

## NUST TEAM SHOWCASES RENEWABLE ENERGY TECHNOLOGIES

Science Festival from 12-16 September 2016 in Ongwediva

The Science, Technology and Innovation Festival is an annual science promotion festival organized by the National Commission on Research, Science and Technology (NCRST). It mainly takes the format of science-related keynote addresses, illustrated talks, workshops, short courses, competitions, displays and exhibitions. The first festival took place in Windhoek in 2015 and the second was in Ongwediva in 2016.

Six students and two staff members (Dr Chisale and Mr Zulu) of NUST exhibited at the festival using the newly acquired Renewable Energy

Technology (RET) kits. The kits were mainly for demonstration and awareness to High School learners and other participants at the festival, what the potentials are in RET solar, wind and hybrid systems. The data capture system of the kits was particularly appreciated. A RET quiz was also conducted to Secondary School learners to stimulate interest. Small prizes were awarded to encourage participation.

NUST Brain Match Quiz: 14 September 2016

The first NUST Brain Match Quiz, jointly organized by the Faculty of Engineering and the Faculty of Health and Applied Sciences, under the sponsorship of the NEED Project, was a huge

success. The quiz completion was officially opened by Dr Samuel John, Dean of the Faculty of Engineering and NEED Project Work Package Leader. As a new University of Science and Technology, NUST endeavours to engage with High School learners and cultivate a culture of excellence in science and mathematics. This is consistent with the aspirations and tasks of the NEED Project's Work Package 3 – the promotion of science among young people. About 300 students participated in the science fair. Nine schools and a total of 36 competitors took part in the Brain Match Quiz while around 100 students and staff were in attendance to support their schools. And the winner was ... St. George's High School!



Dr Samuel John, Dean of the Faculty of Engineering (left) and Vice-Chancellor, Tjama Tjivikua (centre) are pictured with a teacher and members of the winning team, St. George's Diocesan College. From left: Michelle Dhamini, Miriam Da Conceição, Kerstin Eysselein (teacher), Nanaya Joseph and Ndapunikwa Dongwi. (Source: NUST)



Students Receiving Instructions for the 2016 Brain Match Quiz Competition. (Source: NUST)

## NEED TEAM VISITS A VOCATIONAL TRAINING CENTRE AND BIOGAS PLANT IN LIVINGSTONE

The NEED team was privileged to visit two sites that were of interest to the project during the tightly scheduled meeting that was held in Livingstone, Zambia between 30 August and 3 September, 2016. These two sites were the Youth Community Training Centre (YCTC) and the Libuyu Community Biogas plant.

The YCTC is a professional training school for vulnerable teenagers of Livingstone which was built in 1999 by the NGO CeLIM and the Diocese of Livingstone. It provides capacity building opportunities to hundreds of youths by offering them vocational training in plumbing, electric appliances, tailoring, computers, catering and construction techniques. The NEED team visited different departments of the school under the guidance of the manager, Sister Maureen Nakamba. Sister Nakamba explained that the school recently introduced a 'Photovoltaic (PV)' course in the existing construction techniques programme in order to meet the increased demand for PV expertise in Livingstone. She further explained that 80% of former students get employed due to the good reputation of being able to offer high quality services in industry. The remaining 20% set up their own businesses.

Accompanied by the Regional Manager of Southern Water and Sewerage Company (SWASCO), Mr Tuba Mashekwa, the NEED team visited one of the nine biogas plants in Libuyu Community that is used in treating sewage from households. Mr Mashekwa explained that the project stemmed from the urgent need to shift from the use of shallow pit latrines as sewage disposal systems which pose health risks to improved sewerage treatment systems. He further mentioned that with the technical assistance of Water and Sanitation Association of Zambia and the Bremen Overseas Research and Development Association, SWASCO settled for the option of utilising biogas plants for treating the sewage. The plants do not only treat sewage from 390 households in an effective manner, but also provide cooking and heating energy to 9 households.

In all, the two site visits provided insight into vocational training opportunities offered in key developmental areas including Renewable Energy and the use of renewable energy technologies (bio-digesters in this case) to simultaneously solve sanitation and energy challenges in Zambia.



