you will see that your name is listed there. By clicking on it, you will see either your personal data (which you may update anytime by using your login) or you still need to enter your personal profile.

To correct or complete your own profile click on "For Alumni Only" written in the upper right corner of the screen. You will be prompted to log in (by using your personal username and password to make sure that only you can enter/change your personal data). Once you submitted, your data it will be automatically online. You may change/correct/add your online file anytime.

If you lost your personal login, which was sent previously by e-mail or if you were not contacted yet due to missing e-mail account or any other reason, please send a small note to: edu@uni-oldenburg.de.

Go for it and join in !!



Figure 1.2: Visitor inspecting an improved cook-stove made out of tin cans

Visitors from South Africa at Energielabor

by

*Andi Michel / Germany &
Ferdinand Ajamah / Cameroon*

(PPRE 03/04)

The Helene Lange Secondary School in Oldenburg has an exchange program – Partnerschaft schafft Energie: Partnership creates power – with a school from Port Elizabeth / South Africa. One focus of their project work is rural electrification and so the Helene Lange School supported their partner school in SA with a solar home system.

Within the exchange programme in September 2004 a group from South Africa (seven students and three teachers) stayed three weeks in Germany and did several visit to facilities that deal with renewable energies (Enercon, Aleo Solar). One afternoon they went to University of Oldenburg and visited our Energielabor. During that afternoon they learnt about SHS and improved cooking stove. Besides they enjoyed solar fried eggs and a special tea, which actually was

143	1997-98	Jackson	Thomas	Mr.	USA	jackson@oninet.pt
144	1997-98	Delamo Duch	Alex	Mr.	Spanien	aamo@inet.org
145	1997-98	Endres	Manuela	Ms.	Deutschland	endres@energieagentur-oberfranken.de
146	1997-98	Vangine	Wooslene	Ms.	Haiti	vangine@yahoo.com
147	1997-98	Lustig	Konrad	Mr.	Deutsch	konrad.lustig@gmx.de
148	1997-98	Gomez Vilar	Ramon	Mr.	Spanien	ramongomezvilar@gmx.net
149	1998-99	MASUM	Syed Ehteshamul Huq	Mr.	Bangladesch	s_masum@yahoo.com
150	1998-99	LIU	Hui	Ms.	China, VR	lien21agenda@yahoo.com
151	1998-99	YANG	Na	Ms.	China, VR	nyang1232003@yahoo.ca
152	1998-99	URENA VARGAS	Wesly	Mr.	Costa Rica	weslyto@hotmail.com
153	1998-99	KEKELIA	Bidzina	Mr.	Georgien	bidzina@kekella.com
154	1998-99	PATIL	Samudragupta Ashok	Mr.	Indien	samx1@rediffmail.com
155	1998-99	TIAKO NGALANI	Christophe	Mr.	Cameroon	chriti@yahoo.com
156	1998-99	JAKO	Hancox Wilson	Mr.	Kenia	hansjakoko@yahoo.com
157	1998-99	CHIMA	Timothy Freeman	Mr.	Malawi	(† died in 7/2004)
158	1998-99	Al-Alawi	Ali Salim	Dr.	Sultanate of Oman	aalawi@squ.edu.om
159	1998-99	CHIRVASE	Dana	Ms.	Rumänien	chirvase_dana@yahoo.com
160	1998-99	DLAMINI	Sibusiso Ndimiso	Mr.	Swaziland	Sibusiso.Dlamini@shell.co.za
161	1998-99	Jamiyansharav	Khishigbayar	Ms.	Mongolia	mjeeekhish@hotmail.com
162	1998-99	Lam	Johannes (Jan)	Mr.	Dutch	lam@tref.nl
163	1998-99	Straub	Christoph	Mr.	Deutschland	
164	1998-99	Oehrens	Juan Sebastian	Mr.	Chile	oehrens@yahoo.com
165	1999-00	Tadesse	Alemu	Mr.	Ethiopia	alemu_t@yahoo.com
166	1999-00	Khan	Md Mesbah	Mr.	Bangladesch	miltonkhan63@yahoo.com
167	1999-00	Hoque	Mozammel	Mr.	Bangladesch	mozammel_hoque@kst.bdcom.com
168	1999-00	Ambe	Roseline	Ms.	Cameroon	akwanwi@yahoo.com
169	1999-00	Wang	Di	Mr.	China, VR	robiniwang@yahoo.com
170	1999-00	Paredes	Rodriguez	Mr.	Colombia	juanro@gmx.net
171	1999-00	Subbarao	Sham	Mr.	Indien	sham_india@yahoo.com
172	1999-00	Al-Nawaiseh	Bassil	Mr.	Jordanien	
173	1999-00	Gamula	Gregory	Mr.	Malawia	ggamula@yahoo.com
174	1999-00	Dahal	YubaraJ	Mr.	Nepal	yubaraJ@engineer.com
175	1999-00	Musa	Mzombe	Mr.	Tanzania	musa_mzombe@yahoo.com
176	1999-00	Sendegeya	Al-Mas	Mr.	Uganda	a_sendegeya@yahoo.co.uk
177	1999-00	Ziesmer	Andrea	Ms.	Germany	za_4@yahoo.de
178	1999-00	Ulziisuren	Enibold	Mr.	Mongolia	ebdu@yahoo.com
179	1999-00	Gläser	Bernhard	Mr.	Germany	b99_uk@yahoo.com
180	1999-00	Kuyvenhoven	Simon	Mr.	Holland	simonkuyvenhoven@YAHOO.COM
181	2000-01	Islam	Mazharul	Mr.	Bangladesh	anjan1970@yahoo.com
182	2000-01	Fuh	Veronica Manka's	Ms.	Cameroon	fuverama@yahoo.com
183	2000-01	Mu	Yundong	Mr.	China	muyundong@hotmail.com
184	2000-01	P.V.	Aravind	Mr.	India	p_v_aravind@hotmail.com
185	2000-01	Srikanth	Subbarao	Mr.	India	Kanthi_vinu@yahoo.com
186	2000-01	Gil Guerrero	Alger	Mr.	Mexico	gergil@gmx.net
187	2000-01	Ghimire	Ram Prasad	Mr.	Nepal	rnrksghimire@hotmail.com
188	2000-01	Anahua Quispe	Edgar Narciso	Mr.	Peru	edgar.anahua@uni-oldenburg.de
189	2000-01	Magessa	Finias Bryceson	Mr.	Tanzania	finiasm@yahoo.com
190	2000-01	Nguyen	Quoc Khanh	Mr.	Vietnam	Khanh_2000@hotmail.com
191	2000-01	Islam	MD. Saiful	Mr.	Bangladesh	Saiful70@yahoo.com
192	2000-01	Tang	Hui	Mr.	China	tang_hui99@hotmail.com
193	2000-01	Risse	Oliver	Mr.	Germany	o.risse@conergy.de
194	2000-01	Abbas	Mushahid	Mr.	Pakistan	
195	2000-01	Tardón	Saioa	Ms.	Spain	saioa.tardon@mail.uni-oldenburg.de
196	2000-01	Nino	Raul	Mr.	Venezuela	Raul_nino@hotmail.com
197	2000-01	von Hauff	Elizabeth Leoni	Ms.	Canada	liz@spintriplet.com
198	2001-02	Mohtad	Ibrahim (Shafi)	Mr.	Bangladesh	imohtad@hotmail.com
199	2001-02	Belle	Vivian	Mrs.	Cameroon	vebote@yahoo.fr
200	2001-02	Nanji	Henri Nota	Mr.	Cameroon	nanji_hn@yahoo.co.uk
201	2001-02	Sanchez Mino	Santiago Jorge	Mr.	Ecuador	ecoelec@hotmail.com
202	2001-02	Shukla	Anand	Mr.	India	anand_s72@hotmail.com
203	2001-02	Gadde	Butchaiah	Mr.	India	b_gadde1@hotmail.com
204	2001-02	Heang	Bora	Mr.	Kambodscha	heangbora@hotmail.com
205	2001-02	Ochieng	Francis Xavier	Mr.	Kenya	xavierfo@yahoo.com
206	2001-02	Dhital	Ram Prasad	Mr.	Nepal	rdhital@aepc.gov.np
207	2001-02	Poudel	Om Prasad	Mr.	Nepal	omppoudel@yahoo.com
208	2001-02	Mazimpaka	Ernest	Mr.	Rwanda	emazimpaka@yahoo.fr
209	2001-02	Abd El Messih	Bahy Saad Abdalla	Mr.	Ägypten	bahy_s@yahoo.com
210	2001-02	Umana	Alejandro	Mr.	Colombia	kask@hotmail.com
211	2001-02	Pilalás	Loukas	Mr.	Greece	darkblue@lycos.com
212	2001-02	Triantafyllos	Panagiotis	Mr.	Greece	panagiotis.triantafyllos@hotmail.com
213	2001-02	Manssen	Thomas	Mr.	Germany	t.manssen@gmx.net
214	2001-02	Winterfeldt	Jörg	Mr.	Germany	j_winterfeldt@hotmail.com
215	2001-02	Avellaneda	Jordi	Mr.	Spanien	ave@cconline.es

70	1992-93	Mutwaly	Safaá	Ms.	Sudan	
71	1992-93	Wang	Jing Jing	Ms.	China	Jingjing503@hotmail.com
72	1992-93	Wafula	James C.	Mr.	Kenya	s_homepower@yahoo.com
73	1992-93	Blaas	Markus	Mr.	Germany	markus.blaas@t-online.de
74	1992-93	Georg	Rolf	Mr.	Germany	georgrolf@hotmail.com
75	1993-94	El-Ghany	Ahmed Abd	Dr.	Egypt	amfathy@hotmail.com
76	1993-94	Tubail	As'ad	Dr.	Palestine	
77	1993-94	Tommy	Henry J.M	Dr.	Sierra Leone	tommyhjm@hotmail.com
78	1993-94	Nahui-Ortiz	Johnny	Dr.	Peru	jnoriz@amauta.rcp.net.pe
79	1993-94	Leon	Mathias Augustus	Mr.	India	augustusleon@hotmail.com
80	1993-94	Rommel	Mathias	Mr.	Germany	rommel@iis-b.fhg.de
81	1993-94	Mergia	Mesfin	Mr.	Ethiopia	ras_mesfin2002@yahoo.com
82	1993-94	Gadah Eldam	Nagwa	Ms.	Sudan	N.Gadaheldam@unido.org
83	1993-94	Siefert	Oliver	Mr.	Germany	siefert.o@pg.com
84	1993-94	Andriamahafapary	Olivier	Mr.	Madagascar	olivierdonat@hotmail.com
85	1993-94	Rodrigues dos Santos	Rosana	Ms.	Brasil	rosana.santos@mme.gov.br
86	1993-94	Hurmuzan Kanam	Senda	Mr.	Indonesia	senda@bpl.go.id
87	1994-95	Lingbo	Cui	Mr.	China	(† Febr. 1996)
88	1994-95	Yanzhao	Dong	Mr.	China	
89	1994-95	Teka	Melis	Mr.	Ethiopia	tekamelis@hotmail.com
90	1994-95	Tolessa	Samson	Mr.	Ethiopia	samson.gtz-sun.energy@telecom.net.et
91	1994-95	Primo	Gayle	Ms.	Guyana	gbbest@rocketmail.com
92	1994-95	Myint	Mu Yar	Ms.	Myanmar	
93	1994-95	Gautam	Satish	Mr.	Nepal	satis_gautam@hotmail.com
94	1994-95	Sellahewa	Raveendra A.	Mr.	Sri Lanka	rsella@agl.com.au
95	1994-95	Ntoga	Julius	Mr.	Tanzania	jntoga@yahoo.com
96	1994-95	Gassir Farouk	M?med Ibrahim	Mr.	Sudan	
97	1994-95	Ghebrehiwot	Debesai	Mr.	Eritrea	debaig@yahoo.com
98	1994-95	Mesfin	Yohannes	Mr.	Eritrea	
99	1994-95	Ksoll	Michael	Dr.	Germany	
100	1994-95	Kuntze	Björn	Mr.	Germany	kuntze@gmx.net
101	1995-96	Negash	Bereket	Mr.	Eritrea	
102	1995-96	Fraser	Orville	Mr.	Guyana	gnea@guyana.net.gy
103	1995-96	Rosyid	Oo Abdul	Mr.	Indonesia	rosyid_id@yahoo.com
104	1995-96	Basnet	Diwaker	Mr.	Nepal	dbasnet@hotmail.com
105	1995-96	Ahmed	Maqbool	Mr.	Pakistan	maqbool_ahmed@hotmail.com
106	1995-96	Magpoc	Godofredo Jr.	Mr.	Philippines	gbmagpoc@napccor.gov.ph
107	1995-96	Maltsev	Alexandre	Mr.	Russia	
108	1995-96	Lin	Yeong-Chuan	Mr.	Taiwan	d01505@taipower.com.tw
109	1995-96	Kingu	Elizabeth A.	Ms.	Tanzania	ekingu@hotmail.com
110	1995-96	Endale Geda	Genene	Mr.	Ethiopia	ggeda@gmx.com ??
111	1995-96	Baba	Abdallah	Mr.	Tunesia	Baba.Abdallah@planet.tn
112	1995-96	Fuentes	Enrique	Mr.	Chile	efuentes@uta.cl
113	1995-96	Steinmeier	Ernsjoachim	Mr.	Mexico	
114	1995-96	Nikolic	Mliorad	Mr.	Germany	mcnik2003@yahoo.ca
115	1995-96	Woelk	Karsten	Mr.	Germany	kwoelk@solvis-solar.de
116	1996-97	Kamberi	Mirela	Ms.	Albania	mkamberi@icc-al.org
117	1996-97	Oriando	Perez	Mr.	Bolivia	Operez@electropaz.com
118	1996-97	Celestine Anyam	Awa	Mr.	Cameroon	c_anyam@yahoo.com
119	1996-97	Ye	Zhao Hui	Ms.	China	zhaohui@freenet.de
120	1996-97	Teshome G/Tsadik	Hiwote	Ms.	Ethiopia	hiwote.gtz-sun.energy@telecom.net.et
121	1996-97	Yimer Woldetekle	Nebiyu	Mr.	Ethiopia	yimer@hotmail.com
122	1996-97	Gbagbo	Joseph Kofi Nani	Mr.	Ghana	
123	1996-97	Hegde	Gajanana Krishna	Mr.	India	akh67@yahoo.com
124	1996-97	Osawa	Bernard	Mr.	Kenya	osawabernard@yahoo.co.uk
125	1996-97	Ballesteros Perez	Miguel Angel	Mr.	Nicaragua	migueldang_1@yahoo.com
126	1996-97	Projestus M.	Rwiza	Mr.	Tanzania	(† 2002)
127	1996-97	Morris	Richard	Mr.	Australia	richard.morris@zebotec.de
128	1996-97	Sancho	Sebastian	Mr.	Costa Rica	sesado2000@yahoo.es
129	1996-97	Dalexis	Walme	Mr.	Haiti	(† Feb. 1999)
130	1996-97	Belz	Matthias	Mr.	Germany	m.belz@ralos.de
131	1996-97	Schröter	Wolfram	Mr.	Germany	wo.schroeter@web.de
132	1997-98	Vásquez Cavieres	Ruben Eduardo	Mr.	Chile	rubenvasquezc@hotmail.com
133	1997-98	Chen	Rong	Mr.	China	chenrong@hotmail.com
134	1997-98	Zhang	Yin	Mr.	China	zhangyin814@163.com
135	1997-98	Castillo Arguello	Guillermo Eduardo	Mr.	El Salvador	
136	1997-98	Abdulkadir Ibrahim	Bekala	Ms.	Ethiopia	aisha_sal2@yahoo.com
137	1997-98	Ahiataku Togobo	Wisdom	Mr.	Ghana	wtogobo@yahoo.co.uk
138	1997-98	Parthan	Binu	Mr.	India	bp@reep.org
139	1997-98	Odeh	Ibrahim	Mr.	Jordan	odeh@homemail.com
140	1997-98	Sichali	Francis	Mr.	Malawi	fmasichali@yahoo.co.uk
141	1997-98	Petrucci	Fernando	Mr.	Argentinien	fepe@arnet.com.ar
142	1997-98	Schröder	Christoph	Mr.	Deutschland	cxs@gmx.de



