



Special training program on Renewable Energy Framework and Capacity Building in Developing Countries initiated and coordinated by IFEED, at Solar Center Mecklenburg-Pomerania, Wietow, Germany.

IFEED organized a training course for 7 researchers of the Ministry of Science and Technology (MoST), Baghdad, Iraq in the period from 30 November – 11 December 2014.

The training course could be performed with substantial financial and logistical aid of the US Civilian Research and Development Foundation (CRDF Global), Arlington, Virginia, USA with its office in Amman, Jordan.

The program included lectures by trainees and technical excursions.

1.0 Contents of the Workshop

- Discussion on the outlines of the contents of the training program and presentation of the recent development of renewable energy applications activities in Iraq, Germany and the USA as well as in global context.
- Introduction of the PVS 2000: Photovoltaic simulation program version 2000 and technical requirements.
- Lectures on Laser light technologies, Fresnel lens system for solar pumping and Nanotechnology applications.
- State of knowledge on nanotechnology for nano-solar cells (DSSC) fabrication.
 - Solar thermal collectors and systems, theory and practice.
- Simulation of solar photo voltaic and thermal systems and applications.
- Solar light, spectrometry and measurements.
- Electro mobility, demonstration of several electric cars and principals of construction.
- Conditions for installations of weather stations for renewable energy studies (software and hardware).
- Introduction and demonstration of Smart PV, smart houses and smart control technologies.
- Description and presentation of effecient greenhouses, light separation and climate control in greenhouses.
- Presentation of different types of small wind turbines (up to 3 kW), their features and installations.
- Importance of big wind turbines (up to 7.5 MW power) for countrywide power supply and transmission issues.
- Big PV and solar thermal technologies and systems, simulation and applications.
- Solar food and bio-photons for healthy nutrition supply.
- Ecological building materials for low energy consumption.
- Biomass resources and conversion technologies for heat, electricity and fuels.
- Presentaion of concentrated solar thermal technologies for electricity and water desalination.
- Planning and implementation of integrated energy rural villages and solar oases for poverty alleviation.
- All seven trainees from Iraq presented lectures on their own research activities in renewable energy in the research Centre of MoST, Baghdad, Iraq.

2.0 Technical Excursions

- Modern community biogas plant, Schimm Biogas Company, MV
- Grid-connected Wind power plants in Lübow, capacity 2 MW
- Small wind turbine DELA company, Neubukow
- Historical Dutch wind mill for cereals, Stove



- Green Campus University Wismar, growth chambers, plant extraction, Malchow
- Biggest German Pellets Production Company, Wismar
- Discussion on renewable energy policy in MV with State Parliament member, State Parliament of Mecklenburg-Pomerania, Schwerin, Germany
- Test fields on shore wind mills up to 7.5 MV, the biggest worldwide wind turbine
- Energy power greenhouse and solar plus energy house, Solarcenter - Wietow
- Parabolic trough company Solarlite, Duckwitz, Germany

3.0 Assessment

The participants showed high interest in the program and covered topics, during the training. They intensively participated in the discussions and were very motivated. The training units lasted up to 12 hours and on some days the participants worked with their trainees until 12h midnight.

The discussion went between the trainers and the grantees on their requested equipment have revealed minor changes to their lists.

They received certificates and also electronic copies for all the lectures, presentations, profiles of the companies and research organizations, related computer software and documented photographs.

4.0 Recommendations

- IFEED offers its expertise organization of further workshops and training courses, coordination and planning of the necessary steps for deployment of renewable energy systems in Developing Countries to overcome power, food and water shortage.
- Setting-up supporting teams with international experience in projection, construction and implementation of projects.
- Promoting cooperation with international institutions in science and technologies.
- Exchange students and academic staff in the field of renewable energies. Further training for specific and specialized topics might be necessary.
- The participants need to receive in depth further special courses on their specific fields of research for longer periods.

7.0 Acknowledgements

The training course could be only performed with substantial financial and logistical aid of the US Civilian Research and Development Foundation (CRDF Global), Arlington, Virginia, USA with its office in Amman, Jordan. CRDF Global is an independent nonprofit organization that promotes international scientific and technical collaboration through grants, technical resources, training and services. Its Mission is to promote peace and prosperity through international science collaboration.

The IFEED staff did the most arduous and time consuming work of preparing the training course and made great efforts to organize and coordinate the contents of the program, to offer high qualified trainers and to ensure the logistical framework.

The staff of IFEED-Solar Training Center Mecklenburg-Pomerania, Wietow, Germany made major efforts in developing the program, offering technical facilities, technical excursions, catering and accommodations.

The Ministry of Science and Technology, Baghdad, Iraq nominated and took the necessary steps to ensure the participation of the grantees.

The German Embassy in Baghdad facilitated the issuing of the visas.

Most grateful thanks are due to the all involved organizations and their staff members.

Prof. Dr. N. El Bassam

Director of IFEED

Germany, 11th of December 2014