During an excursion, the NEED group visited the Youth Community Training Centre in Livingstone. (Source: THI)



The second visit was at the Libuyu Community Biogas plant, a demonstration project that wants to simultaneously solve sanitation and energy challenges by using renewable energy technologies in the households, in this case bio-digesters. (Source: THI)

## SUCCESSFUL LAUNCH OF THE AIR PROJECT

In May 2016, the German-African cooperation project Academic Initiative for Renewables (AIR) was launched with a meeting at the Technische Hochschule Ingolstadt (THI), Germany. The focus of this four-year project is the development of more practice-oriented academic education in the field of renewable energies. The consortium consists of the Institute of new Energy Systems of THI and seven African partner universities from Botswana, Malawi, Mozambique, South Africa, Zambia and Zimbabwe. In addition, 14 African and 1 German industry partner will bring

in their practical know-how.

At the kick-off meeting, a total of twelve professors and lecturers from Southern African universities participated, amongst them the NEED partners Botswana International University of Science and Technology (BIUST) and University of Zambia (UNZA). The focus was put on the exchange about existing study courses at the partner universities as well as the identification of stakeholders that will be included in the course of the project. Through a campus tour

and visits of the state-of-the-art laboratories, the partners gained valuable insights into teaching and research at THI. They took an excursion to a photovoltaic and biogas plant and to a wind-power station. The factory tour at Citrin Solar GmbH, the German industry partner of the project, marked the end of the successful kick-off meeting.

[www.air-project.org](http://www.air-project.org)



The participants of the AIR kick-off meeting that was hosted by THI in Germany. (Source: THI)



The focus of the meeting was the presentation of existing study courses at the partner universities and the identification of relevant stakeholders to be included in the project. (Source: THI)



Photovoltaic: The AIR team visited a photovoltaic plant close to Ingolstadt, Germany. (Source: THI)

## NEED FINAL CONFERENCE - SAVE THE DATE

We are pleased to announce that the final conference of the NEED project will be held on 25 & 26 July 2017. The programme will include presentations of main achievements within the NEED project, plenary discussions with stakeholders as well as a poster exhibition. The conference will take place at Namibia University of Science and Technology (NUST) in Windhoek, Namibia. For any inquiries, please contact Ms. Petra Beer, Project Coordinator ([petra.beer@thi.de](mailto:petra.beer@thi.de)).



### Contact

Technische Hochschule Ingolstadt (THI)  
Institute of new Energy Systems (InES)

Ms Petra Beer,  
Esplanade 10  
85049 Ingolstadt, Germany  
+49 841 9348 6492

[info@need-project.org](mailto:info@need-project.org)

Newsletter online available under  
[www.need-project.org](http://www.need-project.org)