Figure 1.3: Fried egg done with Solar concentrator



Figure 1.4: Group picture with A. Michel (4th f. right), F. Ajamah (2nd) and Dr. Blum (1st f. right)



Figure 1.5: F. Ajamah explaining outdoor set-up

Coincidentally, their visit was on a Thursday (Remember our tedious lab courses). As such, they too did outdoor experiments on solar home system. The challenges to sustainability on PV rural electrification as well as innovative technical solutions that could be adopted were equally examined during their visit. Following information and knowledge gained during the visit, participants started nursing intentions to start up a stand-alone PV system project in South Africa in the nearest future.

Feedback from our visitors:

a world premiere, solar boiled Ostfriesentee. The solar cooked / fried wood and the smokeless fire of the improved cooking stove impressed the visitors and lead to valuable discussions afterwards.

A special lessons on the functioning of the key components of a solar home system was given, where they were informed that a solar home system is more than just the technical components. The user who derives comfort from the system is an integral part of the system. He plays a vital role with regard to the sustainability of the system. As such the visitors were informed of the importance of the training and the education of the user to ensure proper system management.

‘On September 9th we had the chance to visit the Energy Laboratory of Oldenburg’s University where we learned about renewable energies in developing countries and Solar Home Systems (Ferdinand from Cameroon). His presentation was very impressive because it showed the South Africans and of course the Germans to what extent renewable energies are used in their homeland Africa and made us think about the possibilities there are. Seeing this was very encouraging. After that Andreas Michel from Germany talked about his stay in Lesotho and the GTZ pF. Ajamah explaining outdoor set-upproject he took part in. He dealt with cooking in developing countries with wood and solar cookers and talked especially about cooking at schools

in rural areas in Lesotho. Then we had the chance to look at all the equipment like the solar panels, the wind turbine etc. We learned about the question of how the amount of light influences the outcome of the solar system by doing an experiment which was a concrete example. We were very lucky with the weather as we could use the solar cooker in wonderful sunshine to fry eggs – only by using the power of the sun which the students could hardly believe. Andi also showed us the way his special cooker made of used tins works. We all enjoyed the hot tea made in the steamless cooker – an incredible and easy way to reduce air pollution and to use wood more efficiently. At the end we got an introduction by Dr. Blum on the Postgraduate Programme Renewable Energy and the history of the laboratory building which encouraged a few students to work in that field and maybe to apply at the university.'

'Firstly, a huge THANKYOU for having us at the university. We really appreciate you taking the time to share with us. Without exception the students found the experience "interesting, exciting, unbelievable, amazing", to name but a few adjectives. The manner in which it was presented suited their level of understanding and therefore held their attention. Coming from Africa, we could identify with the stove smokeless fire. The students experienced first hand and mentioned the fact that they could not believe how the sun had so much energy and could fry eggs and boil water for tea. They could only be richer after being granted this opportunity to experience and witness what is being done at the university!'

PPRE Students

PPRE 2003/04

The last PPRE batch in 'traditional style' (i.e. 12-months course) started in October



Figure 1.6: PPRE 2003/04 with friends during EuroSun 2004 in Freiburg.

2003 with 19 students, eleven from Asia, four from Europe, three from South America and one from Africa. Their names and country of origin are given below (see table 1.1):

Their practical training was quite international: Australia, India, Nepal, South-Africa, Mali and France – of course some stayed in Germany, in cities like Bremen, Duisburg, Wuppertal, and Oldenburg – nobody remained without a nice training placement. The students did their thesis projects in the three-months period and most of them were graduated 10th September 2004.

PPRE 2004/06

Although PPRE 2004/06 (which will be finished in January 2006) started with 15 students, only 14 made it to the end of the winter term (see table 1.2) as the colleague from Sudan had to postpone participation for health reasons for maybe two years.

Students of PPRE 2004/06 have now finished their first two terms, with lots of exams and are working very hard on their six-months thesis projects – most of them in external institutes or companies. Many have selected their thesis topic based on external training experience.

LIST OF ABSOLVENTS & PARTICIPANTS

NO	YEAR	Surname	Name	Tit.	COUNTRY	e-mail
1	1987-88	BEKDACH	Hussein	Dr.	Libanon	
2	1987-88	DEMEL	Lothar	Mr.	Germany	demel@uni-oldenburg.de
3	1987-88	DIBOR	Alfred	Mr.	Nigeria	
4	1987-88	FISCHER	Eric	Mr.	Brasil	efischer@cefetpr.br
5	1987-88	Heilscher	Gerd	Mr.	Germany	heilscher@meteocntrl.de
6	1987-88	ZARATE	Carlos	Mr.	Peru	carlos-zarate@web.de
7	1988-89	HAMAD	Bakri	Mr.	Sudan	
8	1988-89	Kimaro	Ainea	Mr.	Tanzania	ainea_2000@yahoo.com
9	1988-89	Holtorf	Hans G.	Mr.	Germany	hans.holtorf@uni-oldenburg.de
10	1988-89	MORAES-Duzat	Rejane	Dr.	Brasil	rduzat@hotmail.com
11	1988-89	NONTASO	Ngarmnit	Ms.	Thailand	
12	1988-89	Lu	Bai	Ms.	China	
13	1988-89	JIA	Xi-Nan	Dr.	China	thmasia@mbox3.singnet.com.sg
14	1988-89	MAIGA	Alhousseini Issa	Mr.	Mali	cnesoler@spider.toolnet.org
15	1988-89	Oludhe	Christopher	Dr.	Kenya	coludhe@uonbi.ac.ke
16	1988-89	Pietscher	Jochen	Mr.	Germany	jopiet@gmx.de
17	1988-89	Rakha	Hassan	Mr.	Egypt	
18	1988-89	Camillo	Roger R.	Mr.	Nicaragua	riguenergy@yahoo.es
19	1988-89	RAMESH	Muthya Pranesrao	Mr.	India	rameshmuthya@hotmail.com
20	1988-89	TORO CORTES	Francisco	Mr.	Chile	torofran@hotmail.com
21	1988-89	Rivasplata	Cesar	Mr.	Peru	crivaspata@hotmail.com
22	1989-90	GAO	Ying	Dr.	China	
23	1989-90	JAHN	Ulrike	Ms.	Germany	ujahn@easynet.de
24	1989-90	KIMANI	John Muiruri	Mr.	Kenya	mjkimani@yahoo.com
25	1989-90	Han	Wei	Dr.	China	
26	1989-90	MIRANDA Murillo	Alexis	Mr.	Honduras	ujahn@easynet.de
27	1989-90	MISRA	Anil K.	Mr.	India	lesolarch@yahoo.com
28	1989-90	Mukherjee	Partha S.	Mr.	India	parthasm05@yahoo.com
29	1989-90	REYNALDO	Reynaldo	Mr.	Philippines	r_reynaldo@yahoo.com
30	1989-90	SCHWARZ	Thomas	Mr.	Germany	tom.schwarz@t-online.de
31	1989-90	Tarh	Zaccheus T.	Mr.	Cameroon	
32	1989-90	THI HONG HAI	Nguyen	Ms.	Vietnam	
33	1989-90	Park	Myong-Sik	Mr.	Korea	
34	1990-91	Barroga	Maria L.	Ms.	Philippines	
35	1990-91	HASSAN	Gimba	Mr.	Nigeria	
36	1990-91	Usbeck	Stefanie	Ms.	Germany	uh.su@t-online.de
37	1990-91	Ennison	Isaac	Mr.	Ghana	
38	1990-91	Pandey	Krishna C.	Mr.	India	krishna@ciae.mp.nic.in
39	1990-91	Adam	El Fadil	Dr.	Sudan	fadiladam@hotmail.com
40	1990-91	KIOKO	Joel M.	Mr.	Kenya	kebs@africaonline.co.ke
41	1990-91	Knagge	Edu	Mr.	Germany	edu@uni-oldenburg.de
42	1990-91	MISHRA	Christianand	Dr.	India	
43	1990-91	OKAE	Charles	Mr.	Ghana	cokae@juno.com
44	1990-91	OSMAN	Abdalla	Mr.	Sudan	
45	1990-91	PEIRIS	Wettasingha	Mr.	Sri Lanka	
46	1990-91	Lemus	T. Hernando	Mr.	Bolivia	
47	1990-91	XIE	Enhai	Mr.	China	
48	1991-92	Abel	Bettina	Ms.	Germany	bettina_abel@gmx.de
49	1991-92	Ally	Noel	Mr.	Guyana	noelally2003@yahoo.com
50	1991-92	Gyi	Aung	Mr.	Myanmar	
51	1991-92	Hakim	Mahmoud El	Mr.	Sudan	
52	1991-92	Ingwe	Anna Nafal	Ms.	Tanzania	annaingwe@yahoo.co.uk
53	1991-92	Kaur	Jagjit	Ms.	India	
54	1991-92	Mansaray	Kelleh G.	Dr.	Sierra Leone	kellehgawuru@hotmail.com
55	1991-92	Xiang-jun	Ming	Mr.	China	mirrox@163.com
56	1991-92	Mugisha	Patrick	Mr.	Uganda	pmugi1900@yahoo.co.uk
57	1991-92	Santoso	Murtiyanto	Mr.	Indonesia	murtis@peter.petra.ac.id
58	1991-92	Tegeler	Ludger	Mr.	Germany	
59	1991-92	Nabutola	W. Musungu	Mr.	Kenya	musunguw@yahoo.co.uk
60	1992-93	Al Kailani	Fayez Jamil	Mr.	Jordan	
61	1992-93	Burdiono	Chayun	Mr.	Indonesia	chayun@INDO.NET.ID
62	1992-93	Hamid	Mohamed Ali	Mr.	Sudan	ohaj99@yahoo.com
63	1992-93	Kariyawasam	Palitha L.G.	Mr.	Sri Lanka	palithakariyawasam@yahoo.com
64	1992-93	Kassenga	Gabriel	Dr.	Tanzania	Kassengagr@yahoo.com
65	1992-93	Lonis Abdu	Bertha	Ms.	Nigeria	abdulonis@yahoo.com
66	1992-93	Magno Desendario	Evelyn	Ms.	Philippines	evendesendario@yahoo.com
67	1992-93	Shresta	Kedar Shanker	Dr.	Nepal	ksshresta@hotmail.com (res)
68	1992-93	Pandya	Udayan	Mr.	India	udayan@wiltononline.net
69	1992-93	ElAsaad	Kawther A. Mohamed	Ms.	Sudan	k_alassad@hotmail.com

The Geothermal Energy Barometer is available at: http://www.observe-er.org/observe-er/stat_baro/eufores/baro156.asp At the end of the year 2002, worldwide installed geothermal capacity for production of electricity was 8 356MWe.

The Solar Thermal Energy Barometer (June 2003) is available at: http://www.observe-er.org/observe-er/stat_baro/eufores/baro155.asp Europe's installed capacity of solar thermal collectors totals 12.8 million m². This represents 34 m² per 1000 Europeans.

The Photovoltaic Energy Barometer (April 2003) is available at: http://www.observe-er.org/observe-er/stat_baro/eufores/baro154.asp "Worldwide photovoltaic cell production increased by 33.3% in 2002, and the European Union's installed capacity grew by 37.7% to reach 392 MWp..."

The Wind Energy Barometer (February 2003) is available at http://www.observe-er.org/observe-er/stat_baro/eufores/baro153.asp "The 30 379 MW wind turbine capacity installed in the world by the beginning of 2003 now make it possible to supply nearly 17 million households with electricity..."

The EurObserv'ER barometer is a project supported by the European Commission. EurObserv'ER is a consortium composed of four European organisations devoted to the promotion of renewable energies within the European Union. These four organisations are: * Observ'ER, the Observatory of renewable energies (Paris); * Eurec Agency, the European association of renewable energy research centers (Brussels); * Eufores, European forum for renewable energy sources (Brussels); * O.OE.Energiesparverband, (Linz, Autriche).

