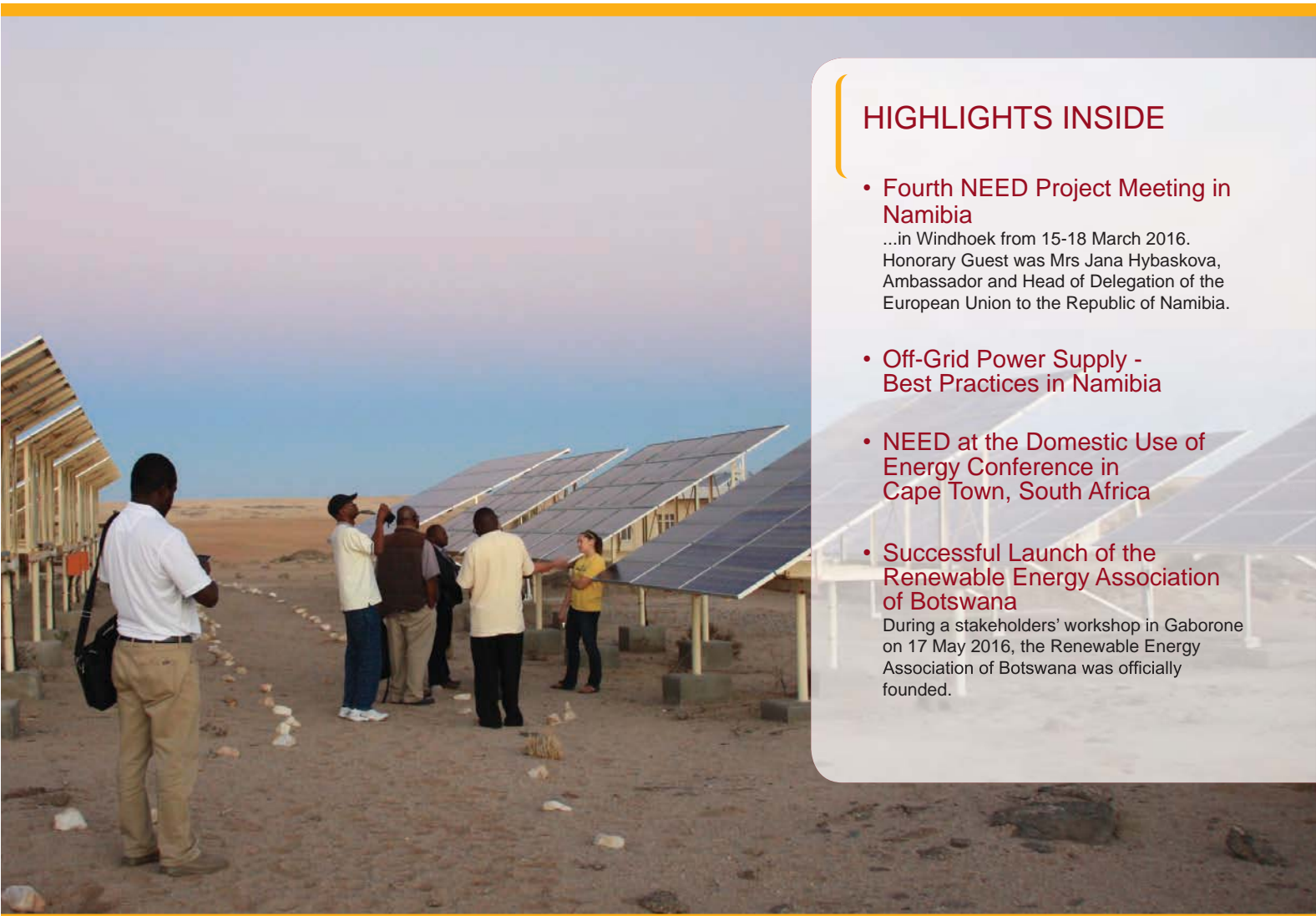




Network of  
Energy Excellence  
for Development

## NEED Newsletter 07-2016



### HIGHLIGHTS INSIDE

- **Fourth NEED Project Meeting in Namibia**

...in Windhoek from 15-18 March 2016.  
Honorary Guest was Mrs Jana Hybaskova,  
Ambassador and Head of Delegation of the  
European Union to the Republic of Namibia.

