TRAINING COURSE PROSPECTUS

Title:	**EAC Regional Training Course on Development, Design, Installation and Operation of Small Hydropower Plants**
Place:	**Makerere University**
Date:	**29 September 2019 - 4 October 2019 (6 days)**
Deadline for Nominations:	**13 August 2019**
Organizers:	The East African Centre of Excellence for Renewable Energy and Efficiency (EACREEE) in collaboration with Uganda National Renewable Energy and Energy Efficiency Alliance (UNREEEA) (through Hydropower Association of Uganda (HPAU)), and the Centre for Research in Energy and Energy Conservation (CREEC), supported by bfz the United Nations Industrial Development Organization (UNIDO), the Austrian Development Agency (ADA).
Language:	The language of instruction will be English.
Participation:	The training course is open to 30 participants from the East African Community (EAC) Partner States.
Participants' Qualifications and Experience:	Participants should be qualified technician or engineer by basic training and should be involved in designing, operation, maintenance and implementing small hydropower systems. As the training course will be conducted in English, participants should have sufficient proficiency to follow lectures and express themselves in this language without difficulty.
Purpose of the Course:	The course aim at equipping participants with relevant technical skill and experience in planning, designing, developing, and operation of small hydropower plants. This is inherently expected to increase the regional generating capacity thereby accelerating rural access to electrical energy which can be efficiently sustained with competent human resource capital.
Nature of the Course:	The training course consists of lectures and practical session on design and installation, operation and Maintenance of small hydropower Systems. The

training will involve lectures, practical lessons and field visit that would provide content on hydro design, project development process, quality control and assurance, electro-mechanical equipment, as well as operation and maintenance of a hydropower plant.

Detail training programme is in the Annex.

Expected Outcomes

- Enhanced skills in trouble shooting as well as operational and maintenance practices by hydropower plant operators to reduce downtimes and promote reliability of supply from small hydropower plants.
- Knowledge enhancement in small hydropower scheme development with regard to quality control and assurance so as promote sustainable and efficient power plants.
- Improved competence in quality control and assurance during hydro power plant development.

Certification: After successful completion, each participant will receive certificate of attendance.

Application Procedure: Applicants should complete the standard EACREEE application form for training courses and submit by E-Mail to info@eacreee.org copied to info@creec.or.ug not later than 13th August 2019. The applications **must** be endorsed by the employer. Nominations received after that date will not be considered.

Financial Arrangements: The training fees for this course is US$300 per participants – which will be covered by bfz for selected participants. However, each participant will make self-arrangements for travel and accommodation during the training course.

The organizers will provide lunches and coffee breaks during the training course.

Liabilities: The organizers of the course do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is traveling to and from or attending the course, and it is clearly understood that each participants (or sponsor), undertakes responsibility for such coverage. The participants would be well advised to take out insurance against these risks.

Contact Persons:

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EAST AFRICAN REGIONAL TRAINING COURSE ON DEVELOPMENT, DESIGN, INSTALLATION AND OPERATION OF SMALL HYDROPOWER PLANTS

AGENDA

DAY 1: Sunday, 29 September 2019

Time	Activity	Facilitator
13:30 - 14:00	Arrival and Registration	
14:00-18:00	Travel for Site Visit in Kasese	

DAY 2: Monday, 30 September 2019

Time	Activity	Facilitator
9:00 - 12:45	Site Visit	
12:45 - 14:00	Lunch	
14:00-18:00	Travel back to Kampala	

DAY 3: Tuesday, 1 October 2019

Time	Activity	Facilitator
8:30 – 9:00	Registration	
9:00-10:15	Official Training Opening	
10:15 - 10:30	Coffee Break	
10:30 - 12:45	**Introduction to Micro & Small Hydropower Systems** *Overview of M& SHP Systems, Rural Electrification and other applications, Economics, Social and Environmental aspects, sustainability issues.*	Rana Singh
12:45 - 14:00	Lunch	
14:00 - 15:30	**Basics of hydropower** *Hydrological cycle, Types of hydro power plant and their layout, Determination of Power & Energy Power Plant structures and water turbines.*	
15:30 - 15:45	Coffee Break	
15:45 – 17:00	**Site Survey** *Site identification, Hydrological Study, Topographic and Geology Study, Optimal utilization of stream potential, Social and Environmental Impact Assessment, Elements of Feasibility Study, Prefeasibility Study, Cost estimation, Financial analysis, Clearances, Use of Modern Techniques such as GPS, RS and GIS for conducting investigations and assessment.*	