Network of  
Energy Excellence  
for Development

## NEED Newsletter 07-2017

### HIGHLIGHTS INSIDE

#### RENEWABLE ENERGY USE AT CHOBE GAME LODGE

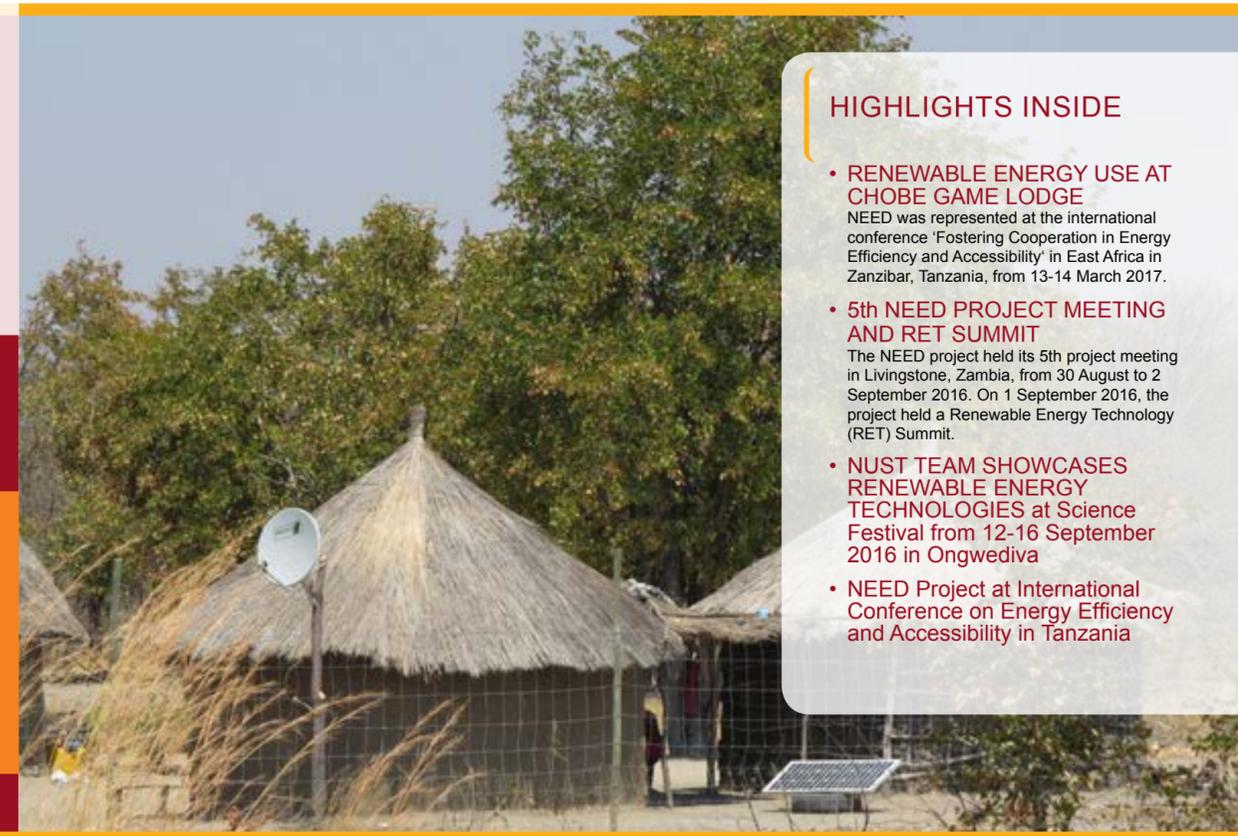
NEED was represented at the international conference 'Fostering Cooperation in Energy Efficiency and Accessibility' in East Africa in Zanzibar, Tanzania, from 13-14 March 2017.

#### 5th NEED PROJECT MEETING AND RET SUMMIT

The NEED project held its 5th project meeting in Livingstone, Zambia, from 30 August to 2 September 2016. On 1 September 2016, the project held a Renewable Energy Technology (RET) Summit.

#### NUST TEAM SHOWCASES RENEWABLE ENERGY TECHNOLOGIES at Science Festival from 12-16 September 2016 in Ongwediva

#### NEED Project at International Conference on Energy Efficiency and Accessibility in Tanzania



## THE PROJECT IN BRIEF...

NEED means

Network of Energy Excellence  
for Development

and therewith describes the central idea of the project: The establishment of a research network in the field of Renewable Energies in Southern Africa. Four universities and one research centre from Zambia, Namibia, Botswana and Germany have joined their forces to create structures for the development of technical know-how in the field of renewable energies, to interlink relevant

stakeholders and to foster the awareness and the willingness to take actions for renewable energies on political level in the target countries.

Of central importance therefore are the following three fields of action

- the development of dual study programmes
- the harmonization of industry standards and
- the pooling of research activities in the field of renewable energies

Besides these three fields of activities two energy concepts for remote areas – a dryland area

and a wetland region – will be conceptualised.

The NEED project wants to interlink successful initiatives, research institutions, small- and medium-sized enterprises (SMEs) and national and local public decision makers in the domain of Renewable Energy Technologies (RETs) in order to contribute to a wider acceptance and application of renewable energies within Southern African societies.

The project is scheduled for three years and funded by the European Union.

## RETS IN NIED CURRICULUM FOR PHYSICS 'ORDINARY' LEVEL

### Introduction

The effort to institutionalize RET's in participating countries of the NEED project has been gaining grounds. It is in this light that we approached the National Institute for Educational Development (NIED) to discuss the possible inclusion of RET's into the Namibian High School curricula.