EurObserv'ER barometers may be downloaded in PDF format at the following



Figure 4.1: PV Panels in Hawaii

address www.energies-renouvelables.org
- www.eurec.be - www.eufores.org -
www.esv.or.at www.ibmer.waw.pl/ecbrec -
www.europa.eu.int

Tsunami Crisis

P.L.G. Kariyawasam (PPRE 1992/93) from Sri Lanka wrote us: "I request all friends and organizations to help Sri Lanka to meet the needs of millions of people affected by the tsunami tidal wave which hit Sri Lanka's coastal areas on 26th December. Nearly, 1/12th of the the Sri Lanka's population has lost their dwellings and all their belongings and thousands missing. while over 18000 are confirmed dead. Sri Lanka needs finances, medicine, clothing, construction material and help to rebuild the infra-structure. I request the international friend to extend their help to Sri Lanka. You can go through the web sites available in this regard and make your contributions, please!"

Table 1.1: PPRE 2003/04

Name	Country	Ext.Train. (Inst./Place)	Thesis subject
Veneranda M., Nicolás E.	Argentina	JUWI Consultancy (Wind), Mainz	Development of Wind ... (1)
Sanchez C., Julio	Colombia	Garrad Hassan (Wind), Oldenburg,	... Farm Projects (2)
Ahmed, Firoz Uddin	Bangladesh	GTZ, Eschborn	Rural Renewable ...
Aman, Julia	Bangladesh	GTZ, Eschborn	...Energy for Livelihood
Ajarah, Ferdinand	Cameroon	SSD-EN (Fee-for-Service company), Mali	Solar Home System
Mitra, Indradip	India	Inst.Solar Energy Technol, Kassel	Solar Photovoltaics f. Villages
Lawless, Richard	Ireland	Environ. Consultancy, Copenhagen	Solar Thermal for Sports Building
Han, Seong-sook	South Korea	Wuppertal Institute	Renewable Energy in South Korea
Trinh Viet, Hieu	Vietnam	Bremen Energy Institute	Economics of RE Technologies
Sarran, Mathieu	France	Wind Consultancy, France	Solar Thermal in France and Germany
Bröer, Torsten	Germany	Rural Electr. Project, Sunderbans / India	Island Electrification by Solar Energy
Michel, Andreas	Germany	GTZ, South Africa	Efficient Cooking Stoves
Bandlamudi, George C.	India	ZBT (Fuel Cell Research Centre), Duisburg	Fuel Cells for India
Husainova, Farida	Kyrgyzstan	Univ. Canberra, Australia	Thermoch. Storage of Solar Energy
Dosmalinov, Meirzhan A.	Kazakhstan	EHF, Oldenburg	Polymer Solar Cells
Possamai, Everson	Brazil	Project GmbH (Wind), Oldenburg	Regional Energy Systems
Palle B., Iresha S.	Sri Lanka	MasterGas, Bremen	Gasification for Sri Lanka
Bajracharya, Prashun R.	Nepal	Biogas Project, Nepal	Biogas in Nepal
Yandri, Erkata	Indonesia	PLANET, Oldenburg	Design of Biogas Digester

Table 1.2: PPRE 2004/06

Name	Country	Training
Boon Jin Tek	Malaysia	FH Stuttgart
Alfredo Peña D.	Colombia	Garrad Hassan
Juan C. Morenz M.	Venezuela	AL-PRO
Shahriar Chowdhury	Bangladesh	ZSW Stuttgart
Maksim Toropov	Kyrgistan	Univ. Oldenburg
Prakash Sapkota	Nepal	Univ. Oldenburg
Suraju Aderinto	Nigeria	PLANET
Sebastian Hermann	Germany	Indonesia
Tubtim Limsoontorn	Thailand	Univ. Hohenheim
David Otieno	Kenya	GTZ
Evelyn Brudler	Germany	PLANET
Naveed Akhtar	Pakistan	FZ Jülich
A.N.M. Zobayer	Bangladesh	ZSW Stuttgart
Christian Henriquez	Peru	TU Delft

Practical Training Experience

In this new section of the newsletter we want to encourage exchange on training experience. Please send us your contributions concerning this often quite important part of your studies.

My Practical Training in India (2004)

Time flies - and in the meantime we are already 5 weeks in India and have adjusted quite well. The first week in Delhi we did a little weekend trip to see the famous Taj Mahal in Agrar, which was incredible. But also the trip was an experience itself. We went through so many towns and cities and couldn't believe how crowded, chaotic and crazy some of the areas appeared to us. Busy "roads" with thousands/millions of people - all this different vehicles (e.g. "rickshaws" carrying huge loads) and elephants, camels, lots of cows, pigs, dogs etc.

sharing the same road - everything without any apparent lane system and of course people, people, people....EVERYWHERE.

At the moment we are in Kolkata which is meant to be one of the most congested cities in India and now I find it pretty normal to have all this people around me and feel more or less save to "be part of the traffic". Oldenburg will be a small village after all this!

I am learning also lots about the application of renewable energy over here. I have been on several island with Off-Grid Stand-Alone Solar PV Power Plants (the biggest one was 110 kW), with lots of Solar Home Systems and other PV applications like streetlights and lanterns. I also learned much more about Biogas and Gasifiers which are also used here on the island.

In a few days we leaving to the north to look at some micro-mini hydel projects. As I also like the mountains I am really looking forward to that as well as I am looking forward to cooler temperatures again. Here its 35°C which I together with the high humid-

tem). It is from Stockholm Environment Institute (SEI). The web address is <http://forums.seib.org/leap> I thought to inform you that it is free for not-profit organisations, it is good in capability. It might be interesting to organise few classes on it in energy planning or simulation / computer applications in PPRE course.

GTZ / GATE Information Service

Question Answer (QA) enquires can be made in any one of the following languages:

English, Spanish, French, German. Q/A makes its know-how available, free of charge, to anyone from the developing country or a non-commercial organization involved in development cooperation. Q/A services include:

- Demand-and problem oriented information on specific technologies.
- Contacts to NGOs and experts in partner countries
- Information on individual products and procedures
- Addresses of manufactures and consultants
- Project experiences
- etc.

Online documents:

<http://www.gtz.de/gate/id/publications.htm>

Contact: E-mail: gate-id@gtz.de

Towards Sustainable Energy Systems

If you are motivated to see Germany's position on the subject above, then please look at <http://www.wbgu.de/> and download the summary of the report on 'World in Transition-Towards Sustainable Energy Systems'.

SWERA — Solar and Wind Energy Resource Assessment

The Solar and Wind Energy Resource Assessment (SWERA) is bringing high quality information of wind and solar energy resources to thirteen developing countries. Helping to assess the overall potential for renewable energy and creating reliable site-specific information, SWERA is developing information tools for energy planners and project developers, including regional and national maps of solar and wind energy resources, and is also developing a geographical information system (GIS) interface.

The web site of SWERA can be accessed at - <http://swera.unep.net> which is primarily designed to facilitate communication among members of the collaborating agencies. As such, it has a forum for use by the collaborators to share information, and a calendar to help keep track of events and meetings. The core of the web site is the Data Archive and Dissemination System which is used to share data both among the collaborators and with civic society interested in Solar and Wind Energy alternatives. Early in the life of the project the focus will be on the construction of the Energy Resource Assessments.

Find more at <http://swera.unep.net>.

View the complete Wind Energy Barometer at:

http://www.energies-renouvelables.org/observ-er/stat_baro/eufores/baro159.asp

You can also read the previous barometers at the following weblinks:

The wood energy Barometer is available at: http://www.observ-er.org/observ-er/stat_baro/eufores/baro158.asp

The Biogas Energy Barometer is available at: http://www.observ-er.org/observ-er/stat_baro/eufores/baro157.asp A 6.4% growth in 2002.

sites (see suggested list below). Some of these industry groups have state or regional chapters composed of their local businesses, who manufacture, assemble, install or service systems in the chapter's state. So for instance, for SEIA or ASES - www.ases.org - click on their State Chapters under 'membership'. Meet companies at local trade shows and seminars. You can learn if they are growing and need people, and, if they do, what kind of positions and requirements they need. I am not a believer in sending blind resumes, so I suggest personal interactions and maybe an internship if possible. Working with some related clean energy non-profits, where you get a chance to personally meet clean energy industry leaders and practitioners, is also a good start. Read magazines or web newsletters to learn of companies and their needs.

Biofuels: <http://www.EthanolRFA.org>

Biopower and products:

<http://www.newuses.org>

Combined heat and power:

<http://uschpa.admgt.com/>

Fuel cells: <http://www.usfcc.com>

Geothermal: <http://www.geo-energy.org>

Hydropower: <http://www.hydro.org>

Solar: <http://www.seia.org>

Wind: <http://www.awea.org>

Editor's Note: visit the *RenewableEnergyAccess.com* jobs board to find out who is hiring in the renewable energy industry.

Recently taken from the RE Weekly News - RenewableEnergyAccess.com

Energy Literacy Series

Produced by the SEEDS Foundation for the Centre for Energy, the Energy Literacy Series utilizes interactive and leading edge technology-based teaching resources that create a multi-media energy. When completed, the program will examine 10 energy sources and allow for non-judgmental

discussion of its bias-balanced social and environmental content.

<<http://www.centreforenergy.com/education/EnergyLiteracy/EE-EL.asp>>

European Conference for Renewable Energy "Intelligent Policy Options"

<<http://www.erec-renewables.org/berlin2004.htm>> on this site you will find all info about the very successful European Conference for Renewable Energy "Intelligent Policy Options", 19-21 January 2004, Berlin, which was organised by the European Commission.

RETScreen

recommended by Everson Possamai, Brasil (PPRE03/04), who thinks it contains useful software.

Also Alger Gil Guerrero from Mexico (PPRE 00/01), who is working for GPO inc. in Quebec, Canada wrote: "By the way... Do you think that someone there may be interested in RETScreen courses? What do you think? We may present an attractive proposal if there's the chance. we can even provide RETScreen courses in German, Russian, and of course French languages. We have trainers here 100% fluent in all those languages. If you luckily find someone interested in the RETScreen courses please tell them to contact me at this Email. GPCo inc. has a close relationship with NRCan. <http://www.retscreen.net/>

LEAP

Indradip Mitra (PPRE 2003/04) recommended using the software LEAP (Long-range Energy Alternative Planning Sys-

ity don't like very much.

My short conclusion for India so far (the small part I saw): I REALLY LIKE IT!

Torsten Böer (PPRE 2003/04).

Experience at ISET e.V., Kassel

Kassel, a city in central part of Germany, is remembered as the city of Grimm Brothers. The city is also known as the host of the famous international art exhibition - Documenta. The city of Kassel is surrounded by the beautiful valley of river Fulda and hilly terrains. I had the privilege being associated with ISET e.V. (*Institut für Solare Energieversorgungstechnik*) in Kassel. This institute is among the premiere research and development organisations in Europe in the field of renewable and distributed energy supply technologies (see details at <http://www.iset.de>).

I was a student practical trainee for two months from February to April 2004 in the Electricity Grids Group of the Engineering and Power Electronics Division. I was fortunate to have Dr. Thomas Degner, who earlier was a student and associated as a staff of the Oldenburg University as well, as my supervisor.

I was involved in the following research activities at ISET in this duration :

1. Development of a hardware wind turbine simulator
2. Performance study of a wind diesel system through computer simulation

In this article, my main activities at ISET are described below very briefly.

Wind Turbine Simulator

The objective of the initiative was to simulate different wind regimes and their effects on different types of wind turbines with their control systems. A hardware simulator is useful to study the influence of the

wind energy converter unit on the behaviour of the electrical island grid and the interaction with other components in small modular hybrid power system. Studying various electrical effects in a controlled laboratory environment is interesting for the researchers.

Experiments with the inverter based power supply systems

I got opportunity for further training from October till December 2004 for two and half months. In this period my activities were directed to the planning, execution and performing experiments concerning the transient behaviour of inverter based energy supply systems as well as recording of power quality.

In the period October-December 2004, several experimental set ups were planned and arranged. Some experiments were performed with a single 75 KVA battery inverter and some others with a cluster of 3 numbers Sunny Island battery inverter of total 10 kW capacity. For the measurements of power quality and transient related parameters a sophisticated power measuring-analysing system, called HAAG, was used. The goal was to study the behaviour of the grid formed by different energy supply systems. The specific objective of the experiments was to record, measure and determine the nature of the power produced from various combinations of power supply sources under the presence of different types of load (resistive, inductive and capacitive) in different situations (symmetric, asymmetric, switching etc.). Current and voltage transient phenomena was one of the key parameters to record. Power quality measurements were done according to EN 50160 standard. One set up arrangement is shown in figure 1.7.

Conclusions

I was interested to learn about decentralized power generation systems through renew-

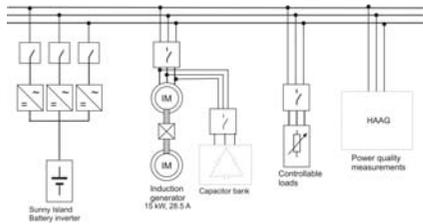


Figure 1.7: Power quality measurements setup

able energy technologies. In addition I got experience in working in a professional scientific organization, with different persons who are specialists in their respective fields. The training helped me to gain a wider perspective of the current research in renewable energy technology applications and work in state-of-the-art research laboratories like DEMOTEC.

Indradip Mitra / India (PPRE 2003/04)

PPRE Publication Project continued

After the first PPRE publication (see coverpage in fig. 1.8) [ISBN 3-8142-0837-4] with the title 'Renewable Energy for a Sustainable Future', which is still available for PPRE alumni, a second volume has been published, with the title "Renewables and Rural Electrification" [ISBN 3-8142-0928-1). This second volume (see fig. 1.9) was completed by three editors (George C. Bandlamudi, Anand Shukla, Anil Misra) and has been printed in the last fall – copies are available for everybody who sends \$ 5,- (or equivalent) to Edu Knagge.

