German Solar Academy Cameroon

HOCHSCHULE SRH BERLIN

Landesstelle für gewerbliche Berufsförderung in Entwicklungsländern

Berlin.de

GSACameroon (German solar academy Cameroon) &

GERMAN PARTNERS (SRH UNIVERSITY and PROFESSIONAL TRAINING CENTER, BERLIN)

ADVANCE COURSE IN RENEWABLE ENERGY

Course Objective

Subject of this course is photovoltaics – the technology which converts sunlight directly into electrical power. The photovoltaic technology belongs to the fastest growing sector among the advanced Renewable Energy industry. During the last two decades photovoltaics became well established and the enormous potential for power generation especially for sun-rich countries is apparent. Thus it will form one of the key technologies in power industry of the 21st century driven by concerns about rising prices of fossil fuel, power security or carbon emissions. Regarding these aspects photovoltaic technology has clear advantages. Scalable off-grid photovoltaic systems allow flexible and stable power supply for any private household, photovoltaic micro grids can be used to ensure the power service for community independent of the national grid and on-grid systems can be employed to enhance the capacity of the national power grid. Additionally photovoltaic systems are characterized by a long lifetime of up to 20 years with low maintenance and zero emission. Since the sun light as the only primary resource needed is for free the price for power is low over the life time compared to fossil driven systems.

This course is addressed to professionals in power sector and all those who are interested in Renewable Energy technology, especially photovoltaics. In the first part of the course the fundamentals of photovoltaic technology are learned. Special focus is put on practice like layout, implementation and installation of photovoltaic systems in the second part of the course coached and trained by experts.

Course Content

1.1 Principes fondamentaux

01_Systemes photovoltaiques et Application
02_Le rayonnement Solaire
03_Effet PV et fonctionnement des ccellules solaires
04_Caractéristiques électriques des cellules solarires

1.2 Les Modules Photovoltaique

05_Types and composition of photovoltaic modules
06_Characteristique I-V curves for modules

1.3 photovoltaique Hors réseau

07_ Composition des systèmes photovoltaïques autonomes
08_Les Batteries dans les systèmes photovoltaïques autonomes
09_ Régulateurs de charge
10_ Onduleurs autonomes
11_Boîte de junction du générateur, diodes de serie (branche) et fusibles de série (branche)

1.4 Planification et dimensionnement hors réseau des Systèmes photovoltaïques

12_Systèmes DC et AC couplés
13_Mesure de la consommation d'électricité
14_Dimensionnement des systèmes photovoltaïques
15_Dimensionnement de la batterie
16_Dimensionnement de la section de câble
17_ Utilisation d'un onduleur

1.5 Systèmes photovoltaïques raccordées au réseau

18_ Composants de systèmes PV connectés au réseau
19_ Types d'onduleurs connectés au réseau

1.6 Systèmes photovoltaïques planification et dimensionnement raccordés au réseau

20_ les concepts de systèmes
21_ Dimensionnement des onduleurs connectés au réseau
22_ Dimensionnement des câbles pour les systèmes PV connectés au réseau
23_ Sélection et dimensionnement de la boîte de jonction PV et l'interrupteur principal DC
24_ mesures de protection
25_ Prévisions Rendement

1.7 Systèmes de montage et de l'intégration du bâtiment

26_ toits bases
27_Façade basics
28_Photovoltaic facades
29_Glass roofs
30_Mounting systems for free-standing installations

1.8 Installing, Commissioning and Operating Photovoltaic Systems

31_General installation notes
32_Shading Analysis
33_Example installation of a stand-alone photovoltaic system
34_Photovoltaic systems in decentral electricity grids (micro and mini grids)
35_Guarantee
36_Breakdowns, typical faults and maintenance of photovoltaic systems
37_Troubleshooting
38_Monitoring operating data
39_Long-term experience and quality

1.9 Economic Performance and Environmental Assessment

40_Power production costs
41_Technological trends and cost impact
42_Energy payback and harvest factor
43_Module recycling concepts

1.10 Practice

44_Planning and installation of an off-grid system
45_Monitoring operating data