- **Off-Grid Power Supply -  
Best Practices in Namibia**

- **NEED at the Domestic Use of  
Energy Conference in  
Cape Town, South Africa**

- **Successful Launch of the  
Renewable Energy Association  
of Botswana**

During a stakeholders' workshop in Gaborone  
on 17 May 2016, the Renewable Energy  
Association of Botswana was officially  
founded.

### THE PROJECT IN BRIEF...

NEED stands for

**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 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 are the following 3 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 3 fields of activities 2 energy concepts for remote areas – a dryland area and a wetland region – are conceptualised. The intentions of the NEED project are 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 runs from 03/2014 to 02/2017 and is funded by the European Union.

# OFF-GRID POWER SUPPLY – BEST PRACTICES IN NAMIBIA

## NEED project visits forward-thinking off-grid installations in rural Namibia

In March 2016, part of the NEED team visited a number of rural off-grid installations in Namibia. Many of these sites power tourist lodges such as Betta Campsite and ROOISAND Desert Ranch.

Betta Campsite was built on a road junction in Namibia's southwest to serve as a stop-over for tourists and provides food, fuel and overnight accommodation. It is close to the Namib Desert and the historic Duwisib Castle, both frequently visited by travellers. It is a five-hour drive (approx. 410 km) away from Namibia's capital Windhoek and a four-hour drive (approx. 325 km) away from Keetmanshoop, the regional capital of Namibia's south.



Betta Campsite's hybrid power system [Source: THI]

Its remote location and the absence of an electricity

grid on the one hand and the requirements of a tourist operation on the other hand ask for absolutely reliable as well as low cost electricity supply. Supplied and serviced from 2012 by a Keetmanshoop based company, Betta Campsite relies on a typical hybrid power system consisting of a small wind turbine, a photovoltaic array and a battery bank. The system is supported by a 30 kVA diesel generator set. Betta Campsite's owners and operators are extremely happy with the design and service of the installation.

ROOISAND Desert Ranch is situated on the fringe of the Namib Desert in Namibia's central region. It is a three-hour drive (approx. 170 km) away from Windhoek. Apart from its farming activities, the ranch offers various kinds of accommodation and activities to nature-loving travellers. Because of the absence of an electricity grid, but especially because of it being embedded in nearly unspoilt nature, the management decided to have a hybrid power system installed based on renewable energies. Of course, reliability plays an important role in premium-quality tourism. This system that also supplies the staff village nearby consists of several photovoltaic arrays and a battery bank. It is supported by a 120 kVA diesel generator set. In addition, the chalets are equipped with solar-thermal water heating. ROOISAND Desert Ranch's owners and operators are proud of their installation that

is permanently being enhanced, currently, for example, by introducing automated central monitoring of the installation. The installation is serviced by a Windhoek based company.

Anyone interested in these forward-thinking, renewable energies based off-grid installations is welcome to contact Betta Campsite and ROOISAND Desert Ranch.



Very well designed and looked after ROOISAND Desert Ranch's hybrid power system. The picture shows the battery bank room with space for growth (currently 6,000 Ah battery capacity at 48 V) [Source: THI]



### Germany – Coordination / Dissemination

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## NAMIBIA

### SITE VISIT TO THE SOLAR-DIESEL HYBRID SYSTEMS IN TSUMKWE AND GAM

Namibia struggles to electrify its rural communities. Most rural settlements are far from major power supply lines. The Tsumkwe Constituency in Otjozondjupa region in the north-eastern part of Namibia is located in the off-grid area about 150 to 400 km to the nearest electricity grid line.

In early March 2016, a three-days site visit to this region was undertaken by Ms Helvi Iлека from the Namibia Energy Institute (NEI) and Mr Fabian Junker from the Institute of new Energy Systems (InES) to evaluate and conduct a study tour of the two Solar-Diesel Hybrid Systems (SDHS) installed at the rural settlements Tsumkwe and Gam.



Scientific staff from THI and NUST [source: THI]

One of the first larger off-grid solar plants in Namibia was built at the rural settlement of Tsumkwe with main funding from the European Union (EU) and co-funding from NamPower as well as Ministry of Mines and Energy (MME). The SDHS was officially inaugurated in January 2012. The produced energy is fed into the 11 kV mini-

grid that distributes the energy to the villagers. The solar power plant consists of four main components. A 202 kWp photovoltaic (PV) generator, a 180 kW 3-phase inverter/charger which consists of 36 single units combined, a lead acid battery bank with a nominal capacity of 1.93 MWh and three diesel generator sets of one 350 kVA and two 150 kVA small generators. It was observed that the mini-grid is faced with management and ownership challenges. Moreover, poor maintenance, lack of a monitoring system and theft of electricity was observed. New houses are under constructions that are expected to be connected to the same grid (growing power demand).