NIED is a directorate of the Ministry of Education and Culture in Namibia. Its main objective is spearheading the design and development of school curricula in all subjects. Curriculum panels, which comprise of schoolteachers, professionals and other stakeholders, are constituted to help with curriculum design.

Mr Andrew Zulu (NEED WP3 Coordinator) was appointed to serve on the Physics/Chemistry/Physical Science Curriculum Panel to make valuable contributions in these fields and for the three-year cycle June 2016 to June 2019. The first curriculum panel meeting for the cycle took place from 28 to 30 June 2016 at the NIED Headquarters in Okahandja. Many aspects of the new curriculum and its framework were discussed and agreed upon.

### Inclusion of RET's in the Physics 'Ordinary Level' Curriculum

The general guideline for inclusion of any curriculum panel was that it had to be pegged at levels 2 to 4 of the Namibia Qualifications Framework (NQF). This meant it had to be introductory in nature, roughly on the knowledge and applications levels on the Bloom's taxonomy.



Mr Andrew Zulu, WP3 coordinator at NUST, was nominated to serve on the Physics/Chemistry/Physical Science Curriculum Panel for the cycle June 2016 to June 2019, which is organised by the National Institute for Educational Development (NIED) (Source: NUST)

Hence, in line with the aspirations and tasks of the NEED Project, RET's were deliberated upon and included in the new Physics Curriculum at 'Ordinary Level'. Before this, RETs topics were just mentioned and were not specific and certainly were vague. After the panel discussions, RET's (specifically solar and wind) were made more visible and took their rightful place in the new curriculum.



### NEED Work Packages 3 + 6: Dual Studies/Renewable Mini-Grid Drylands

NUST - School of Engineering

Dr Samuel John (Work Package Leader)

[sjohn@nust.na](mailto:sjohn@nust.na)

## ZAMBIA

### NEED AT UNZA AND WISEKIDS VISIT CHARITY PROJECT in SOUTHERN PROVINCE

Under the NEED project, UNZA (represented by Mr Donat Ngendo) accompanied Mrs Gerda Büttner Biernath from Ingolstadt, Germany, who is the Chairperson of Wisekids, on a two-day visit to Monze Boarding Secondary School and Rusangu Secondary School in Southern Province of Zambia. Both schools are recipients of charity from Wisekids. The purpose of the visit was to assess the needs for improvement of the water and power supply systems at Monze Secondary School.



Mr Chimambo, Head of Monze secondary school, receives three bicycles donated to the school by Ms Büttner-Biernath, Chairwoman of Wisekids. On the right is Mr Ngendo, a lecturer at UNZA. (Source: UNZA)

### Water Supply

Monze Secondary School has two main tanks of capacity of 270 litres. To fill the tanks to capacity and satisfy the school needs in water supply, two additional boreholes and two primary pumps and booster are required. The sanitation system is good enough in the 12 dormitory blocks for boys (568 pupils), but not in the dormitory blocks for girls (140 pupils). This situation worries the school management as the hygiene requirements for girls are greater than for boys. During this visit, Mrs Büttner Biernath gave a monetary donation to cover the cost of paying a contractor to drill a water borehole to supply the dormitory block for girls and three bicycles to ease transportation problems at the school.

### Power Supply

A backup motor pump of 11Kw is needed to replace the damaged one at Monze Secondary School. Otherwise there would be no water if the present one in operation stopped or got damaged. It was observed from the utility bills that the school paid K15, 000 per month on average, which is a substantial amount against other school requirements. The school is further affected in its operations by load shedding. It is thought that a low-cost solar power plant of



These drums are used at Monze Boarding Secondary School to supply water for the girls' dormitory. (Source: UNZA)

30 kW capacity feeding directly through a grid interactive inverter to the utility in combination with a biogas-based micro turbine at 30 kW for cooking could serve the school better.



### NEED Work Package 2: Research Strategies

University of Zambia (UNZA)  
School of Engineering

Prof Mundia Muya (Work Package Leader)

[mmuya@unza.zm](mailto:mmuya@unza.zm)

## 5TH NEED PROJECT MEETING AND RET SUMMIT

The NEED project held its 5th project meeting in Livingstone, Zambia, from 30 August to 2 September 2016 at which deliberations on the progress of the project were made.

