

# Overview Tutorials

13 October 2009, Bremen

9.00 am

## Basic Track

### Session A- Overview of Wind Turbine Technology

*Dr. Eckehard Tröster and Dr. Thomas Ackermann, Energynautics*

#### Wind Turbines – Basic Principles and Generator Concepts

- Wind energy conversion, Betz law etc.
- Wind turbine components
- Status of technology

#### Basic Overview of Wind Turbine Designs

- Fix speed induction generator
- Induction generator with variable rotor resistance
- Doubly-fed induction generator
- Generator with fully rated converter

#### Basic Overview of Grid Code Issues

#### Discussion

13.00

Lunch

14.00

### Session B- Introduction to Wind Turbine Modeling

#### 1) Basic Overview of Wind Turbine Models (1h)

*Dr. Eckehard Tröster, Energynautics*

#### 2) Modeling Wind Turbines in Digsilent (1h)

*Nis Martensen, Energynautics*

#### 3) Modeling Wind Turbines in PSS<sup>®</sup>E (1h)

*Ralph Hendriks, Siemens*

#### 4) Validation of Wind Turbine Models (1h)

*Mark Meuser, Forschungsgemeinschaft für elektrische Anlagen und Stromwirtschaft e.V. (FGH)*

#### Discussion

18.00

## Advanced Track

### Session C- Advanced Modeling of Wind Turbines – Part 1

#### 1) Modeling Wind Turbines in Digsilent (1h)

*Dr. Markus Pöller, Digsilent*

#### 2) Modeling Wind Turbines in PSS<sup>®</sup>E (1h)

*Ralph Hendriks, Siemens*

#### 3) Validation of Wind Turbine Models (1h)

*Mark Meuser, Forschungsgemeinschaft für elektrische Anlagen und Stromwirtschaft e.V. (FGH)*

#### 4) Grid Integration Studies – Part 1 (1h)

*Dr. Markus Pöller, Digsilent*

- Impact on Distribution;

#### Discussion

### Session D- Advanced Modeling of Wind Turbines – Part 2

#### 1) Grid Integration Studies – Part 2 (1h)

*Dr. Markus Pöller, Digsilent*

- Impact on Transmission Systems
- Impact on System Stability

#### 2) Wind Turbine Models – the Enercon Perspective (1.5h)

*Dr. Angelo Mendonca, Enercon*

#### 3) Wind Turbine Models – the Vestas Perspective (1.5h)

*Bo Hesselbæk, Vestas Denmark*

#### Discussion

### Session E - Patents for Wind Energy Technology

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#### Introduction and Guidelines from a Patent Authority