The Gam solar project is the second large scale mini-grid project in the country and was implemented by the MME together with NEI and NamPower with 100% funding from Government. The SDHS started operations in November 2014 and consists of four main components. The CIS modules produce a total power of 292 kWp, a 216 kW 3-phase inverter/charger which consists of 36 single units combined, a lead acid battery bank with a nominal capacity of 2.6 MWh and two diesel generator sets with 300 kVA each including two 2,200 litre-capacity diesel tanks. The distribution of power in Gam is also realized through an 11 kV mini-grid.

During daytime the PV modules produce enough power to supply the whole settlement with electricity and simultaneously charge

the batteries. The battery bank is designed in such a way that when fully charged it will be sufficient to supply the entire community throughout the night. The two diesel generator sets only serve as backup supply.



The solar-diesel based power station of Tsumkwe [Source: THI]



# IMPRESSIONS OF THE FOURTH NEED PROJECT MEETING IN NAMIBIA

## official opening with EU & government representatives

From 15-18 March 2016, the NEED Team had its fourth project meeting at the NUST campus to report on the progress made so far, share ideas and strategize the way forward. At the official opening, representatives from the EU and the Ministry of Mines and Energy (MME) were also present.

Prof Tjama Tjivikua, Vice Chancellor of NUST, officially opened the project meeting and highlighted the importance of international collaboration in RETs and the water sector: "It makes perfect sense to move away from the use of coal and diesel oil as sources of electrical energy. I am pleased that the NEED

project interlinks successful initiatives, research institutions, Small and Medium Enterprises, and national and local public decision-makers in the domain of Renewable Energy Technologies."

Mr Nico Snyders, the Deputy Director of Renewable Energy Division (MME) said: "We encourage new projects to work on appropriate curricula at our universities so that engineers and technicians are trained."

NUST, through the Namibia Energy Institute (NEI), is collaborating with the MME and the National Housing Enterprise to ensure that the houses constructed through the Mass Housing

Project are equipped with solar water heaters. Afterwards, Honorary Guest Mrs Jana Hybaskova gave her remarks on sustainable growth for (economic) stability and emphasized on wind energy development and issues of sustainability, governance and how to empower people in energy by making use of best practices.



Jana Hybaskova, the new EU Ambassador to Namibia (front row, centre), and Prof Tjama Tjivikua, Vice-Chancellor of NUST (to the right), are pictured with the other delegates who attended the NEED meeting [Source: NUST]

## STAKEHOLDER MEETING ON WORK PACKAGE 3 ISSUES

In the framework of the project meeting at NUST, a public part event was held on 17 March 2016 that several stakeholders in the Namibian energy sector attended. Among the invited guests were representatives from the Namibia Engineering Corporation (NEC), the Namibia Training Authority (NTA) and the Multi Engineering and Training Services.

After a general introduction to the NEED project, the participants entered into a dynamic discussion on the following topics that are related to Work Package 3 "Dual Studies: Renewable energy activities in Namibia, energy resources in Namibia, best practices on dual studies and policy on dual studies.

Some of the key findings include:

- The need for increased deployment of mini-grids
- The need for alternative and appropriate renewable energy appliances like solar water heaters, PV systems, solar and wind pumps and wind turbines
- The need for industry to participate in the development of training programmes and for coordination between companies conducting apprenticeships
- The need to provide incentives for students inclined for practical work to institutionalize a culture of science for RETs amongst young people

The NEED team thanked the participants for their coming and the interesting brainstorming. Results of this event will be incorporated in the project implementation.

Afterwards, the team visited Namibia Breweries Limited in Windhoek where Mr. Bernd Esslinger, engineering manager, took the members through the various process plants such as water treatment plant and fermentation plant. The site visit ended with a courtesy product tasting.