On 1 September 2016, the project held a Renewable Energy Technology (RET) Summit within the wider 3rd International Conference on Development and Investment in Infrastructure (DII), also in Livingstone, Zambia, running from 31 August to 2 September 2016.

During the NEED meeting, presentations were made by UNZA, working on developing RET research strategies, NUST working on establishing dual studies programmes and BIUST working on a route to harmonise RET standards in the region. ORI had a presentation outlining the work to a transition to RET applications in the Okavango Delta region in Botswana (representing a wetland model), while NUST further outlined the route to a transition to RET applications in Gobabeb in Namibia (representing a dryland model).



During the internal meeting, the NEED project partners presented achievements within their respective work packages. (Source: THI)

At the conclusion of the meeting, the team reviewed the progress to sustain the network beyond the formal NEED project and pledged to investigate more routes to do this.

The RET Summit showcased the results of the activities of the NEED project to the external world in the five active themes, and was graced with a keynote speech by the CEO of the Rural Electrification Authority of Zambia, Mr Geoffrey



During the DII Conference, the NEED team organized a summit on Renewable Energy Technology issues. On this platform, the objectives and current results of the NEED project were presented to the audience. (Source: THI)



These NEED members participated at the DII-2016 conference and the RET Summit in Livingstone, Zambia, from 30 August until 02 September 2016. (Source: UNZA)

## NEWS

### DATA MEASUREMENT FROM A MINI-GRID FOR DRYLANDS

The NEED group WP6 at Namibia University of Science and Technology (NUST) has a commitment to playing an active role in relation to sustainable development of renewable mini-grid drylands. The mini-grid that WP6 is dealing with is located at Gobabeb in the Erongo Region of Namibia. Gobabeb is a small isolated research facility in the middle of the Namib desert and generates its own electricity for system users. The

Gobabeb's mini-grid system is a hybrid energy system, using solar and wind power, battery storage, and diesel generators. The photovoltaic (PV) generates 16 kW<sub>peak</sub>, resulting in a projected annual contribution of approximately 40% (40 kWh per day) and 60%, from a diesel-powered generator, per annum.

Gobabeb has a highly variable group of energy users. The users are: Gobabeb residents

(about 30), visitors, conference and workshop groups (10–100) and school groups. Energy produced from the mini-grid is mainly consumed by households for cooking, refrigeration, and lighting. In May 2016, the NEED WP6 installed a system to remotely measure energy production and consumption data from the Gobabeb mini-grid. Based on the production and consumption patterns, the system is able to provide a structured electricity bill on the basis of the Erongo tariffs. From the preliminary data obtained from the system (see figure), it is operating optimally. However, there is need to capture more data in order to make realistic conclusions. The bills, based on the Erongo tariffs, are not affordable for the surrounding communities. During the remaining project period it is envisaged to establish the ability of communities, by analyzing the data from the questionnaire, to purchase the required appliances in order for them to make use of the electricity. Also, an indication of the power demand, for rural consumers, will be obtained based on disposable incomes; energy needs found in a typical home; and the number of end-users that could realistically be supplied by the mini-grid power.

### RENEWABLE ENERGY USE AT CHOBE GAME LODGE

Chobe Game Lodge located in North Western Botswana is one of the few safari lodges that has invested millions of Pula over the years to become a leader in the country in sustainable tourism practice. Chobe Game Lodge follows sustainable tourism practices throughout the operation. An interview with Mr Johan Bruwer - the General Manager at Chobe Game Lodge and the Environmental Officer revealed that the Lodge has adopted the following practices: a) Use of renewable energy sources from hydroelectric power; b) Solar energy for heating water for guests at the lodge, and, c) Production of biogas from waste which is used for cooking.

