

Program - International Summer School Sustainable Energy Systems

Interdependence between Technical Design and Social Acceptance

September 23 – 28, 2013, Dresden, Germany

The **TUD International Summer School on Sustainable Energy Systems** aims at bringing excellent students and young researchers in the broad-based fields of engineering, economic and social sciences together in order to discuss current and future research questions arising with the shaping of our future energy systems. The summer school will provide comprehensive knowledge from diverse disciplines including various methods aiming a matching process along the interdisciplinary research questions. Emphasis is put on scientific interaction and an exchange of thoughts in the context of interdisciplinarity. Especially, relevant research questions with regard to energy systems should be discussed in the intersection of the different disciplines. Thus, participants from all disciplines, e.g. mechanical and power engineering, economics, communication and political sciences, with interest in the shaping of our future energy systems are welcome to participate.

Programme

The summer school consists of three parts:

- Lectures from well-known experts by TU Dresden (TUD) and international partners from various disciplines, in particular engineering, economics, communication and political sciences
- Participants will work on interdisciplinary issues and present their group results along example case studies
- Field trip towards the Institute of Power Engineering and the Center for Energy Technology (CET) at TU Dresden

Educational objectives

The summer school will excite for an interdisciplinary view on the challenges of the shaping of our future energy system and will introduce to the methodological approaches from the different disciplines. The broad spectrum of educational objectives contains:

- Participants will get familiar with innovative technical designs on sustainable energy systems
- Participants will get an overview about energy policies in various European countries and understand their influence on the shaping of the energy system
- Participants will get an overview of dimensions in and distributions of people's attitudes and behaviors on energy-related subjects and to which extent media can affect public opinion

Thereby, the following learning transfers should be achieved:

- Participants have formed their scientific approach while passing the interdisciplinary discourse about the shaping of our future energy system
- Participants have majored interdisciplinary skills in the topical thematic field of sustainable energy systems
- Participants are capable to match disciplinary methods towards a method-mix addressed to their fields of research interests and case studies

Monday, 23th September 2013

- 8:30 *Come together*
- 9:00 **Adress of Welcome**
Prof. Dr. Hans Müller-Steinhagen
Rector of TU Dresden
- 9:30 **Round of introduction**
- 10:00 *Break*
- 10:30 **Shaping our Future Energy System**
Prof. Dr. Dominik Möst and Daniel Schubert (TUD)
- Prospects and challenges of energy supply
 - Investments, generation and electricity markets
 - Integration of renewable energies
- 12:30 *Lunch*
- 13:30 **Introduction to the Case Study**
- 15:00 *Break*
- 15:30 **Biogas and Biomethane**
Prof. Dr.-Ing. Norbert Mollekopf and Onkar Dixit (TUD)
- Potential and challenges
 - Process upgrading
 - Policy discussion
- 17:30 *End of day 1*
- 19:30 *Come-together - Canapé and Poster Session*

Tuesday, 24th September 2013

- 9:00 **Mobile Applications of Energy Systems**
Dr.-Ing. Tino Schmiel and Alexander Kruse (TUD)
- Concepts of energy conversion, power regulation, power distribution and energy storage
 - Performance properties and selection criteria for aerospace and automotive
 - Waste heat recovery for mobile applications
- 11:00 *Break*
- 11:30 **Perspectives towards a Hydrogen Based Energy Supply**
Dr. Johannes Töpler (German Hydrogen and Fuel Cell Association)
- Available storage technologies
 - Safety aspects
 - Specific applications for hydrogen
- 13:00 *Lunch*
- 14:00 **Hydrogen**
Prof. Dr.-Ing. Ullrich Hesse and Mario Ludwig (TUD)
- Liquid versus Gaseous Hydrogen
 - Strategy for an Enhanced Hydrogen Liquefaction
 - Hydrogen based Peak Power Management
- 16:00 *Break*
- 16:30 **Energy Policy and Energy Systems in Finland**
Prof. Dr.-Ing. Matti Lehtonen (Aalto University)
- Power markets and associated legislation
 - Power generation and power use, and
 - Distribution systems in Finland
- 18:00 *End of day 2*
- 19:00 *City Tour in Group*

Wednesday, 25th September 2013

- 8:30 **Field Trip**
- Center for Energy Technology (CET)
(Prof. Dr.-Ing. habil. Antonio Hurtado)

 - Institute of Power Engineering
(Prof. Dr.-Ing. Peter Schegner)
- 13:00 *Lunch*
- 14:00 **Working Groups**
Preparation of case studies
- 15:30 *Break*
- 16:00 **Working Groups (Continued)**
Preparation of case studies
- 18:00 *End of day 3*
Free time

Thursday, 26th September 2013

- 9:00 **Energy Policy: Challenges for the Political System**
Prof. Dr. Werner J. Patzelt and Sebastian Thuß (TUD)
- ‘Political sustainability’: the need for a new energy consensus
 - Current policy options in the context of the German institutional setting
- 11:00 *Break*
- 11:30 **Public Acceptance of Major Projects - Case Study: the South German Ethylene Pipeline**
Prof. Dr.-Ing. Aldo Belloni (Linde)
- 13:00 *Lunch*
- 14:00 **Opportunities and Challenges of Energy Supply**
Prof. Dr.-Ing. habil. Antonio Hurtado and Mark Erndt (TUD)
- Energy sources today and beyond
 - Development of energy demand
 - Issues of different energy sources
- 15:00 *Break*
- 15:30 **Offshore Wind**
Prof. Dr. Antje Orths (energienet.dk)
- International Status and Perspective
 - Ten Countries’ Investigations – Outcome so far
- 17:00 *End of day 4*
- 20:00 *Self-payer option: Semper Oper – Saxon State Orchestra: 1. Kammerabend*

Friday, 27th September 2013

- 9:00 **Ecological Assessment**
Prof. Dr. Edeltraud Günther and Stefan Münch (TUD)
- Environmental Management Accounting
 - Does it pay to be green?
 - Barriers to Greening
- 11:00 *Break*
- 11:30 **Life Cycle Assessment (LCA) of Energy (Session 1/2)**
Prof. Adisa Azapagic, Ph.D. (University of Manchester)
- Introduction to LCA
 - LCA of different energy options
 - Case study and hands-on exercise
- 13:00 *Lunch*
- 14:00 **Life Cycle Assessment (LCA) of Energy (Session 2/2)**
Prof. Adisa Azapagic, Ph.D. (University of Manchester)
- 16:30 *Break*
- 17:00 **Technical Aspect of the German Energy Transition**
Prof. Dr.-Ing. Peter Schegner and Niels Erdmann (TUD)
- Challenges in electricity grid expansion
 - Approaches of solution
 - Holistic approach of validation energy transmission systems
- 19:00 *End of day 5*
- 20:00 *Summer School dinner*

Saturday, 28th September 2013

- 9:00 **Science Communication**
Prof. Dr. Wolfgang Donsbach, Adriane Schmidt and Thomas Meyer (TUD)
- Science, the public, the media
 - The scientist-journalist relationship
- 11:00 *Break*
- 11:00 **Reducing Energy Demand?**
Prof. Dr. Hannes Weigt (University Basel)
- Demand Reduction and the Efficiency Gap
 - Efficiency vs. Sufficiency
 - Demand Side Management or Demand Side Participation?
- 12:30 *Lunch*
- 13:30 **Presentation of case study results**
- 15:30 *Break*
- 16:00 **Summary and Wrap-up**
- 17:00 *End of Summer School*