Below you find the call for papers, as it appeared on PPRE-L, a year ago:

"Dear friends, as you know that PPRE has been an international course with participants from all over the world and is 17 years

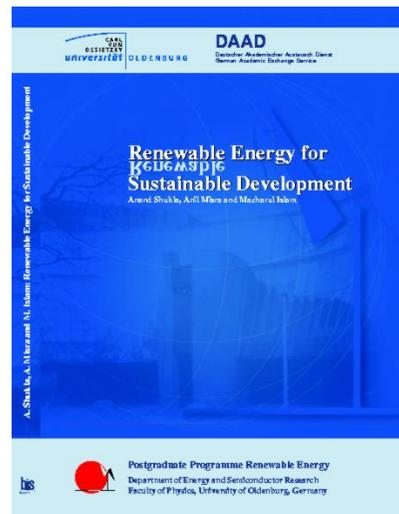


Figure 1.8: Title page of PPRE publication 2002

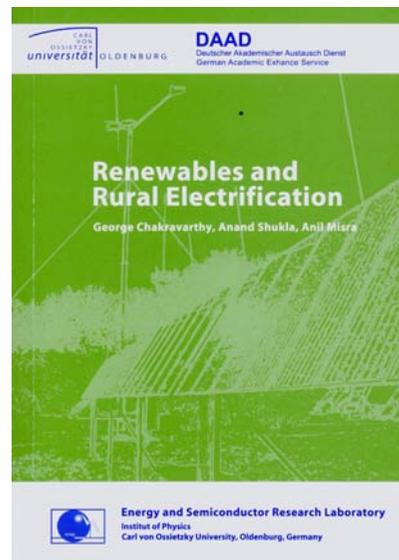


Figure 1.9: Title page of PPRE publication 2004



Figure 3.10: Family who own an improved mogogo

lates to 322 kg/household/year. The saving is a massive 665 kg per household per year.

Acceptance by the society

The improved traditional cooker is widely accepted on the society. And it has been proved that every family had wanted to have the cooker constructed in their homes during the pilot project implementation. The reason is that the mogogo is easy for cooking, is comfortable to use while cooking, it saves time and money, and increases agricultural productivity. Besides it is not much changed in its construction though it has changed significantly in its efficiency.

Conclusions

By using improved wood mogogo, people can cook food using branches and twigs instead of split logs. Gathering fallen branches can bring people firewood with out killing the trees, if the of use matches the resource. The branches are already a handy size so people can be spared the labor of splitting logs as well. The trees continue to grow while people cook with wood on Adhanet. The fuel - wood consumed in 1997 was over 1.8 million tones, which is widely believed to be unsustainable compared with

the yield of the already denuded forest resources of the country. The modified traditional wood fired Mogogo through research thereby improves its efficiency from the current 8-10 20stoves is reduced by at least 50 Because of the many benefits of the improved efficiency Mogogo, initial experience demonstrates enthusiastic acceptance by rural households. In the few villages in which the improved mogogo has been installed, people have demonstrated the large improvements of stove efficiency that were measured in the Energy center.

With such enthusiastic acceptance, and large household and national benefits, the only task remaining is to distribute the stoves to all families in Eritrea. By unifying the efforts of the Eritrean people, donors, and the Eritrean government institutions, major improvements in stove and household energy use efficiency can be made. A lot of funding agencies are showing good interest in funding Eritrean villages to have the improved stove. Concerning the change and improvements, they are still worked on and several improvements have been made.

WEB LINKS

How do I get a renewable energy industry job?

Q: I have a technical background and I want to know how I get an ultimate job in the renewable energy industry in the US?

A: The most frequent questions I receive are how to use clean energy in my home and how to find a job in the clean energy industry. Obviously, regional interests, prior job experience, educational and training background, and salary requirements all play into the job search but there are some common actions required, no matter what the job. To understand general market trends and get lists of companies, you should log on to the different industry association web

their machine and it was possible to work with my design.

To design the ceramic blocks of the firebox wall, the circular wall of the firebox is divided into 8 small sections. Then when the ceramic firebox wall construction blocks are added together they create the whole shape. A prototype firebox construction blocks are made and then they are reproduced in the brick factory.

Now with the manufacture of the ceramic firebox blocks, the construction of the whole improved stove becomes very easy and quick as well as increasing the efficiency of the resulting stove by 3. This happens because the gap with the ceramic block is exactly 7 cm as the system required but those made of thin stone round box by the artisans do not have equal gap and are not completely round.

Construction of complete stove

Design Principles:

In the successful design, there were three elements that contributed to doubling the efficiency:

- (1) Improved air control/flow and combustion
- (2) Insulated firebox
- (3) Chimney

Traditionally the stove for cooking enjera is a large fixed device in the kitchen/cooking area. The improved design raised up the stove, and put an air inlet and ash trap below the firebox.

The air then flows through a ceramic fire grate into a fire chamber that rather than being made from solid rock is now made from manufactured ceramic block that has

a double wall with insulating ash or sand in between. It also has an outlet chimney that is concrete pipe and which has an air control valve and a galvanized iron rain cover.

Laboratory tests also showed that traditional bread cooking was conducted at efficiencies at or below 10 above 25

Efficiency comparison between traditional and improved Mogogo

When we compare the energy consumption for cooking the same number of enjera using the traditional oven, we find that the improved efficiency stoves use one half the amount of wood or dung on the average. For traditional bread (taita), we find that the improved efficiency stoves use one half the amount of wood on average. While the improved stove is used to cook more and more tiata at one event (for wedding, kiln or other) then the efficiency is much more high reaches above 25. For particular cases, the improvement in efficiency can be by a factor of four if the traditional stove is a three-stone open hearth where the efficiency is around 5 intensity in a cooking session is around 9.4 Mega Joules per kg of enjera for traditional semi-enclosed stove compared with 5.2 MJ/kg enjera, for the improved stove. We can estimate per-household savings from improved stoves using an alternative method as follows: in the traditional stove the average biomass consumption per one event of enjera baking is 10.3 kilogram per household, based on the 1998 national survey results. In a month, a five-member household on the average, has there are 8 Enjera baking events. Therefore, total biomass consumption per year per average household is 987 kg, or nearly 1 tonnes. While for the same size family, the average biomass consumption was found to be 3.35 kg per cooking period which trans-

old, having its alumni, currently working in various parts of the world and in very many interesting organizations. A few of us, with the concurrence of Dr. Blum had thought that it would be nice if we could compile some technical papers/articles which would be of use to us while we work in our respective fields. As we all know, one cannot specialize in everything at the same time. Yet, we need one another and the co-operation and contribution from one another. And hence, we are going to compile some papers/articles drawn from all the different varieties of renewable energy technologies currently viable, from the rich experiences of our PPRE and our contacts. Here are a few details:

1. It helps us while we work in the field
2. Current renewable energy technologies of various kinds are discussed at length in just one compilation
3. Some Tips and ways to make these technologies viable in our own places of work, etc.
4. It would be a good and collective work of the PPRE down the years and help us all to share with others as to what we do and what we did.
5. As this compilation will have contributions from the PPRE (staff, students both current and the past), we believe that this would be a platform for renewable energy (green) technocrats to express themselves and form a good network of global players.
6. The content will be subject like market trends, issues and barriers technology specific or RET, pragmatic approach, policy concerns, technical issues, viability of RETs in developing countries, etc.
7. The readers, markets targeted are institutions (Energy Renewable Energy institutions) and our contacts, etc.



Figure 2.1: PPRE alumni from left to right: R.P. Ghimire (PPRE 00/01), R.P. Dhital (PPRE 01/02), S.K. Mishra (PPRE 02/03), Binu Parthan PPRE 97/98), and M.K. Khadka (PPRE 02/03)

8. The compilation is a sequel to the existing first publication 'Renewable Energy for a Sustainable Future'.

NEWS FROM PPRE ALUMNI

PPRE-Alumni gathering in July 2004 in Nepal

Binu Parthan from India (PPRE 1997/98) met several PPRE alumni from Nepal, when he visited Kathmandu end of July 2004 for some days. They obviously had a nice time together (See fig. 2.1).

Nepal Oldenburg Renewable Energy Center (NOREC)

Energy has been the basic need of humanity; human life cannot exist without energy. The global energy need is rapidly increasing with the expansion of population and industrialization and conventional energy sources is depleting day by day. Moreover, conventional energy sources are not environmental friendly. Energy crisis has been the

major challenge in the present world due to environmental degradation and modernization. Nepal's energy consumption pattern is heavily dependant on biomass and the rate of consumption is higher than regeneration. There is a high demand for renewable energy sources, which is environmentally clean but the share of renewable energy is less than one percent in Nepal. The graduates from the University of Oldenburg realized to form a formal group called Nepal Oldenburg Renewable Energy Promotion Center (NOREC) from of its own alumni to help Nepalese energy sector for promotion of renewable energy technologies. NOREC is a non-profit making organization, recently established and will be registered in District administration office Kathmandu and Social Welfare Council Nepal. NOREC is a cohesive group of Energy graduates from the University of Oldenburg, Germany.

Vision: Develop and Promote Indigenous Renewable Energy Resources and Technology through research and development and experience sharing for the development of the Nation.

Objective: The main objective of NOREC is to work for the promotion of Renewable Energy with professional expertise gained by its members.

Other objectives of NOREC are:

- Identification of Renewable Energy Sources and implement it for environment conservation and income generating activity.
- Collaboration with national governmental and non-governmental agencies working in the sector of renewable energy and climate change.
- Create network and pressure group for promotion of renewable energy among different stakeholders.
- Organise workshop, seminar and conduct training for effective experience

sharing and effective planning of the renewable energy program.

- Conduct research and development of renewable energy technology and suggest proper measures for implementation of these technologies to replace indigenous traditional technology.
- Create effective network among PPRE (Post Graduate Program in Renewable Energy) alumni, professors and lecturers of University of Oldenburg for the development of renewable energy technologies in Nepal.
- Provide technical and consulting services for the promotion of renewable energy technologies.
- Publish articles, magazines, newsletter related to renewable energy technology, energy planning, and climate change and disseminate it among related stakeholders.

Status of NOREC

NOREC is in the process of registration in District Administration Office Kathmandu. Presently, six graduates in Renewable Energy are working in various organizations. NOREC will be working as per its objective with support from different national and international organization, DAAD and University of Oldenburg.

Adhoc committee of NOREC.

1. Ram Prasad Ghimire Chairperson (PPRE 2000/01)
2. Prashun Ratna Bajracharya Vice-chairperson (PPRE 03/04)
3. Manoj Kumar Khadka Secretary (PPRE 02/03)
4. Ram Prasad Dhital Treasurer (PPRE 01/02)
5. Subhash Kumar Mishra Member (PPRE 02/03)
6. Om Prasad Poudel Member (PPRE 01/02)
7. Prakash Sapkota Member (PPRE 04/05)

Present Position and Status of NOREC Members

1. Ram Prasad Ghimire, Energy Planner, Water and Energy Commission Secre-

Work done to find out the convenient way for cone shape construction:

The air accelerator (the cone shape) component of the improved stove was hard to make. I drafted a calculation of 65°C in order to increase the horizontal starting diameter of 20 cm on the bottom to 54 cm ending diameter upward in the required distance. This is mathematically calculated and we constructed the model for work from metal sheet. As a result, the molding for the cone shape part was easy to make with the new form and we distributed it as part of the material for supporting the stove construction work. The calculation for determining the slant height of the cone will be:

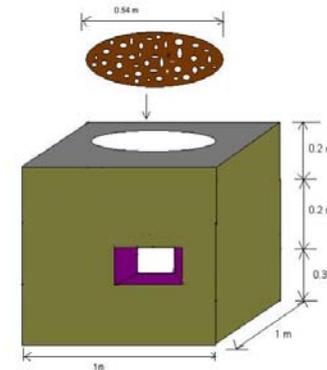


Figure 3.9: Fire Grate

vided sodium and potassium carbonate for the material analysis tests.

Test done to distinguish the composition of best clay for fire grate:

The results of the materials analysis tests are as follows:

After realizing the type of clay it was possible to build a fire grate, which is the core of the change and is 54 cm diameter and has 2cm thickness.

Strength tests of the ceramic fire grate.

Three different fire grates of different thickness and weights were tested in the Ministry of Construction. The results of these tests are shown in the following table.

As can be seen from these results, that each of the grates can hold more than 100 kilograms of load. This provides us confidence that the grates will last a long time.

Vertical height $= () 2 = 40.2 \text{ cm}$

The cone shape the air accelerator is made by metal sheet serve as supporting material in construction time. I go further and I made the air accelerator out of clay as part of the component.

Work done to find out the convenient way for fire box with 7 cm gap for Insulation

The fire chamber is the main body of the stove that holds the burning fire, supports the black cooking plate, and has a 7 cm insulating gap in the walls. The box is a round circle with an inner diameter of 59 cm and an outer diameter of 73 cm. The appropriate height is 25 cm. For the cooking process of the Mogogo to be more efficient, the firebox construction materials should be fired ceramic blocks that are produced in the brick factory. So I went to Segen Construction Company and give them my design when it was not possible to work with it, in the end of 1999 I re-fixed

1. The heat from the burning fuel is not enclosed in a firebox so much heat escapes.
2. The mogogo geometry is not optimized to transfer heat well to the cooking surface.
3. Much smoke is produced which leads to health problems for those cooking with the stove.
4. Due to poor air supply, it is often difficult to get the fire started. Blowing, and kerosene are often used.
5. With the exposed flame and floor-level construction, the burning stove is a danger to children.

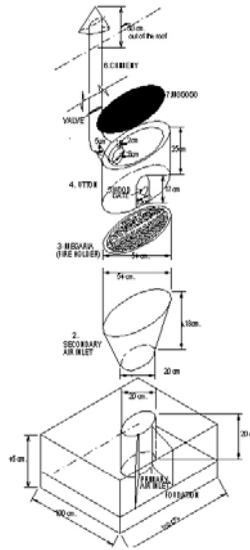


Figure 3.8: 3 Improved Stove Sketch

successfully made of clay only. The sketch and component of the improved stove is as follows.

