

# PEESA – Programme on Energy Efficiency in Southern Africa

## SUMMARY OF RESULTS

Advanced curricular on energy efficiency aligned with European quality standards for engineering education, including:

- 3 MTech Master programmes in energy efficiency developed and implemented;
- 3 MEng Master programmes in energy efficiency developed;
- 69 students recruited in the implemented Master programmes;
- 94 teaching staff members involved in international exchanges;
- 10 teaching staff members trained in online courses;
- 123 academic staff members trained in quality teaching;
- 11 scientific papers published.

## BACKGROUND

In Africa, the transition towards a knowledge economy provides significant opportunities for higher education. Higher education should, therefore, focus on these government- and market-driven demands. Education in engineering in particular will play a key role in building Africa's future technological innovation. This transition, also driven by globalisation, industry and employability, calls for developing an interdisciplinary approach and the ability to combine theory and practice.

Whilst educational institutions in southern Africa may possess the necessary scientific and technological capacity, they often lack the innovative capacity to develop programmes that have a true impact on the opportunities that exist. There is, therefore, a need to facilitate this process of strengthening capacities ranging from scientific and technological capacity development, adapting existing technologies to local conditions, making research results accessible to African users, and fostering an institutional networking culture between EU and African partners.

The PEESA project (Programme on Energy Efficiency in Southern Africa) targeted the development and implementation of master engineering programmes at CPUT, NUST, VUT and TUT aligned to EU quality standards.

## METHODOLOGY

### Guidelines on engineering programme design

Methodology for engineering curriculum design: planning of objectives and learning

outcomes, and credit allocation according to EUR-ACE® Framework and national standards of the African countries.

### Curricula and syllabus development

Preparation of curricula. Updated syllabuses and teaching materials of courses and modules with ECTS (European Credit Transfer System) credits mapped to learning outcomes. Textbooks for areas of programme specialisation purchased.

### Train-the-trainer blended course

Educate faculty developers and teachers in interdisciplinary approaches in the field of energy efficiency.

### Evaluation against HEQC and EHEA

External evaluation by peers against EU and national standards requirements: Africa's Higher Education Quality Council (HEQC) and the European Higher Education Area (EHEA).

### Quality monitoring

Purchase of software and communication instruments to conduct professional video conferences and platform for exchanging information and material.

### Disseminating results

Outputs published through project website and platform, as well as in papers and presentations on national and international events.

### Implementing and promoting the Master's programme

African partners implement train-the-trainer course and the master programmes introducing teaching materials and methodologies.



Visit to Windhoek Brewery, Photovoltaic Roof Plant, Namibia.

## PROJECT IMPLEMENTATION PERIOD

October 2013 – March 2017

## CONSORTIUM

- Hochschule Wismar, University of Applied Sciences and Technology, Business and Design, Germany
- Ernst-Abbe-Hochschule Jena University of Applied Sciences (EAH Jena), Germany
- Hochschule Flensburg (HSF), Germany
- Cape Peninsula University of Technology (CPUT), South Africa
- Namibia University of Science and Technology (NUST), Namibia
- Tshwane University of Technology (TUT), South Africa
- Vaal University of Technology (VUT), South Africa
- European Network for Accreditation of Engineering Education (ENAE), Belgium

## PROJECT CONTACT

Prof. Dr. rer. nat. Norbert Gruenwald  
Hochschule Wismar  
Tel: +49 3841 758 2290  
E-mail: norbert.gruenwald@hs-wismar.de

## PROJECT WEBSITE

<http://peesa.nust.na/>

## RESULTS

### → Outputs

#### Capacity building

- 3 MTech Master programmes in Energy Efficiency.
- 3 MEng Master programmes in Energy Efficiency.
- 1 train-the-trainer online programme at master/PhD level.
- 94 teaching staff members involved in international exchanges.
- 123 academic staff members trained in quality teaching.
- 10 academic and teaching staff members (3 female, 7 male) trained in online didactics.
- 38 students (12 female, 26 male) enrolled in the programmes.

#### Documents

- Guidelines on Engineering Programme Design in alignment with European Qualifications Frameworks, European Standards

for Accreditation of Engineering Programmes and Southern African Quality and Accreditation Standards.

- Evaluation paper of 4 Master degree programmes in Energy Efficiency in Southern Africa.
- Trainer programme including teaching material.

#### Networking

- Platform Blackboard: <http://www.blackboard.com/higher-education/index.html>

#### Publications

- 11 scientific/educational papers.

#### Visibility

- Project website.
- 7<sup>th</sup> International Conference on Engineer-

ing and Business Education (7<sup>th</sup> ICEBE) in Shijiazhuang (China), October 2014.

- German-African Energy Forum in Hamburg (Germany), April 2015.
- PEESA Dissemination Conference in Windhoek (Namibia), September 2015.
- 8<sup>th</sup> International Conference on Engineering and Business Education (8<sup>th</sup> ICEBE), Fredrikstad, (Norway), October 2015.
- Communication Event in Deutscher Bundestag in Berlin (Germany), May 2016.
- 'Domestic Use of Energy' Conference in Cape Town (South Africa), February 2016.
- DAAD 3<sup>rd</sup> Network Meeting of the Projects in the University-Business-Partnership Programme in Bonn (Germany), November 2016.

### ↑ Outcomes

- Updated quality assurance system aligned to EU quality standards.
- Southern African partner HEIs have the capacity to develop and deliver advanced engineering curricula.
- African partner faculties capable of designing and delivering quality online training and online didactics.

### 🎯 Impacts

#### Usage

- CPUT, NUST, TUT and VUT have developed the Master's programme in Sustainable Energy which will address national needs for capacity building in renewable energy, and will produce graduates with the ability to analyse, design, evaluate and maintain highly sophisticated renewable energy systems. The programme will enable the students to use and share not only their specialised knowledge, but also their social competences in real-life working scenarios.

#### Policy implications

- The use of the engineering Master programmes aligned with national and local requirements and conditions, the EUR-ACE<sup>®</sup> accreditation standards by Southern African universities and the Train-the-Trainer online course, provide the right skills for employability, the skills to work with business and employers, thereby sustaining good practices in energy efficiency management.
- The Master programmes will also make

meaningful and substantial contributions to the vision of NUST as well as national economic agendas.

#### Sustainability

- The Southern African partner universities will offer the developed Energy Efficiency Master's programme regularly.
- PEESA continues and is sustained by:
  - PEESA II: Project Hochschulkooperation 'Energy Efficiency in Southern Africa', supported by Bundesministerium für Bildung und Forschung, Germany.
  - PEESA III: ERASMUS+ Personalised Engineering Education in Southern Africa.

## TESTIMONIAL



**Anthony Staak,**  
Deputy Vice-Chancellor  
for Teaching and Learning,  
Cape Peninsula University  
of Technology, South  
Africa

“The experience gained from the project will help pave the way for the introduction of more professional masters degrees at our institution. Staff members at the institution have benefitted from the training courses on curriculum development, accreditation and on-line learning and will be able to apply the expertise gained to bring about improvements in other areas as well.”

ACP-EU Co-Operation Programmes in the fields of Higher Education and Science, Technology and Research

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