#### Solar Heating of Water:

Chobe Game Lodge has made investment in making use of excess power generated by the hydroelectric scheme around Victoria Falls to provide lighting in the lodge. In this regard, Chobe Game Lodge uses clean power generated from a renewable energy source, thus significantly reducing the amount of carbon emissions. In addition to using renewable energy from hydroelectric power, Chobe Game Lodge is heating all the water used by Guests using solar



At Chobe Game Lodge, the first biogas plant in Botswana's tourism industry can be found. (Source: ORI)

energy. In this regard, Chobe Game Lodge has almost zero use of fossil fuels. In heating water, Chobe Game Lodge has solar panels mounted on top of the building. The hot water system at Chobe Game Lodge is supplemented by three sets of solar panels that heats over 6,000 litres that combined with the low voltage lighting recently installed in the lodge reduced power consumption by more than a third. A Solar Panel used to heat water at Chobe Game Lodge

#### Biogas:

Chobe Game Lodge has a recycling project where all the waste from the kitchen is used to

produce biogas. This is the first Biogas plant in Botswana's tourism industry. The Biogas Plant has three tanks - two tanks serve as the biogas generators and feed all kinds of waste from grass clippings to used oil to leftovers from the kitchen. The third unit serves as a storage for excess methane gas. The two air-tight tanks convert the biomass waste into methane. The methane is stored and used for gas cooking in the kitchen. As a result of its effort in promoting renewable energy use, recycling and green technology, Chobe Game Lodge was awarded the GREEN + tourism certification in 2010 and follow up assessment in 2012 full ECO tourism certification. Mr Johan Bruwer notes: "We are constantly evaluating new technologies and developing new environmentally friendly business practices and we do acknowledge the reality that there is lots of room for improvement in our day to day operations".



### NEED Work Package 5: Fossil-Free Wetlands

Okavango Research Institute (ORI),

Prof J.E. Mbaiba  
(Work Package Leader)

[jmbaiwa@ori.ub.bw](mailto:jmbaiwa@ori.ub.bw)

### INTERNATIONAL CONFERENCE: SOLAR TECHNOLOGIES & HYBRID MINI GRIDS TO IMPROVE ENERGY ACCESS

#### Metropolitan area Frankfurt, Germany

The conference 'Solar Technologies & Hybrid Mini Grids to improve energy access' took place in Bad Hersfeld, metropolitan area Frankfurt, Germany, on 21-23 September 2016. The conference drew many participants from universities, institutions, organizations and companies from all over the world. A total of 168 people from 38 countries and 5 continents participated in this international event. The conference merges three very successful conferences into one, namely: a) PV-Hybrids and Mini-Grids (7 editions), b) Small PV Applications (4 editions), c) Solar Energy Technology in Development Cooperation (1 edition).

The NEED team was represented at the international conference by Fabian Junker and Stefan



Mr. Junker presented the paper titled: "Solar Energy Systems for Off-Grid Rural Electrification in Sub-Saharan Africa" with a 30 minutes presentation. He described a strategy for a sustainable supply of remote rural settlements with electricity (work package "Renewable Minigrid Drylands"). (Source: THI)

Schneider from the Institute of new Energy Systems (InES), THI.

This joining of forces aims at the implementation of a more comprehensive conference with higher impact which is focusing on PV and other renewable energy based electricity, solar thermal systems and policy, government



Mr. Junker presented the paper titled: "Solar Energy Systems for Off-Grid Rural Electrification in Sub-Saharan Africa" with a 30 minutes presentation. He described a strategy for a sustainable supply of remote rural settlements with electricity (work package "Renewable Minigrid Drylands"). (Source: THI)

and donor programs. The conference was organized by the 'Ostbayerisches Technologie-Transfer-Institut' (OTTI). The objective of the conference was to consolidate knowledge around solutions that have proven to work

and their enabling factors, the presentation of different models of financing, business models and technologies that enable the fast uptake of such solutions, and to provide new roads for research and innovation. Moreover, the event was a good platform to bring together academia, practitioners, industry and research institutions with the aim of sharing experiences and the latest technology developments, learning from each other and networking.



#### Germany – Coordination/Dissemination

Technische Hochschule Ingolstadt (THI)  
Institute of new Energy Systems (InES)

Prof Wilfried Zörner (Project Leader)

[info@need-project.org](mailto:info@need-project.org)

## THE NEED PROJECT PARTNERS

## MEETINGS