Sketch and Components of the Improved Stove

Construction of fire grate (the improved Mogogo)

Much of the work of making the improved utton was in finding an appropriate construction method for the fire grate that holds the fuel during the burning process. Iron grates are several times the expense of a ceramic grate, so efforts focused on the proper materials and construction of the ceramic fire grate.

Part of the analysis involved a compositional evaluation of different types and sources of material. This work was assisted by the University of Asmara, which pro-

tariat (WECS), Kathmandu, Nepal. Professional Expertise: Energy Policy, Program and Planning, and Climate Change.

2. Prashun Ratna Bajracharya, Program Manager, Nepal Biogas Promotion Group, Thapathali, Kathmandu Professional Expertise: Renewable Energy, Technology especially Biogas and cookstoves.

3. Manoj Kumar Khadka, Consultant Engineer, Lasersun Energy Pvt. Ltd. Pulchowk, Lalitpur Professional Expertise: Renewable Energy Technology especially Micro Hydro, Solar energy technology, energy planning, community development.

4. Ram Prasad Dhital: Energy Officer, Alternative Energy promotion Center (AEPIC). Professional Expertise: Renewable Energy Technology especially micro hydro and improved water mills, energy planning, community based energy development.

5. Subhash Kumar Mishra: Assistant Manager, Transmission Line and Substation Construction Department, Nepal Electricity Authority Kathmandu Professional Expertise: Wind Power, Power Transmission and Distribution.

6. Om Poudel: Portfolio Manager, Poverty Alleviation Fund Kathmandu Profession Expertise: Renewable Energy Technology especially micro hydro development and infrastructure development.

7. Prakash Sapkota: Student PPRE 04/05 Professional Expertise: Renewable Energy technology especially micro hydro technology, solar energy technology.

Address for Correspondence Prasun Bajracharya Vice president, NOREC Mobile: +977 9841-327655 Manoj Kumar Khadka Secretary NOREC Mobile: +977 9841-273960

Mailing Address GPO Box 21098, Kathmandu, Nepal e-mail:

mkhadka@rediffmail.com

PPRE 1988/89

Ainea Kimaro / Tanzania extended his contract with KIST (Kigali Institute of Science Technology in Rwanda) for another two years. Among other subjects, Ainea is going to focus on large biogas installations. Certainly, for prisons biogas production will be for cooking; farmers owning over 50 cows on the other hand, are happy if they can produce electricity from the gas. Recently Ainea was seeking potential suppliers of generator sets in the range of 15–50 kW that run on biogas and made use of PPRE Q&A service.

PPRE 1989/90

John Muiruri Kimani / Kenya joined the Irish School of Ecumenics in Dublin, Ireland as research student in the field of Peacebuilding in IGAD Region. The three-year research project aims to investigate the existing community-based micro-level approaches that have been successfully used to mitigate the conflicts and build peace in humanitarian and development interventions in the IGAD region.

Thomas Schwarz / Germany is employed at *Phönix Sonnenstrom AG* in Germany. He informed us recently that early in 2005 he will be travelling to Central America to organise and supervise the installation of a grid-coupled 20kW_p PV system at the German school in San Salvador. The project is financed by DENA, the school, and various sponsors. Thomas considers this trip as kind of vacation from his regular duties here in Germany, where since years he is working in the fast booming PV systems market.

PPRE 1991/92**Markus Blaas / Germany**

changed job and is now working in an engineering consultancy near Augsburg in Germany. His main duties are concerned with energy consultancy for industries, like Siemens, Kuka, Eurocopter, MAN, etc.

Murtiyanto Santoso / Indonesia

was on his way back home to Indonesia at the end of 2004 after completing a one semester stay in Valparaiso University, US. He did a comparison study and was observing the education system in the US.

Ming Xiang-jun / China

visited his former employer Xijiang Wind Energy Co. located in Xinjiang recently, which is nowadays holding the main shares of the GoldWind Science Technology Co.Ltd.. This new company has imported German Jacobs integrated technology and they are producing 600KW WTGs in Xinjiang province, China. The actual boss of that company is his former colleague and both agreed that they would like to invite and welcome PPRE students from Oldenburg University, who might be interested in China and specially in a WTG assembling manufacturer for practicing activity.

PPRE 1992/93**James Wafula / Kenya**

in 2004 spent two months at the Centre for Solar Energy Research (ZSW) Stuttgart, on re-innovation by DAAD, working in the department of Dr. Hansjörg Gabler, former teacher / lecturer in PPRE Oldenburg. James also attended the PPRE Summer School in Oldenburg.

PPRE 1993/94**Augustus Leon / India**

who is doing his PhD at AIT in Bangkok, Thailand wrote last year: "Dear PPRE-staff, First of all, thanks a lot for making the Germany (*Summer School* in Oldenburg and *Renewable 2004* conference in Bonn) visit possible. It was the one single event that gave me the most impact in several years. I will always remember it. There seems to be another Europe visit coming up for me in August 2005. The University of St. Gallen in Switzerland has selected me as one of 17 participant in their Okios PhD Summer Academy during 16-20 August 2004 (<http://www.oikos-foundation.-univisg.ch/academy2004/leon.htm>). I hope this will add further to my studies and career, and help me in enhancing my knowledge on sustainability. I consider it proper to inform you about this as I believe that my PPRE Master degree carried a considerable weight when the organisers selected me as a participant. I am really happy for that."

Dr. Johnny Nahui-Ortiz / Peru

runs his own consultancy in Lima, Peru. Mid 2004 he was participating in a consultancy service associated with electricity generation based on renewable energy. The main objective of the study is to propose an adequate framework for the integration of Renewables into the current electricity grid structure. Both technical and economic aspects are of key interest. Most recently Johnny is searching for potential speakers in order to structure a few training programmes and/or seminars to be conducted in Peru during 2005, in particular for subjects associated with electricity generation using Renewable energy and natural gas technology. Actually he put a respective offer via the PPRE discussion list. For qualified personnel they even

1. For the flow of air to be sufficient and to collect proper supply of air, the first air inlet shall be a narrow pass inside the room where the kitchen is placed.
2. The second air inlet shall be in the middle of the whole Mogogo body itself, connect with the first air inlet from the end edge and enabling the air to be distributed up ward and evenly.
3. The third air inlet shall be a cone frustum with 20 cm and 54 cm diameters from the bottom and the top respectively.
4. On the top of the third air inlet the core of the improved Mogogo is placed. It is a fire grate made of clay with 54 cm diameter and it has 2 cm thickness. It is geometrically designed to allow fire to burn, air to get in and ash to fall down. It has holes 12 mm diameter from the top and 18 mm diameter from the bottom, and about 118 holes are in general. The holes are of equal distance from each other, which are equilaterally drawn. Through this system the flow of air flows upwards and turbulence around the cone shape is minimized. The air passes through the holes of the fire grate in greater speed where the air particles enter the holes they drive upward to burn the fuel in its optimum way. Following this, the passing of the air particles forces the flame to goes straight upward to the black cooking plate in all directions.
5. The fire chamber wall is made sufficiently thick for insulation purposes. The appropriate gap is 7 cm. Currently, the fire box is made by ceramic brick from the factory with the gap for insulation.
6. The appropriate height of the fire-box from the fire grate to the black cooking plate is 25 cm in height which allows the heat to flow directly to the plate.
7. The wood inlet door has an iron door gate that should be closed during the cooking session. This helps retain heat in the firebox.
8. There is a valve or damper that controls the heat difference in the system which is part of the chimney and helps the fuel to burn and when the burning reaches it highest stage and remain with out smoke then the valve will be closed to ensure that the heat will be retained at the cooking plate and the cooking plate can stay heated with little additional fuel wood.
9. The black cooking plate has its own effect on the cooking process, if it has above 1.7 cm thick a lot of heat is consumed. When it is less than 1.5 cm heat is transferred too quickly in the cooking plate so the enjera will stick and is bad and disturbed. Therefore the required size of the black cooking plate is between 1.6 - 1.8 cm thick.

Traditional stove in Eritrea

Eritrea has been cooking on the traditional Mogogo oven for centuries. Every household is equipped with this simple home-manufactured oven made of clay. The Mogogo oven has many advantages and no woman will do cooking without it. However, the disadvantage is that the Mogogo consumes considerable quantities of firewood, which is extremely scarce in Eritrea. Due to the dense smoke in the kitchen the population is often suffering from respiratory and eye diseases. For this reason, the Energy Research and Training Center in Asmara developed an improved version, which combines the advantages of the traditional Mogogo design with more advanced design techniques.

The design problems of the traditional Mogogo are as follows:



Figure 3.7: **Combustion Inside the Mogogo**

making a door for the fire wood inlet (see fig. 3.8). The whole body of the mogogo is made up of clay and heat resisting stones. For cooking, chips of wood or dung are placed inside the mogogo firebox, ignited, and the opening is closed for cooking.

Air for combustion enters from the bottom opening, and when it reaches the lower opening of the frustum it will accelerate at the opening. Because, as air moves through a pipe of varying cross section and elevation, the pressure will change along the pipe. The air will speed up at the constriction and spread out over the holes of the above plate. By the same principle the air will blow through the wood inside the mogogo (Note the holes on the fire grate are not cylindrical the are frustum holes.). When you see a good combustion you can close the air inlet so that there is no unnecessary burning of the chips. (See fig. 3.7).

One of the first combustion and heat transfer principles that must be satisfied for any well-design stove is that it must permit the combustion of fuel to occur completely. This is primarily a matter of ensuring that the fire chamber is the correct size for the fuel being used, that there is adequate supply of air and that the heat from combustion is well-contained.

The two important mechanisms by which heat is transferred are radiation and convection. Their relative contribution to cooking will vary depending on the details of the design of the traditional Mogogo stove. The way the cooking plate is positioned relative to the fire and the behavior of the fire itself are important. The radiation of energy from the embers and flames of a fire takes place in all direction. Heat radiated from the fuel bed is absorbed by the surrounding stove walls and by the bottom of the black Mogogo cooking plate. When the radiation encounters objects such as the outside of the Mogogo cooking plate, it is absorbed or reflected in different degrees depending on colour texture and other characteristics of the surface which have been heated in a way that reradiates heat in all directions.

Convective heat transfer is the name for the various processes by which the heat combustion gases give a proportion of their energy to the cooking plate Mogogo as they flow past it. As their temperature increases in the fire the air density is reduced, the air then becomes more buoyant and flows upwards around the sides and bottom of the Mogogo. The rising gases are then replaced by cooler air flowing inwards towards the fire thus causing the natural draw with which the fire replenishes its oxygen supply.

The upward draw of the gases has a major effect on combustion, the shape of the cooking plate of the Mogogo and the degree to which the gas flow extends around it are also important, hence the way it is positioned in relation to the fire can make a substantial difference to the heat absorption.

Based on the above thermodynamic principles we made changes on three main features of the stove and a current "best model" has been designed.

might be able to finance some of the travel and lodging expenses. Interested person should contact Johnny directly at <jnor-tiz@AMAUTA.RCP.NET.PE>

Olivier Donat Andriamahefaparany / Madagascar

informed us that he became General Secretary of the municipality of Antananarivo in July 2004. His new duties with respect to town development seem to be quite challenging for Olivier.

In January 2005 another quite surprising news reached our office:

Mr. Olivier Donat Andriamahefaparany became

Ministre de l'Energie et des Mines

**of the Republic of Madagascar in
December 2004.**

He is looking forward to build up new cooperations and projects in the field of RE! Actually the first project with GTZ is planned already (the German government has agreed to support a hydro-power plant in Madagascar).

PPRE 1994/95

Debesai Ghebrehiwot / Eritrea (PPRE 1994-95)

told us, that their Energy Training Center participated in the RENEWABLE2004 conference in Bonn last year to present improved stove design and some solar systems (see his article on page 34). Actually also his Minister of Energy and Mines participated in the conference.

PPRE 1995/96

Elizabeth A. Kingu / Tanzania

wrote: "May be you may add something from me in our next newsletter. Currently I am second year student attending the degree course in Business Administration (MBA) at the University of Dar Es Salaam.

Still holding my work position at the Ministry of Water and now I am Ag. Assistant Director, Operation and Maintenance Section at Urban Water Supply and Sewage Division.

My RESCO Consultant Services with Musa Mzumbe (PPRE 99/2000) are still moving."

Enrique Fuentes / Chile

lecturer at Universidad de Tarapaca in Arica, Chile was doing formal courses on the preparation of distance learning modules, mainly from the pedagogical point of view. Enrique is looking forward to act as tutor in this field. Actually he completed the structure of his first on-line course in spanish, titled: "Energy sources in the Southern Cone and their Strategic Relevance", which was designed together with a specialist in History Geography Human Science (team effort learnt during his stay in Oldenburg and Freiburg influence as he mentioned).

PPRE 1996/97

Sebastian Sancho Dobles / Costa Rica

after 3.5 years of active cooperation with Lahmeyer International GmbH in Italy decided to move to Spain where he is planning to establish a business branch of Ralos GmbH together with **Matthias Belz / Germany (PPRE 96/97)**. Ralos GmbH is well established in the solar market in Germany. The idea to spread out activities

abroad was initiated last year, motivated by the favourable conditions (legal, administrative, technical) in Spain. The main goals of work are the development of solar projects and photovoltaic turn-key projects. Sebastian is also looking forward to get in touch with other PPRE alumni working in Spain.

Orlando Perez / Bolivia

writes: "I am so happy to hear news from you there in Oldenburg, as you may notice I am still working at Electropaz S.A. the largest power utility in Bolivia. Actually I have been promoted to manage the Industrial and large customers portfolio."

Miguel Ballesteros / Nicaragua

has been working for different companies in the last years, mainly doing maintenance. Aside from working for the university (which he still does and will do for years to come), he has worked in an electrical company, then a road construction company and presently he is employed at the American embassy in Managua in the maintenance section. His relationship with Renewables has been mostly in the University: by doing thesis-projects and some small projects. As a last note Miguel informed us that it is real hard on their side of the world to push the Renewables; they are actually moving ahead but too slowly.