In the public part event in Windhoek, the NEED team had fruitful discussions with Namibian stakeholders [Source: THI]



Visit to the Namibia Breweries Limited in Windhoek [Source: THI]



**NEED Work Packages 3 + 6:  
Dual studies/Renewable Mini-Grid Drylands**

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# ZAMBIA INTERNATIONAL ENERGY CONFERENCE (ZIEC) - 2016

## Diversifying Zambia's Energy Mix for a Resilient Power Sector

The NEED project was represented at ZIEC (25-26 April 2016 in Lusaka) by Donat Ngendo from UNZA. The objective of the conference that was organized by the Ministry of Energy and Water Development (MEWD) jointly with Stanbic Bank Zambia and other partners was to engage stakeholders in finding immediate and long-term measures to mitigate the power deficit and enable the sector to be resilient to climate change. Further, information on Government plans and policies was disseminated and the potential of projects aimed at diversifying the energy sector were showcased. The participants were experts in the Power and Renewable Energy (RE) sectors ranging from policy makers, technical experts, project developers, financing institutions, power utility companies as well as multilateral and bilateral agencies.

In her keynote speech, Hon. Dora Siliya highlighted the electricity crisis the country was facing in part due to over-dependency on hydro for electricity generation which is affected by climate change. The Minister stated that the MEWD was in the process of exploring non-hydro renewable energy technologies (RETs) for electricity generation to improve the electricity supply in the country. She acknowledged the need for different stakeholders to participate in this process including research

institutions. This informal invitation gives NEED an opportunity to cooperate with the government in developing research strategies aimed at accelerating research in RET.



Hon. Dora Siliya, the Minister of Energy and Water Development at ZIEC [Source: UNZA]

Afterwards, a representative from the Energy Regulation Board (ERB) of Zambia highlighted that they have developed a Regulatory Framework for projects under the Renewable Energy Feed-In Tariff Program (REFIT) with the assistance of KfW of Germany and USAID. Recently, Zambia developed a REFIT policy to promote renewable electricity generation. One of the policy strategies aims at generating 200 MW of electricity from RE sources in the next three years: 100 MW from hydro and the other 100 MW from non-hydro sources.

a senior official from the Department of Energy (DOE) explained that DOE with support of World Bank is currently developing resource maps that will show in two years from now the country's solar and wind resource potential with the aim of encouraging investment in RE. Various potential RE Independent Power Producers expressed interest to invest in the RE sector due to the favourable investment incentives provided by the Zambia Development Agency. There was a session on green energy and energy efficiency where the role of biofuels in the national energy mix was highlighted and the potential opportunities in Zambia discussed. The participants agreed that the mining industry in Zambia can play a critical role in saving energy by being energy efficient in their operations.

### NEED Work Package Research strategies

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## CONFERENCES

### DOMESTIC USE OF ENERGY (DUE) INTERNATIONAL CONFERENCE

The DUE Conference was held from 29-31 March 2016 at the ABSA Auditorium, Cape Town Campus of the Cape Peninsula University of Technology (CPUT), Cape Town, South Africa.

The theme of the conference was: Towards Sustainable Energy Solutions for the Developing World. The international conference drew more than 100 participants from institutions, organizations and companies from across Africa, Europe and America.

To set the tone of the conference, Day 1 was devoted to a visit to a home in Durbanville, Cape Town, which fully depends on a hybrid solar and wind installation for all its energy needs. Participants first gathered in the auditorium of the SARETEC building, CPUT, Bellville campus, where the owner of the home, Mr Hugo Potgieter, made an enchanting presentation on his journey with renewables leading to being independent of the conventional power grid for all his home energy needs, ranging from swimming pool cleaning and temperature control to lighting, space heating and cooking using the hybrid wind-solar energy system. Being a do-it-yourself enthusiast Hugo gave useful hints on how to successfully implement RETs from an experiential stand point and the different challenges he had to overcome.

On arrival at Hugo's home, participants were welcomed with hot cups of tea and cupcakes prepared using the renewable

energy plant in the home. There were several renewable energy companies present that also exhibited different mobile renewable energy technologies and gadgets.

On Day 2, after the official opening and the keynote session, three parallel sessions were scheduled. In Session C, focusing on Renewable Energy, NEED's Work Package 4 Leader Prof James Katende from the Botswana International University of Science and Technology (BIUST) presented the paper titled: "The NEED Project: Enhancing the widespread use of renewable energy resources in the Southern Africa region".



Prof James Katende represented the NEED project at the DUE Conference [Source: BIUST]

In the afternoon, another parallel session focused on curriculum design for master's degree programmes in energy efficiency at four different universities in Southern Africa. This included a paper by one of the NEED team members, Dr Paul Chisale from the Namibia University of Science and Technology (NUST) who described features of the Master's degree programme in energy efficiency at nuSt. The conference ended with a closing ceremony in which the best paper award was made to a young researcher from one of the South African universities.

