

## leXsolar-Academy

### “Renewable Energies:

### Fundamentals, Applications, Economic Prospects and Latest Trends”

**Date:** May 8th 2015

**Place:** UniMAP, Perlis, Malaysia

**Time:** 9am – 4.30pm (break 12.30am – 2.45 pm)

**Number of participants:** 60 – 100

**Target group:** Lecturers, post graduate students, final year students

**Lecturer:** Ronny Timmreck, leXsolar, Germany

#### Background

Renewable energies have entered the mainstream! They are not anymore niche products for enthusiasts. Most governments of the world have passed ambitious policy targets to increase renewable energy deployment.

After a significant share of renewables in energy production has been reached in many countries, the challenges of storing electricity and achieving high grid stability become more and more important. Furthermore, electric mobility becomes another focus of attention since conventional vehicles are strongly contributing to greenhouse effect. The global goals for electric vehicles are tremendous: Only the EU, the U.S. and China together aim for more than 15 million electric cars until 2020!

Without putting great effort into education and training of future engineers all these targets cannot be reached!

Therefore, the fundamentals of renewables, smart grids as well as energy storage technologies have to be integrated much more into the curricula of colleges, universities or polytechnics.

The offered training will on the one hand give an overview of the state of the art renewable energy solutions, the current status of smart grids and a fundamental overview of electric storage technologies. On the other hand participants will use the leXsolar training systems “leXsolar-PV Professional” and “leXsolar-Wind Professional” for sophisticated lab based experiments to understand the basics and applications of these technologies.

**Contents of the training:****PART I: Lecture (9am – 12.30am)**

1. Introduction (30min)
  - Motivation
  - Overview of renewable energies
  - Detailed analysis of renewable energies and its applications
  - Prospects for renewables and worldwide market overview
2. Photovoltaic Technology (60 min)
  - Fundamentals
  - Applications
  - Curriculum integration
3. Wind power Technology (60 min)
  - Fundamentals
  - Applications
  - Curriculum integration
4. Storage technologies and electric mobility (30 min)
  - Overview of storage technologies
  - Battery technologies
  - Characteristic values and dimensioning of batteries in systems – especially electric mobility
  - Curriculum integration
5. Smart Grids (30 min)
  - What is a smart grid and comparison to conventional grids
  - Challenges when integrating renewables into electricity grids
  - Technical solutions to increase grid stability
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**Part 2: Experiments (2.45pm – 4.30pm)**

1. Material:
  - 5 leXsolar-PV Professional
  - 5 leXsolar-Wind Professional
  - 5 leXsolar-Wind Ready-to-go
2. Experiments: 1 PV-Experiments, 2 Wind-Experiment (working in groups of 4-7 persons)
3. Concept: Each Participant will be able to conduct all three experiments

**Benefits for the participants**

- Getting a deep insight into renewable energy technologies, smart grids and energy storage technologies
- Getting an overview of the market prospects of renewables
- Understanding fundamentals of these technologies and learn how they can be applied

**For lecturers:**

- Being able to teach these topics in engineering study courses
- Being able to supervise lab courses with leXsolar products