Bernard Osawa / Kenya

quit his job at ESDA (Energy for Sustainable Development Africa) in November 2004 after working 10 years with the ESD family. Bernard joined the recently established new office of IT Power Eastern Africa as Technical Director in charge for Sustainable Development.

His office address: IT Power Eastern Africa

P.O Box 1532 - 00606 Nairobi - Kenya Tel: +254 20 3754853 Fax: +254 20 3750505 Cell: +254 723 273 615 Email: <bosawa@integral-advisory.com>

Awa Celestine Anyam / Cameroon

was appointed Director of Electricity in his Ministry in May 2004. Ever since Awa seems to be quite busy, since reforms in the electrical sector has been top on his desk. After receiving an approval of the energy minister there are more reforms to come in this year. Recently the Government of Cameroon sold its energy supply company to AES, which is an American company with the objectives of producing and selling of electrical energy in Cameroon. But the Cameroonian government holds 40 percent of the capital.

Other PPRE-alumni working in the energy sector with the Ministry of Water Energy in Cameroon are: Mr. Zaccheus Tarh (PPRE 90-91), Ms. Alice Njiki-Assah (PPRE 02/03) and Mr. Ferdinand Ajamah (PPRE 03/04).

PPRE 1997/98

Fernando Petrucci / Argentina

informed us late last year that he is working on a wind farm project to install a couple of wind turbines in Patagonia. He also mentioned that during COP10, the 10th UN's conference of the parties on climate change, he met Binu Parthan from India (PPRE 97/98), who was participating as representative of REEP.

Wisdom A. Togobo / Ghana

who is working at the Renewable Energy Dept. of the Ministry of Energy in Ghana,

Mogogos done previously. During the liberation struggle, much experience was gained in stove efficiency and investigation was made regarding improvements for Mogogo in particular. In 1996 the ERTC began a series of scientific investigations and measurements of different types of mogogos including electric, liquid petroleum gas (LPG), and wood Mogogos. Under the supervision of ERTC scientific staff, students from the University of Asmara assisted with these investigations. These initial tests helped to collect information about the efficiency of various types of existing Mogogos.

The Idea of improved stove

Realizing that keeping the existing design as it is will not lead to large efficiency improvements, a substantial, integrated change in the design was made. Therefore in 1998 a modified design of stove was developed. The idea of improving the stove came from the field experience combined with the application of thermodynamic heat transfer principles, from the experiences of the post-graduate in Oldenburg university in Renewable Energy technology. I have formulated the design and wanted it to be shaped from iron sheet in our workshop. Daniel Afewerki has done this job efficiently. So my close colleague, by name Haile Teklay and I went to Damba where traditional black cooking Mogogo is constructed. We found three dedicated artisan women, called Abeba, Asmeret and Taimu. They helped us to get a fine clay and make the fire grate out of clay which fits to the design. Besides we found Wedi Mongot in Adikeyih and his idea was very supportive. This process of testing and construction went for 3 years. During this stiff research work which had gone for more than three years, Minat Behane, at that time the Director of Research and Training center was giving enough support.

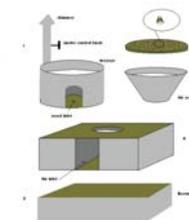


Figure 3.6: **Improved mogogo components**

The improved traditional mogogo is constructed on a 1m by 1m area. It has base constructed on the ground (see fig. 3.6). On the top of the base another rectangular prism with an opening at the front, which leads to the air accelerator, is constructed. The air accelerator is a frustum of a cone placed on the top of the air inlet. Over the air accelerator frustum is a fire grate that is the size of the mogogo and which has small holes that let the air into the mogogo combustion chamber. Finally the double wall mogogo firebox is constructed over this plate and the enjera plate is placed over it.

The main principle I used here is to minimize heat losses through modification and improvement of the fire place, to have a good combustion of the wood in the mogogo and to have a chimney for the mogogo to draw smoke and combustion products to the outside. The smoke removal with the chimney helps avoid discomfort and health hazards for the person who is responsible to bake the enjera. To minimize the heat losses by conduction I made the mogogo firebox with a double wall design with a gap between the two walls. The convection losses are minimized by arranging the air inlet and the chimney outlet positions to efficiently draw air and smoke while

An Integrated High Efficiency Stove Design

by *Debessai Ghebrehiwot*
Ministry of Energy and Mines
Department of Energy
Energy Research and Training Center
Asmara, Eritrea

Abstract In Eritrea, the cooking of traditionally yeast-leavened flat bread (Enjera or taita) is responsible for over 50 energy consumption. Yet no literature exists in international journals reviewing or analyzing the efficiency or energy intensity of Enjera production. Enjera is the product of baking of a mixture of water and flour that is fermented for about three days. The Mogogo, a clay-cooking plate, is the traditional stove for baking Enjera whose diameter is about 60 cm. Utton is a local name given to the integrated combination of the three stoves of Mogogo, Tsahli and Moklo built adjacent to each. The three component stoves cook respectively Enjera, Tsebhi (sauce) and Kicha (hard bread). Recent research and development efforts by the Energy and Training Center of the Department of Energy, has shown that an improved stove efficiency of 25% of the traditional stove is (6-8) innovator of the improved stove have progressed the improved stove from time to time. For further information please contact me with E-mail Debaig@yahoo.com. Some development to mention about, the improved stove has been selected one of the best innovation in 1993 and conferred the Ashden reward. Further more it has been displayed in Expo 2000 in Hannover/Germany and this year last week in Bonn in Germany.

A Very High Efficiency Wood and Dung Mogogo in Eritrea

Introduction

Deforestation due in part to fuel wood demand represents a major threat to ecosystems in many developing countries. Obviously, the answer to threatened forests is to grow trees at a faster rate than forest products are consumed. Wood can then be used at a sustainable rate, where less is taken than produced. Rapidly growing demand combined with limited supply insures diminishing resources and, if the trend continues, an eventual loss.

Energy use in Eritrea

The energy sector in Eritrea is characterized by heavy dependence on biomass including fuel wood agricultural residue and animal waste; approximately 82% is from biomass supplies, while 18% Therefore improvements in the nation's energy use will require substantial improvements in the utilization of the nation's biomass resources.

In the rural areas, there is nearly 100 as an energy source.

This means that as supplies diminish, more and more labor and effort is used to obtain the necessary energy supplies. This has resulted in deforestation pressures, and a diminished standard of living brought solely by the shortage of energy. First, wood supplies are used up. Then a reliance on dung is developed. And finally the dung that might be used for agricultural fertilizer is burnt in the household instead. This set of circumstances simply is not sustainable in rural Eritrea.

Initially there was a series of encouraging tests and investigations of traditional



Figure 2.2: Installation of small Wind turbine in Ghana

informed us about his activities at the end of last year and earlier this year as follows: "The last few days of the month of November and December were rather tough in terms of time and workload. After returning from my participation in the Wind energy Conference in Tunis in November, I had to prepare and represent Ghana at the Just Ended Global Village Energy Partnership (GVEP) facilitators Workshop in Nairobi Kenya during the first week of December. Ghana is a GVEP partner and currently implementing a GVEP project to complete an Energy for Poverty Reduction Action Plan which will present energy intervention that can be used to enhance poverty reduction in Ghana. In another development, our off-grid small wind power to the poor is also progressing very well with a lot of interesting lessons being learned."

In February he wrote: "I bring you greeting from Ghana and from the off-grid locations where we are currently installing small wind turbines for small business, social centres and households. The impact is very great. For the first time school children and some adults in Kpenu saw electric light and even watch TV. I mean this is a community that never expected to see electric power because of their off-grid locations. See how we do the installation with cranes (fig. 2.2)

The locations are such that cranes can not be sent there. Installation was done manually using a bar, rope and a pulley system. The pulley is fix on top and one end of the rope fixed to the system to be lifted and the rope passed over the pulley and pulled down to lift up the system as you could see in the picture. It is a very simple way of doing things in the absence of advanced technology."

Binu Parthan / India

informed us "that as of 1st October 2004, I will move to the Renewable Energy and Energy Efficiency Partnership (REEEP), assuming responsibility for REEEP's global work programme.

My new co-ordinates will be: *Binu Parthan, REEEP-Deputy Director / Programme Co-ordinator; Vienna International Centre / D 1732, Wagramerstrasse 5, A-1400 Vienna, Austria*"

Christoph Schröder / Germany

returned to Germany in April 2005 after a three-year contract with GTZ in China, where he was involved in MHP projects. Christoph is looking now for a job or further studies with respect to RE in Germany/Europe.

PPRE 1998/99

Ms. Na Yang / China informed us that she immigrated to Canada in 2003 already and got a job as a project engineer at Atlantic Wind Test Site, near Montreal in Canada. End of 2004 she changed her job and is now working with Helimax wind energy consultant company as project engineer in Montreal.

Ms. Liu Hui / China

was accepted by Hult International Business School in USA for an accelerated one-year MBA study. Therefore she is staying in Boston since December 2004.

Liu Hui: “Yes, it is a one year MBA program, it is similar to our PPRE program in Oldenburg. I will graduate in Dec. Actually I did not expect that one day I come to USA to study business, surprising to me too. But I enjoy the study here, and it is a good chance to know how the money flows out of USA.”

Dr. Ali Salim Al-Alawi / Sultanate of Oman

has completed his PhD at the Center for Renewable Energy and Sustainable Technologies at Curtin University in Perth, Australia. He started his job at Department of Mechanical and Industrial Engineering, College of Engineering, Sultan Qaboos University in Sultanate of Oman.

Jan Lam / the Netherlands

re-joined his former employer SNV in the Netherlands and is now mainly involved in biogas projects again. In the beginning of this year he was busy with feasibility studies for biogas programmes in Laos, Cambodia and Bangladesh. Rwanda was also on his list, where he went for a short pre-feasibility study at the end of February and met **Ainea Kimaro from Tanzania (PPRE 88/89)**, who is involved in institutional biogas — see page 15).

High on his companies activity list is also CDM integration in on-going programmes, since it seems that emission certificates trade is going to be big business in the future. Nevertheless Mr. Lam still wishes to get back for a longer period into a country programme to settle down a bit. Most prob-

ably he will be heading towards Cambodia somewhere in the middle of this year.

Latest news: Jan Lam moved to Cambodia, where he is involved in and in charge of the National Biogas Programme for the next 3 years! More news to come!

Dr. Dana Chirvase / Rumania

successfully defended her thesis on *Electrical characterization of organic devices – case study: polythiophene-fullerene based solar cells* in mid-December 2004 and was awarded the PhD degree at the Institute of Physics at Oldenburg University. Dana returned to Rumania earlier this year.

Hans Jaoko / Kenya

is registered as PhD student at an Indian University at the moment. His topic is: *Modelling UVB radiation in mid latitude of Africa* and Hans hopes to submit his dissertation by March 2006. Besides he is also doing some consultancy.

Samudragupta Patil / India

who is employed at Maharashtra Energy Development Agency in Pune wrote: “Moin Moin, here I am after long time. At the outset let me know how are you and your pretty Oldenburg? Sorry I could not remain in touch with Oldenburg as I had been away for executing micro-hydro power projects in the most primitive areas of the state. This area is covered with forest and the small villages within its vicinity are termed as backward. We have planned to set-up 20 MHP projects by the year 2007 in this area resulting in supply of electricity to nearly 150 remote villages. In early 2004 my office was visited by a German delegation comprising 10 companies involved in renewables. They were impressed with our con-



Figure 3.1: This is a demonstration of PV applications (PV powered video) at Misasi livestock market – a place where people meet to sell and buy livestock



Figure 3.3: Participants of PV course (ended on 18/09/2004) for technicians practising wiring and commissioning procedures of PV systems. Students will participate in installation of demonstration PV systems at schools and health centres



Figure 3.2: Musa distributing project brochures, leaflets (about frequently asked questions about PV) and responding to people's questions at the Hungumarwa livestock market. This market was officially inaugurated by crown prince of Norway when she visited Tanzania in April 2004.



Figure 3.4: Demonstration to course participants (technicians) on effects of shade, tilt angle, orientation and temperature on performance of PV modules – the aim is to show why a PV module should be properly positioned and mounted



Figure 3.5: General view of livestock markets where PV demonstrations are done

ment of Agency is not yet approved in the parliament but we hope that it might be approved next year.

outside the coverage of microhydro power projects. There are some MHP areas where grid electricity has also been extended but the present policy does not allow grid connection for MHP schemes. The grid connection issue is also being addressed in the future.

References:

1. Micro-hydro Data of Nepal (1962 mid-july 2003): HMG/N of Nepal, Alternative Energy Promotion Centre: Energy Sector Assistance Program
2. Micro-hydro year-book of Nepal, (2002) HMG/N of Nepal, and Alternative Energy Promotion Centre: Energy Sector Assistance Program
3. Published and unpublished AEPC documents

Transformation of Rural PV Market in Tanzania

by
Mzumbe Musa / Tanzania

I would like to inform you that I am now working on a service contract as a national project coordinator of PV project : Transformation of Rural PV Market in Tanzania. This is a five year project executed by the Ministry of Energy and minerals and supported by UNDP/GEF. The project aims at removal of barriers for wide dissemination of PV technology in rural areas. The barriers are of policy, information, infrastructure, technical and financial nature.

This is a national project but implemented in Mwanza, one of the region in the country for the first three years and lessons learnt will be useful for PV technology dissemination in other regions in the country.

The project took off in April, this year. We have started with awareness campaigns.

This involve PV demonstrations at market places, radio and TV advertisement and programmes. We are in the process of installing a number of demo systems at health facilities and schools with involvement of community on cost sharing basis.

We have conducted a PV installation course for 16 technicians on proper system sizing, installation, maintenance and repair. We expect to conduct another training before the end of this year. The aim is to have trained technicians in the rural areas for properly sized and installed PV systems. We are negotiating with Vocational Education Training Authority (VETA) to incorporate PV course in their electrical installation curriculum for continuation of such courses in future (when the project ends). In this way we are organising training of trainers course for VETA instrutors.

We have initiated a process of establishing PV standards and codes of practice. We are working with Tanzania Bureau of standards. We will have to go several steps before the standars are adopted. So far we have met twice revising available standards.