The conference was a huge success and kudos to the DUE 2016 organizing committee led by Prof Nico Beute.

### NEED Work Package Industry standards

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## FOSSIL-FREE WETLANDS

### Eco-Friendly Safari Tourism in the Okavango Delta

Botswana prides itself as the superior safari destination in Africa and in the world and is becoming one of the world's leading ecotourism destinations. Chobe Game Lodge is one of the few tourism facilities at the forefront in the introduction of renewable energy and the promotion of environmentally friendly technologies in the tourism sector. The Lodge is one of Africa's historic lodges and is located 100 kilometers west of Zimbabwe's Victoria Falls within the Chobe National Park of Botswana.

As a way of introducing a fossil free tourism in Botswana's wetlands, Chobe Game Lodge in 2014 introduced an electric 4x4 Land Rover vehicle used for Game drives and an electric boat for boating activities in the Chobe River. The electric powered vehicle and boat are replacing the diesel and petrol vehicles which are commonly used. The electricity that charges the long-life lithium batteries to power the vehicle and boat comes from the hydro-electric scheme at Victoria Falls. Through the use of electric vehicles, Chobe Game Lodge has saved over BWP 60,000 in fuel and further savings on maintenance and workshop costs to date. Savings in fuel translates to a total of about 30 tons of CO<sub>2</sub> emissions. This demonstrates a great commitment and achievement by

Chobe Game Lodge to ensure environmental protection and a sustainable tourism industry.



Mr. Johan Bruwer, the General Manager of Chobe Game Lodge [Source: ORI]

Mr. Johan Bruwer acknowledges: "This landrover is the first pure electric game-viewing 4WD vehicle and boat in our quest to operate the first all-electric game viewing fleet in Africa. A first in Botswana and another step towards leading the way in ecotourism in the world." The plan is that by the end of 2016, the lodge should have its entire fleet of nine game drive vehicles running on electricity.

#### Solar powered boat operating since 2015

In 2015, the lodge introduced also the solar powered boat, the first of its kind in Botswana, if not in all Africa. With this boat, Chobe Game Lodge has managed to save

approximately 1,600 kg of CO<sub>2</sub> emissions thus far within a few months. In 2016, the lodge was awarded as Africa's first lodge that has a fully autonomous solar powered safari boat operating on the Chobe River which is powered by solar panels on the roof only.

With the addition of the two solar boats currently in production, the entire fleet of five vessels will soon be all-electric. Chobe Game Lodge is also involved in recycling of waste material and has started projects such as: Biogas production, above ground Grey Water recycling, and has an extensive Recycling, Reuse, Reduce and Upcycling Plant.



Solar powered boat of Chobe Game Lodge [Source: ORI]

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



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## BOTSWANA

### RET STAKEHOLDERS' ASSOCIATION SET FOR LAUNCH IN BOTSWANA

RET stakeholders in Botswana finally launched an association, namely, the Renewable Energy Association of Botswana (REAB).

All the participating stakeholders were drawn together by a common goal of seeking to articulate specific and common interests of propelling the deployment of RETs to the next level in Botswana. Overall, this initiative is aimed to support the Botswana government's effort and strategy for increasing the role of renewable energy options in the overall national energy mix.

In an earlier meeting held in February 2015, the stakeholders mandated the NEED team at Botswana International University of Science and Technology (BIUST) to serve as protem secretariat, develop REAB's constitution, and prepare for the formal inauguration of the association.

Consequently, having produced the draft constitution, the BIUST NEED project team hosted a stakeholders' half-day workshop on 17 May 2016 at the Phakalane Golf Estate, Gaborone, Botswana.

The presentations during the workshop addressed the theme: "Renewable & Sustainable Energy Technologies: Current status and future prospects in Botswana". However, the main thrust for participants was to review and adopt the association's constitution and to elect the founding leadership team of

REAB. The new officials of REAB are: Chairperson Prof Tunde Oladiran; Vice Chairperson Mr Felix Chavapi; Secretary Dr Tedmann Onyango; Vice Secretary Mr Joan Major; Treasurer Mr Anthony Garden. Ms Karen Giffard and Ms Gina Maswabi were nominated as additional committee members. Prof Oladiran and Dr Onyango are from NEED team at BIUST. The interim committee members are to remain in the office until the next general meeting.