DAY 2: Wednesday, 2 October 2019

Time	Activity	Facilitator
9:00-10:45	**Site Survey** *Site identification, Hydrological Study, Topographic and Geology Study, Optimal utilization of stream potential, Social and Environmental Impact Assessment, Elements of Feasibility Study, Prefeasibility Study, Cost estimation, Financial analysis, Clearances, Use of Modern Techniques such as GPS, RS and GIS for conducting investigations and assessment.*	
10:45 - 11:00	Coffee Break	
11:00 - 12:45	Practical and Exercise Session	

12:45 - 14:00	**Lunch**	
14:00 - 15:30	**Selection and Design of Electro-Mechanical Equipment of SHP** *Introduction of electro-mechanical equipment of SHP, Selection of hydro turbine, governing system, Design and construction of hydro turbine, Selection of hydro generator and AVR & Excitation system, Design and construction of hydro generator Automation, Control and monitoring systems- various options and selection, Abnormal operating conditions and protection system for safety of machines, Selection of switchyard equipment, lay out and main single line diagram, Selection of power station auxiliaries and AC auxiliary system, Battery, battery charger and DC system..*	
15:30 - 15:45	**Coffee Break**	
15:45 – 17:00	**Selection and Design of Electro-Mechanical Equipment of SHP (Cont')** *Introduction of electro-mechanical equipment of SHP, Selection of hydro turbine, governing system, Design and construction of hydro turbine, Selection of hydro generator and AVR & Excitation system, Design and construction of hydro generator Automation, Control and monitoring systems- various options and selection, Abnormal operating conditions and protection system for safety of machines, Selection of switchyard equipment, lay out and main single line diagram, Selection of power station auxiliaries and AC auxiliary system, Battery, battery charger and DC system..*	

DAY 4: Thursday, 3 October 2019

Time	Activity	Facilitator
9:00-10:45	**Selection and Design of Electro-Mechanical Equipment of SHP (Cont')** *Introduction of electro-mechanical equipment of SHP, Selection of hydro turbine, governing system, Design and construction of hydro turbine, Selection of hydro generator and AVR & Excitation system, Design and construction of hydro generator Automation, Control and monitoring systems- various options and selection, Abnormal operating conditions and protection system for safety of machines, Selection of switchyard equipment, lay out and main single line diagram, Selection of power station auxiliaries and AC auxiliary system, Battery, battery charger and DC system..*	
10:45 - 11:00	**Coffee Break**	
11:00 - 12:45	**System Design: Exercises**	
12:45 - 14:00	**Lunch**	
14:00 - 15:30	**Operation and Maintenance of SHP** *Operation of SHP plants, Operational problems and maintenance in SHP plants, Control and protection equipment, Standards and practices for operation and maintenance of electro-mechanical equipment, Maintaining a SHP plant, Renovation, life extension and upgrading of existing stations.*	
15:30 - 15:45	**Coffee Break**	
15:45 – 17:00	**Operation and Maintenance of SHP (Cont')** *Operation of SHP plants, Operational problems and maintenance in SHP plants, Control and protection equipment, Standards and practices for operation and maintenance of electro-mechanical equipment, Maintaining a SHP plant, Renovation, life extension and upgrading of existing stations.*	

DAY 5: Friday, 4 October 2019

Time	Activity	Facilitator
9:00-10:45	**Operation and Maintenance of SHP (Cont')** *Operation of SHP plants, Operational problems and maintenance in SHP plants, Control and protection equipment, Standards and practices for operation and maintenance of electro-mechanical equipment, Maintaining a SHP plant, Renovation, life extension and upgrading of existing stations.*	
10:45 - 11:00	**Coffee Break**	
11:00 - 12:45	**Recap: Sharing of Experiences**	
12:45 - 14:00	**Lunch**	
14:00 - 15:30	**Closing and Award of Certificates**	
15:30 - 15:45	**Coffee Break and departure**	