We are negotiating with the ministry of finance to wave out duties for PV equipments. We submitted proposal this year but was not succesful. We are re-writing it for further consideration, with some other efforts of arranging study tour for members of parlimanet to countries with blossoming PV market like Kenya.

In future we will be working on PV business development in order to strengthen the capacity of private sector and identify different financing mechanisms for dissemination of PV systems.

The project is run in parallel with other similar projects. Of great importance is the establishment of rural energy Agency (REA) which will take care of rural energy development. The agency will provide subsidies for different energy projects. The establish-

cept of creating a state level renewable energy educational park in Pune for creating awareness among the masses. They also visited the 57 MW capacity wind farm near Pune. We have even started with our official quarterly magazine named 'Future Energy' dedicated for renewable energy programmes. It is an informative magazine touching renewable development happening locally, nationally and globally. In this context, it could be worth visiting our official web site <www.mahaurja.com>."

†Timothy Freeman Chima / Malawi†

Bernard Osawa wrote us about Timothy: "It is with heartfelt sorrow that I inform you of the demise of Timothy Freeman Chima from Malawi who died on July 15, 2004 after a short battle with cancer. I was in Malawi over the last three days and was informed about the sad reality after calling his cell phone to talk to him. May God rest his soul in eternal peace."

Mrs. Khishigbayar Jamiyansharav / Mongolia

went with her family to the US in 2004 to undergo a Graduate degree program in Ecology at the Colorado State University. Khishig is supposed to graduate by 2007 latest.

She wrote: "I hope you are all doing fine and making people happy, giving them prestigious knowledge. I always remember and appreciate my study at PPRE. I've been very busy with my study all the time except this summer. During the summer we've been in Mongolia to visit our parents and relatives. That was a very nice but a very short visit. I wish I had more time. My daughters were very excited to see their grandparents and to play with their nieces and nephews.

I've received PPRE newsletter and I was so glad to hear some news from my old friends. The very sad and scary news was about Timothy (from e-mail). I couldn't imagine that one of us (PPRE 98/99) is missing now."

PPRE 1999/00

Simon Kuyvenhoven / the Netherlands

informed us end of last year that after working in The Netherlands for a couple of years he and his family are moving to Central America, where his wife has a contract. Further info and new contacts will be sent in due course.

PPRE 2000/01

Srikanth Subbarao / India

conveyed his regards. He is also with IT Power India and is currently busy with proposals and renewable energy projects.

Oliver Risse / Germany

is meanwhile working as 'Vorstandsassistent CEO' with Conergy AG, the mother company of his former employer, SunTechnics. He is the proud father of a son, which was born in Summer 2004.

Jordi Avellaneda / Spain

was really surprised to see the new look of PPRE's website. He wrote: "it makes me think of a new 'era' in the life of our PPRE. I send you all my congratulations, it makes me really happy. Please, do not hesitate to let me know how I can contribute to the programme. Here I am working for solar domestic hot water systems in big buildings (60-100) doors. We are also develop-

ing a new design for this kind of systems. Anyway I will be beginning my MBA on September 20th 2004 at IESE (Barcelona).”

Raul Nino / Venezuela

informed us that he quit his job at ECN, Holland, and is studying in a programme called *Media and Culture* at the University of Amsterdam.

PPRE 2001/02

Butchaiah Gadde / India

who is employed at IT Power India is currently working on CFC phase-out in servicing sector in India. Although it is a different kind of work related to Montreal protocol and India, he thinks that the interesting part lies in learning about management. Apart from this he is working in the health sector with the application of solar energy for melting of used syringes using a concentrating solar melter.

Santiago Sanchez / Ecuador

finished his work at UNDP and the Galapagos RE project in October 2004. Fortunately he succeeded to get another project straight away. Santiago is now offering his services for the PROMEC project with the World Bank. It is a project for the introduction of RE in rural areas of Ecuador (www.conam.gov.ec – see fig. 2.3). Santiago says that the project team is very professional and that he is enjoying this new task. Additionally he is establishing a company for RE and energy services which is called *EnerPro*. His plan is to represent RE companies from Europe and the US to boost the use of these new technologies. He sees interesting opportunities in consultancy too.



Figure 2.3: PV systems installed by Santiago in the Amazon jungle

Ernest Mazimpaka / Rwanda

is employed in the Department of Environmental Physics at *Universite Nationale du Rwanda* in Butara and informed us that he did a two-months training on solar energy application at Gansu Natural Energy Research Institute in China in July/August 2004. Although the content of programme has been quite interesting, the equipment available was poor and students were not allowed to visit the local laboratories. Anyway now Ernest returned to Butara and is trying to join a PhD programme.

Anand Shukla / India

used PPRE-L to send the following: “This mail is to request you all for some information on potential of renewable energies in Iran. Any information related to wind, solar, geothermal energies is important for us at the moment. At the Wuppertal Institute, we are working on a concept where it is required to highlight renewable energies in Iran. Are there detailed studies on the regional distribution of such potentials?”

Any reports, websites, contact person, case study, data would be helpful.

I will be grateful to you if I am able to receive the requested information.”

energy fund supported by DANIDA Energy Sector Assistance Programme (ESAP) and District Energy Fund (DEF). The subsidy policy contain the following key provisions

- NRs 55000 per kW for new MHP plants up to 3 kW capacity and NRs 70000 for new MHP projects above 3 kW
- NRs. 35000 per kW or 50
- NRs.27000 per kW for add-on electricity generation MHP project
- From NRs. 8750 to NRs 21000 per kW as a transport subsidy
- An investment ceiling per kW of NRs 150000

The government of Nepal in its 10th Plan (2003-2008) has targeted to generate 10MW electricity from isolated hydropower schemes to electrify 1000 village development committees (VDCs) including 9.4 MW by new micro-hydro schemes and 500 kW by the rehabilitation and 100 kW from the installation of improved water mills. The pre-qualified manufacturers, installers, consultants, the lending banks, district energy funds, interim rural energy funds and micro-hydro owners and users are the main actors involved in the implementation and dissemination of micro-hydro technology in the country. The AEPC through IREF and DEF provides subsidy, the consultant makes feasibility study, the companies execute installation works and the owners; either community or individuals finance the remaining portion of the cost of the plant through loan or cash. The feasibility study reports are assessed and appraised by technical review committee (TRC) and the feasible projects are recommended for subsidy to the IREF in case of MHP projects supported from ESAP and concerned DEF in case of projects supported from UNDP and WB. The AEPC provides subsidy for the installation of MH project if the following terms and conditions are met:

- technical and financial viability of the project;
- management capability of the owner;
- socially acceptable and environmentally sustainable;
- site ownership of the entrepreneur;
- about 20
- acceptance for loan repayment within 5-10 years.

Present Status of Micro-hydro Development

Micro-hydro technology has been disseminated and power has been generated so far in about 60 districts in the country. Altogether about 2000 Micro-hydro (MH) plants including 800 mechanical schemes and about 850 peltric sets have already been installed. The installed capacity of MHP for electricity generation has reached around 13 MW including mechanical power 7 MW. The main areas of end-uses for electrification schemes are domestic lighting, playing video and TV, Small-scale industries like running agro-processing mills, and low wattage cooker.

Conclusion

The market for the micro-hydro sector has expanded quite significantly in the last decade and is expected to even widen in future. The establishment of the Alternative Energy Promotion Centre has been able to fill the gap of the central coordinating and promoting agency. Long term commitment from the donors, establishment of strong manufacturing base and highly qualified consulting firms has accelerated the qualitative development of micro hydro since 2000. Although the significant achievement has been made in the sector, still a large number of potential areas are

output verification. This has resulted positive impact on system performance of MH schemes. Four Area Centres have been established at the regional basis each at Surkhet, Palpa, Baglung and Ilam. The Area Centres have been providing services especially on awareness creation and information dissemination to the micro hydro owners in their respective areas. This has filled the gap between the central organization and local organizations. The Rural Energy Development Sections have also been established in 25 REDP districts. This has also resulted long term energy development plan of each programme districts.

Furthermore it has been realized the importance of owners network in recent days. ESAP has been supporting in establishing owners' network at district level and national level. There are 16 district networks and a central network of MH owners. The owners' associations have been instrumental in resolving local and political issues.

Well Defined Quality Assurance System

Systems for quality assurance for the micro hydro schemes have already been developed and implemented for project identification, preparation, construction, as well as monitoring and evaluation. The AEPC with the support from ESAP has also trained private sectors and local institutions and developed micro and Pico hydro standards, pre and detailed feasibility study guidelines, and implementation modalities in which the micro hydro owner, community or the entrepreneur takes the overall responsibility for the implementation and operation of the schemes. The micro-hydro sector in Nepal has well accepted the standards and guidelines. AEPC reviews the pre-qualification of service providers i.e. consultants, manufacturers, installers and monitors the sectoral activities. AEPC has also formed a

Technical Review Committee (TRC) in order to maintain one door concept for streamlining the operations for uniformity as well as for coordination among different donor funded projects and programmes. The main objective of the TRC is to ensure the sustainability of the micro hydro schemes functions through ensuring the technical standards and systems' viability from financial, economical, environment and social considerations. The TRC has been coordinated by AEPC with the representation of experts from ESAP, REDP, ADB/N and Nepal Micro-hydro Development Association (NMHDA)

Well Defined Subsidy Policy, Government Plan and Delivery Mechanism

His Majesty's Government of Nepal (HMG/N) announced a policy of subsidy to encourage private participation in rural electrification in 1984. The development of the energy sector was given special priority in the Eighth Plan period(1992-1997). The basic objectives of the energy plan concerning micro-hydro development were to maintain regional balance in the energy sector with hydropower by maximum utilization of indigenous energy sources, and to develop alternative and decentralized energy resources available in the country. Current policies recommend that no license is required to operate a hydropower scheme up to the capacity of 1 MW. This policy ensures the liberty to fix the tariff rates of their schemes. The subsidy used to be channelling through Agriculture Development Bank of Nepal (ADB/N) till 2000. After the establishment of AEPC as a government agency for the promotion of alternative energy promotion centre, the subsidy policy was reviewed in 2000. Since 2000, subsidy has been administered through AEPC's interim rural

And about PPRE Summer School 2004 in Oldenburg Anand wrote:

“Let me express a few words on the recently finished Summer School in Oldenburg. This was the occasion where I achieved more than I expected. Truly, I would like to congratulate you all for such a good organisation of the event and thanks for everything I received during this week. Most exciting was to meet people whom I contacted few years back or exchanging emails but never got a chance to meet them personally. This event was surely a chance to know each other and to inform about individual activities. One thing which is to be noted that everybody present during the SS did PPRE in different years and have different interests and experiences. This is an example to expose our unity in diversity. PPRE is like main rod in a Umbrella and PPRE staff acts as sliding pin to expand and hold its activities.”

Ibrahim Mohtad / Bangladesh

wrote that he is involved with the installation of the first wind turbine generators in Bangladesh: “It is a pilot project with four wind turbines (4 x 225 kW capacity). For the last one and five years we have collected wind data at 35 and 50m height at 8 points in different coastal regions in Bangladesh. We are very much optimistic about the estimated wind velocity and the energy that we got from that data. So as a pilot project we are going to install 4 machines in the first phase and in the next phase we are going to install another four machines. If we get 20% plant factor or a reasonable output from these machines then we have a target (future plan) to install about in total 100 MW capacity (about 400 machines) at different regions in Bangladesh. Indian NEPC is going to supply those machine. My group went to Chennai (former Madras), India to test and inspect this machine. NEPC In-

dia has installed more that 4000 machines in the southern part of India during the last eight years with very successful operating conditions. I met **Butchiaiah Gadde (PPRE 01/02)** in Pondicheri, we had a very nice and cordial time together. Butchia took us to his office and demonstrated his activities there. Butchia and his colleagues (former PPRE) are teaching, offering solutions to different environmental activities. He is enjoying his life with a excellent working group, environmental and renewable activities, good friends and with a very nice city. We also went to Konnakumary, Bangalore, Delhi, Punjab, Haryana, Rajstan (Joypur), Ajmir etc. I missed **Anand Shukla (PPRE 01/02)** there, as he is in Germany for his PhD. India is a very nice country with its widely varied culture and heritage. You are welcome to Bangladesh to see our new wind turbines. We had a very good time in Oldenburg, this feeling come to realization when PPRE people meet one another.”

Xavier Francis Ochieng / Kenya

joined a one-year Wind training course of INVENT (formerly Carl Duisberg Ges.) in September 2004. He spent time in Saarbrücken and Kassel so far.

Jörg Winterfeldt / Germany

started his PhD at the Coastal Research Institute in Geesthacht near Hamburg in Germany. Topic of his thesis will be *Numerical reconstructions and extreme value statistics of the Northeast Atlantic storm climate and comparison with observations.*

Abstract of the project: A regional atmosphere model driven by global re-analysis data for the period 1958-2002 will be used to reconstruct at high spatial and temporal resolution the marine storm climate of the Northeast Atlantic. Results from this simulation will be extensively compared with

existing satellite data, in particular with respect to near-surface marine wind speeds and cloud cover. An attempt will be made to quantify uncertainties in both, model results and satellite data. Here, for instance, uncertainties introduced by the use of different re-analysis products that drive the regional model or by comparing results with satellite data from different sources are addressed. Based on the high-resolution reconstruction of the marine atmosphere as well as on available observational data statistics of extreme events will be derived. Long term changes in storm intensity and frequency will be analyzed in order to assess long term variability and systematic changes of the North Atlantic storm activity.

PPRE 2002/03

Alejandro Bango / Spain

Finally managed to join the Instituto Ecologica in Palmas, Brasil, where he is attached to a project with respect to hybrid technology / hydrogen & PV. But the most important concern of their work is CO₂ sequestration. The project is located in Palmas and Sao Paulo. Alex is also involved in CDM programmes related to renewable energy and of course he is improving his Portuguese.

Ms. Pudji Irasari / Indonesia

joined the Research Center for Electrical Power and Mechatronics in Bandung, Indonesia after her return home. She is doing energy related projects including micro-hydro, fuel cells, and preparing for solar energy activities for the near future.