The first task of the new leadership team is to process the registration of REAB with the Botswana Registrar of Societies.

It is envisioned that REAB will support the further development of cost-effective, sustainable energy generation and consumption solutions likely to be adopted in Botswana in the area of renewables. It will endeavor to promote consultations, reflections and deliberations on key issues in the field of RETs in Botswana by way of partnerships and linkages.

The association will also regularly prepare motivation documents to the Botswana Bureau of Standards (BOBS) for the creation and/or harmonization of applicable standards to enhance adoption and diffusion of RETs particularly in the country and generally in the sub-region in line with the roadmap being prepared by the NEED Work Package 4 on RET industry standards harmonization. In view of the foregoing, the association presents

stakeholders with an unique forum for sharing information, analyzing the latest developments involving RETs, and advocating for partnerships and networks both nationally and internationally.

It is expected that the formation of similar associations will be replicated in other NEED partners' countries in the region where they may not be in existence.



The new REAB Chairperson:  
Prof Tunde Oladiran [Source: BIUST]

#### NEED Work Package 4: Industry Standards

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## TWO HIGH-LEVEL MEETINGS IN WINDHOEK

### NEED pitched at “Knowledge Exchange Forum”

The Namibia Energy Institute (NEI) at NUST pitched the NEED Project to attendees of a “Knowledge Exchange Forum” hosted by the Energy and Environmental Partnership (EEP) and the Southern African Centre for Renewable Energy and Energy Efficiency (SACREEE) in Windhoek, Namibia, on 2 June 2016.

A mixture of presentations, information sessions and round table discussions on topics of relevance to EEP project developers were presented and discussed. The event was attended by more than 80 participants, consisting of EEP coordinators from Swaziland, South Africa, Botswana and Namibia and

representatives from EEP lead donor funding countries such as Finland, United Kingdom and Austria.

Ms Helvi Ileka, Projects Officer at NEI, pitched the NEED Project during a 5-minute presentation in which she highlighted the main objective and scope of the project, the current project costs, progress to date, and especially the resulting research publications which have a direct linkage to the Knowledge Management System of SACREEE. Additionally, she informed the participants on the value proposition for SACREEE. In March 2016, a Mini-grid expert from THI

together with experts from NEI conducted a study tour to Tsumkwe and Gam (see article page 2, bottom) The findings of the trip were presented to stakeholders from MME, Electricity Control Board and to the current SACREEE Interim Coordinator on 19 March 2016 where the linkage to SACREEE was discussed..



Helvi Ileka [Source: NUST]

### Nust hosted aCP-EU Joint Parliamentary assembly

The Namibia National Assembly was privileged to host the 31<sup>st</sup> Session of the African Caribbean Pacific (ACP) – European Union (EU) Joint Parliamentary Assembly from 8-15 June 2016.

The head of EU Delegation in Namibia, Ambassador Jana Hybaskova, requested NUST to host an event on the topic of renewable energy on 12 June 2016 which about 50 ACP-EU Parliamentarians attended. Namibia is endowed with ample sunshine and other natural energy resources like wind and biomass; therefore, NUST was honoured to show case the projects that are promoting the use of sustainable energy technologies through research and development as well as capacity building. The event was held under the theme “Renewable Energy: Creating a Sus-

tainable Future” and aimed at establishing networks for further international cooperation and project visibility, bearing in mind the sustainability of current projects and potential future projects.

The following energy related EU funded projects that are currently implemented by NUST were demonstrated at the event: The Network of Energy Excellence for Development (NEED), the Southern African Sustainable Energy Initiative (SASEI), the Programme on Energy Efficiency in Southern Africa (PEESA), the Participatory Integrated Assessment of Energy Systems (PARTICIPIA) and the University Quality Exchange (UNIQUE). Among the displayed projects was also the Namibian Solar Electric Utility Vehicle

(NSEUV), a multidisciplinary applied innovation project which aims to initiate the African Society's impact on climate change. The event received many compliments and in particular the energy related projects received praise.



Namibian Solar Electric Utility Vehicle (NSEUV) [Source: NUST]

### International Conference on Infrastructure Development and Investment Strategies for Africa



The International Conference on Infrastructure Development and Investment Strategies for Africa, with the theme „Achieving Solutions for Renewable Energy and Sustainable Development“, will take place from 31 August to 2 September 2016 in Livingstone, Zambia. **Within the conference there will be an expert session organised by the NEED project.**

More information and registration at:

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

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