



**KUNGL. TEKNISKA HÖGSKOLAN**  
Royal Institute of Technology

## **Third International Workshop on Transmission Networks for Offshore Wind Farms**

**April 11 – 12, 2002**

**Royal Institute of Technology, Stockholm, Sweden**

### **Preliminary Program**

(Version 1.3, 2002-03-25)

#### **Wednesday 10 April 2002**

18:00-20:00 Registration & Snack

#### **Thursday 11 April 2002**

8:00-9:00 Registration

**9:00 - 9:15 Welcome and Introduction, Thomas Ackermann, KTH**

#### **9:15-10:30 Session 1: Projects and Experiences**

9:15 - 10:15 Presentations:

- *Offshore Electrical System Experiences - or how to mix water and electricity safely;* by Hugh Yendole, Shell WindEnergy, UK;
- *The Swedish Experience, Utgrunden Offshore Windfarm;* Thomas Stalin, Enron Wind Sverige AB;
- *Danish offshore wind farm in The Baltic Sea;* Steen Beck Nielsen, SEAS, Denmark;

10:15 - 10:40 Discussions, Discussion leader: Thomas Ackermann

10:40 - 11:00 Coffee break

#### **11:00-13:00 Session 2: Network Integration Issues I**

11.00-12.15 Presentations:

- *Introduction to Offshore Wind,* Colin Morgan / Garrad Hassan (UK);
- *Solutions for Transmission and Interconnection of Offshore Wind Farms* by Günther Brauner, Institute of Power Systems and Energy Economics, Vienna University of Technology, Austria;
- *Integrating Large (Offshore) Wind Power Plants in the European Electricity Networks* by K. Burgers & E. van Zuylen, Ecofys, Utrecht, The Netherlands;
- *Network Connection Issues For Offshore Wind Farms In UK Waters* by P. Gardner, Garrad Hassan, Glasgow, UK;

12:15-13:00 Discussions, Discussion leader: Paul Gardner

**13:00-14:00 Lunch**

### 14:00-15:30 Session 3: Network Integration Issues II

14.00 - 15.00 Presentations:

- ***Topology and Governance of the United States Electricity Grid - Implications for Wind Development*** by James H. Caldwell Jr., Policy Director of the American Wind Energy Association, USA;
- ***The Impact Of Offshore Wind Farm Output Power Fluctuations On A Power Grid*** by Eduard Muljadi, National Wind Technology Center, National Renewable Energy Laboratory, Golden, USA;
- ***An Undersea Transmission Grid to Offload Offshore Wind Farms in the Irish Sea*** by Rick Watson, Dept of Electronic and Electrical Engineering, University College Dublin, Ireland;

15:00-15:25 Discussions, Discussion leader: Lennart Söder

15:25-15:40 Coffee break

### 15:40-17:00 Session 4

15.40-16.40 Presentations:

- ***Special Issues Concerning Wind Power Prediction for Offshore Wind Farms*** by Hans-Peter Waldl, Overspeed GmbH, Oldenburg, Germany;
- ***Wind Farm Control Software Structure*** by Jörgen Svensson, Dept. of Industrial Electrical Engineering and Automation (IEA), Lund University, Sweden;
- ***Switch For Converting AC Transmission Into DC (And Back)*** by Parviz Ali-Zada, Electronics Department, Fatih University, Istanbul, Turkey

16:40-17:00 Discussions, Discussion leader:

17.30-18.15:

A short (15 min) lecture about fuel cells and a visit to fuel cell laboratory of Applied Electrochemistry at KTH. After the lecture there will be a short discussion about possible synergetic effect of wind power and fuel cells in power systems.

After discussion there is a short tour to fuel cell laboratory of Applied Electrochemistry. A number of participants will be limited to 15 due to lack of space.

The lecture and visit is organised to participants who have a special interest on fuel cells and hydrogen. The laboratory of Applied Electrochemistry is located about 500 meters from main the workshop's seminar room.

### 19:30 Workshop Dinner

**Friday 12 April 2002**

**09:00-10:30 Session 5: An Alternative for Transmission Systems: Hydrogen**

9:00-10.00 Presentations:

- ***Hydrogen as a Storage and Transportation Vector for Offshore Wind Power Production***; Th. Feck, R. Steinberger-Wilckens, K. Stolzenburg; PLANET – Planungsgruppe Energie und Technik; Oldenburg, Germany;
- ***Offshore Wind Farms For Hydrogen Production Subject To Uncertainties***, Nabil Kassem, Royal Institute of Technology, Dept. of Energy Processes, Stockholm, Sweden;
- ***Offshore Wind Potential in Libya: Possibilities for Strategic Plans for Hydrogen Production*** by W. El-Osta and Y. Khalifa, Center for Solar Energy Studies, Tripoli, Libya;

10.00-10.30 Discussions, Discussion Leader: *Jari Ihonen, KTH*

10:30-10:50 Coffee break

**10:50-13:00 Session 6: Transmission Issues**

10:50-12.10 Presentations:

- ***AC or DC for connecting Offshore Wind Farms to the Transmission Grid?*** by Michael Haeusler, ABB Calor Emag Schaltanlagen AG, Mannheim, Germany and Fredrik Owman, ABB New Ventures GmbH, Mannheim, Germany;
- ***HVDC Transmission for Large Offshore Wind Farms***, by N.M. Kirby, W. Siepmann, L. Xu – ALSTOM T&D, UK.
- ***Transmission Networks Serving Offshore Wind Farms Based On Induction Generators*** by Rolf Grünbaum, Per Halvarsson, David Larsson, Lennart Ångquist; ABB Utilities AB, Power Systems, Vasteras, Sweden;
- ***Power Transmission Over Long Three Core Submarine AC Cables*** by Frode Rudolfsen; Norwegian University Of Science And Technology, Norway;

12:10-13:00 Discussions, Discussion Leader: *Peter Christensen*

**13:00-14:00 Lunch**

## 14:00-15:40 Session 7: Power Systems Dynamics

14.00-15.40 Presentations:

- ***Introduction to Modelling for System Stability and Operation Studies*** by Lawrence Jones, Alstom EMM, USA.
- ***Dynamic Models for Modern Wind Turbine Generators and Their Application to Offshore Wind Farms*** by Steven Stapleton, Paul Hopewell, Leslie Bryans, Power Technologies International, Cheshire, UK;
- ***Modelling of Variable-Speed Wind Turbines with Double-Feed Induction Generators in Short-Term Stability Investigations*** by Vladislav Akhmatov, NESA Transmission Planning, Copenhagen, Denmark;

15:00-15:20 Coffee break

- ***Stability Analysis of Grid Connected Wind Power Generation System*** by Tomonobu Senjyu, Norihide Sueyoshi, Katsumi Uezato( all University of the Ryukyus) and Toshihisa Funabashi (Meidensha Corporation);
- ***Potential Impacts of Wind Power on Power System Transient Stability*** by Han Sloopweg & Wil Kling, Electrical Power Systems Laboratory, Delft University Of Technology, Delft, The Netherlands.

16:00-16:20 Discussions, Discussion Leader: Lawrence Jones, Alstom EMM

16:20–16.30 [Final Discussions, \(Lawrence Jones/ Thomas Ackermann\)](#)

16.30 **Closing Remarks**