Jhantu Kumar Saha / Bangladesh

started his assignment as research student at Saitama University in Japan for about 6 months in October last year. After passing the entrance examination he will be a doctoral student in the field of Thin Film Solar Cells from April 2005 onwards. The medium of his study is English (details about the PhD project are still to come).

Manoj Khadka / Nepal

after returning from Oldenburg he has been working as a consultant in Renewable energy in Nepal. So far Manoj has provided training to more than 300 peoples from rural areas of Nepal after returning from Germany. On the long run he hopes to be engaged in some well reputed organization in a good position. Until then he will carry on with his consultancy job. In January 2005 Manoj went to China to provide a training on solar systems for communication applications in Nepal. The course Manoj was giving lasted for one week and it took place at ZTE corporation in Shenzhen, China. Some time ago he wrote: "Sorry for not being able to remain in contact for a long time. I am presently working in the field of solar energy in a private company working for the Solar energy in solar home systems and institutional systems. I have designed a system of about 2 kW providing electricity to a communication system, for computers and lights. Sometimes its interesting but in Nepal the private sector is very difficult to work due to many obstacles and an unclear policy."

See also the news on NOREC (p. 13)

Ms. Jie Shao / China

works with GTZ in Lanzhou in a Sino-German technical cooperation programme

development efforts in a sustainable manner.

Participation of Danida and NORAD

An agreement was made between the Denmark government and his majesty's government of Nepal on 15th April 1999 covering a period of 5 years from 1999 to 2004 to implement Energy Sector Assistance Programme (ESAP) in Nepal. The ESAP, a sector-wide programme, was initiated with a longer-term perspective of 10 to 15 years. The programme has five components and micro hydro is one of the main components being managed by Mini-Grid Support Programme (MGSP). MGSP, a functional unit under the AEPC/ESAP manages the programme activities of the Micro-hydro Component. MGSP opens the door for private as well as community based micro-hydro projects. This is exactly in line with government strategy on rural electrification. Policy document clearly says "emphasis will be given to individual and community ownership and management in the development and dissemination of RETs".

The development objective of MGSP to improve the living conditions of the rural population by easing its access to energy technologies with better performances in terms of productivity, use versatility and environmental impacts.

The immediate objectives of the Components are:

- Establishment of local support structures for mini-grid electrification based on micro-hydropower built-up in 5 areas with promising potential
- Reinforcement of the national framework for capacity building, project support and dissemination
- Implementation of new hydropower projects and rehabilitating of existing

plants equivalent to 2000–2500 kW (revised to 1850 kW by Annual Sector Review 2002) financed adhering to HMG/N policy for investment subsidies

Due to successful implementation of micro-hydro component, the government of Norway has also joined AEPC/ESAP since 2003 adopting ESAP modality for rural electrification through micro hydro. In addition to AEPC, REDP and ESAP, there are several semi-government and non-government organizations including 20 manufacturing companies and 30 consulting firms involved in the development and dissemination of micro-hydro power in the country. The Remote Area Development Committee of government of Nepal, King Mahendra Trust of Nature Conservation and KAADURI have significant contribution in the sector.

Active Presence of Private Sectors, NGOs and Decentralized Energy Units

AEPC has pre-qualified consulting companies for conducting detailed and pre-feasibility studies. There are altogether 34 consulting firms for above-mentioned purpose. Their performance evaluation is done in every two years. Similarly, there are 20 private companies pre-qualified for manufacturing and installing the micro hydro equipments. The potential micro-hydro owners either community or private entrepreneurs select the consultants or companies among the pre-qualified list for the specific purpose. In addition to consulting firms and manufacturing companies, 15 rural energy service centres supported by REDP in its programme districts and one technical service centre supported by ESAP in Jumla are very much active in the sector. There is some pull of resources from private sector for quality check and power

ernment organization (ii) active participation of donor (iii) active presence of private sectors (iv) well defined subsidy policy and delivery mechanism and (v) well defined quality assurance systems. The following subsection briefly describes the acceleration of development.

Creation of Alternative Energy Promotion Centre ((AEPC)

The Alternative Energy Promotion Centre (AEPC), the government organization under ministry of science and technology was established in 1996 to promote and disseminate the renewable/alternative energy technologies in Nepal. AEPC supports the government to formulate national policies and programmes and implements the plans and various activities for promoting the use of alternative energy technologies. The Overall objective of AEPC is to support the government's objective of improving the living standards of the rural people by supporting alternative energy technologies and protect natural environment. Support to micro hydro power projects (installed capacity less than 100 kW) is one of the major activities that have been conducted by AEPC since its establishment. AEPC has also been mandated to support hydropower projects up to 1 MW for rural electrification and is expending its support up to mini hydro power plants (installed capacity up to 1000 kW). AEPC administers subsidy for micro hydro power projects through its interim rural energy fund funded by the government of Nepal and the Danish and Norwegian government. AEPC works closely with various donors, INGOs, NGOs and private sector in order to implement various programme activities. Energy Sector Assistance Programme (ESAP) supported by DANIDA has been actively supporting his majesty's government through AEPC since 1999. Rural Energy Development Programme supported

by the World Bank (WB) and UNDP is also executed by AEPC.

Participation of Donors

Donors' interests have been increasing in this sector with a long-term vision and commitment. It is worthwhile to mention the Danida's commitment for supporting Energy Sector Assistance Programme in Nepal with a 10–15 years horizon. UNDP and the World Bank have also actively participated in the sector. In addition to Danida, NORAD, UNDP and the WB, Asian Development Bank is also keen to interest in the sector. The following subsection briefly highlights the contribution of major donors in the sector.

Participation of UNDP and the World Bank

In the joint efforts of United Nation Development Programme (UNDP) and HMG/N, Rural Energy Development Programme (REDP) was initiated in 1996. It aims to enhance rural livelihoods through the promotion of community managed rural energy system taking micro-hydro as entry point. The programme was initiated in five hill districts of Nepal under the umbrella of the District Development Committee (DDC) and extended to 15 hills district covering a total of Eighty Village Development Committees (VDC). The second phase of REDP supported by WB and UNDP is being executed by AEPC. The second phase is operational in 25 hilly districts of Nepal covering a total of some hundred Village Development Committees (VDCs).

REDP emphasizes community mobilization as an essential vehicle for self-governance. It is a mean to ensure active participation of local people to manage and operate rural energy system along with other community

named "Renewable Energy in Rural Areas in Northwest China", where she is employed since last year. The work involves quite a bit of travelling by airplane, train and long distance shuttle bus. In 2005 they plan to promote the rural living conditions in cooking and heating in Gansu, which reminds Jie Shao of the solar cooker lunch she enjoyed during lab-sessions at Oldenburg Energielabor. The "Rural fuels" program in 2005 is composed of three parts: pellet fuels, solar cooker and high efficiency stoves. Maybe the most interesting news is that there is a new machine developed by Tsinghua University which can produce pellets at normal temperature and normal pressure conditions. Jie Shao promised to send a more detailed report about the new technology.

Gianpiero Nacci / Italy

who started to work for the European Bank for Construction Development (EBRD) in London right after his PPRE studies, is working mainly at energy efficiency projects and programmes and to some extent at carbon credit deals which is good as he gets more involved with RE. He wrote "By the way, now things seem starting to settle in. Living in London is more stressful that we thought and I am starting only now to get used to the impeccable performances of the London transport system. Job is fine even if I am not involved in RET as much as I would like. However, at the moment, I am involved in the technical due diligence of a biomass boiler and assisting other people working in structuring funds for RE deployment. My main focus now is on energy efficiency in the industrial sector and, as you can imagine, there is a lot of scope in the EBRD's countries of operation. For instance, I am working at the biggest car factory in Russia which I believe is the biggest in the world. It is located in Togliatti and it is simply amazing. It produces 700000

cars/year and employs some 80000 people in a single factory (!!). Anyway, trying to identify possible projects in such kind of facilities is somehow difficult: you do not know where to start. The first feeling is that the best thing to do is simply dismantling everything and building a new facility. But this can be even more difficult due to the environmental and social issues associated. The working environment in the bank is more or less as I expected, my conclusion is:too many bankers around."

PPRE 2003/04

Julio R. Sanchez C. / Colombia

started an extended practical training right after his PPRE degree at Lahmeyer International in Frankfurt. Julio will be working there in the area of wind energy for about one year.

Torsten Bröer / Germany

went to Australia last year November to join the Bushlight project conducted by the Research Institute for Sustainable Energy at Murdoch University in Perth as a visiting researcher. He is mainly involved in performance monitoring of the systems installed, which are mainly PV and PV/Diesel-Systems. His research stay ended in May 2005. Torsten promised to send a detailed report about his activities and the project in due course. Info available at: www.bushlight.org.au

George C. Bandlamudi / India

returned to Germany in December 2004 to do a three-months practical training with GATE Division at GTZ GmbH in Eschborn near Frankfurt. One of his duties was, to develop fact sheets on fuel cells, lighting technologies and solar cooling.

From April 2005 onwards George will start a PhD project at University in Duisburg - ZBT (Zentrum für Brennstoffzellentechnik). George will carry on with work he did during his practical training while studying at PPRE last year (details to be announced).

Nicolas Veneranda Mola / Argentina

also started to work with Lahmeyer, but in their South-Italy Office.

Mathieu Sarran / France

in Januray 2005 started to work as International Sales Manager mainly for the European market at *Sun Master Energiesysteme GmbH*, which are located in Kirchdorf/Krems in Austria.

Andeas Michel / Germany

joined GTZ again to work in an improved cookstove project (development and implementation of the so called *Rocket* stove) in Malawi for about 6 months starting February 2005. He is working at the Info Centre for Food Fuel Security Promotion Mulanje, Malawi. Andi helped to establish a cookstove experiment for PPRE students in the outdoor lab.

Ferdinand Ajamah / Cameroon

wrote us: "I am glad to inform you I had a safe journey back home and doing very fine. I lack words to express my gratitude for the assistance you gave me during the MSc course there in Oldenburg. I am just resting now and will join the solar energy company in the following weeks."

Alois Posekufa Mhlanga / Zimbabwe

(Alumni of RE-programme at our partner university in Harare, Zimbabwe) informed us that in early 2004 he joined as Renewable Energy Research Associate the African Development Bank (ADB) in Tunisia. Actually he is looking for contacts in most African countries since the projects he is working on will be implemented throughout the continent. In future he might contact PPRE Alumni on the continent when it comes to country consultations, policy and institutional reviews, capacity building etc. Alois P. Mhlanga also participated in the PPRE Alumni-Seminar in 2003 in Nairobi and obviously was quite impressed by some of the presentation given there. He is positive that some of the participants could really contribute meaningfully to RE dissemination, since they have the technical knowledge as well as the field experience and they are better positioned to contribute towards the above mentioned activities than some consultants who are hired yet they know almost nothing about how things work on the ground. From 23-25 February 2005 the ADB organised a FINESSE Africa program regional consultative workshop in Tunisia, where our PPRE alumni from Tunisia, **Mr. Baba Abdallah (PPRE 1995/96)**, participated as well. He will represent his own company Alternative Energy Systems SARL-AES.

CONTRIBUTED ARTICLES

Micro-hydro Power Development: Past and Present Status in Nepal

*Prasad Dhital** (PPRE 2001/2002)
*Energy Officer, Alternative Energy Promotion Centre, GPO Box 14237, Kathmandu / Nepal

The micro hydro power development in Nepal began in 1960 through the active participation of private sectors. This paper briefly describes the past efforts of private sector for micro hydropower development in Nepal. The qualitative development of the micro hydro installation has been accelerated since late 90s because of (i) creation of nodal government organization (ii) participation of donor (iii) active presence of private sectors (iv) well defined subsidy policy and delivery mechanism and (v) well defined quality assurance systems. The paper mainly highlights the acceleration of development and present status of micro-hydro power (MHP) development in Nepal

Past Efforts for Micro-Hydro Development In Nepal

The development of micro hydropower began in the 1960s through Balaju Yantra Sala (BYS), a private company with the technical and financial assistance of Swiss Centre for Development Cooperation in Technology and Management (SKAT). The main objective was to design, fabricate and install propeller turbines to drive grain-milling machines. Initially BYS had given focus on the development of a propeller turbine water mill to provide a viable alternative source of motive power for diesel powered mills, which performs three kinds of processing, e.g. grinding, oil expelling and de-husking of rice.

In the mid of 1970s, United Mission to Nepal (UMN) was impressed with the success of BYS and supported to establish Developing and Consulting Services (DCS). DCS used to involve not only in designing, fabricating, and testing turbines and associated hardware but also in developing small water powered mills and micro hydro which could be viable to rural areas without any subsidy.

Kathmandu Metal Industries (KMI) located

at Kathmandu, which has long tradition of designing, manufacturing and installation of water mills, has also been involved in research and development activities of micro-hydro power for many years. KMI is well known for its innovation of multi purpose power unit, (MPPU), Peltric Set and Pump as Turbine (PAT) which are installed widely in the country. GTZ/GATE used to help Nepalese technicians and NGOs in further improvement of traditional water mills and multipurpose power unit in early nineties. Intermediate technology development group was also very much active in developing load limiting devices and load controlling systems for micro-hydro.

The government of Nepal gave an impetus for the development of micro-hydro power in the 1980s by providing loan through Agricultural Development Bank of Nepal (ADB/N) to encourage the rural farmers. In 1984, the government decided to de-license all electricity installations up-to 100 kW capacities and announced a provision for subsidy on rural electrification. The subsidy used to be based on total project cost of electromechanical equipments (50 per cent for remote districts and 75 per cent for the very remote areas).

Many electrification schemes constructed in the 1980s and 90s suffered many problems regarding the management, operation, maintenance and repaying of loan. A report published by UNDP in 2000 mentions the functional status of micro-hydro power plants installed up-to early 90s. According to that report 50of MHP plants is not functioning well because of many reasons including poor site study, lack of operating managing capabilities etc.

Acceleration of Development

The qualitative development of the micro hydro installation has been accelerated since late 90s because of (i) creation of nodal gov-

