

**31ST INTERNATIONAL CONFERENCE OF THE INTERNATIONAL
ASSOCIATION FOR ENERGY ECONOMICS (IAEE)
JUNE 18 - 20, 2008, ISTANBUL**

Extended Abstract

***"Making the Turkish transmission system
ready for integrating large amounts of wind energy"***

Jens Bömer

Ecofys Germany GmbH

Stralauer Platz 34, 10243 Berlin, Germany

+49 30 2977 3579 – 14, j.boemer@ecofys.de

Background

In November 2007, the Turkish Electricity Market Regulatory Authority (EPDK) has received 78.000 MW license applications for wind energy. Although the general expectation is that only five to ten percent of these applications will be granted the license, a huge increase of wind energy in the grid is foreseen for the coming years. As the experience has shown in other countries (e.g. Germany and Spain) this strong development of wind energy results in a big technical challenge and therefore requires adequate measures to be taken.

Aim

The paper will discuss necessary technical and regulatory measures from a systems perspective that would enable the Turkish transmission system to take up large amounts of wind energy in the future.

Methodology

The paper bases on an international best-practice analysis from the author's experience and related publications. Special focus will be put on innovative grid technologies, such as high-temperature conductors and dynamic rating of overhead transmission lines, possibilities of undergrounding transmission lines; at the same time, new technical requirements for wind turbines including fault-ride-through capability and voltage support during fault will be regarded. Among the regulatory measures, innovative methods of project financing toward renewable energy grid readiness are presented.

**31ST INTERNATIONAL CONFERENCE OF THE INTERNATIONAL
ASSOCIATION FOR ENERGY ECONOMICS (IAEE)
JUNE 18 - 20, 2008, ISTANBUL**

Preliminary Results

Recent studies have shown that the capacity of transmission lines is increased up to 50 percent by replacing existing conductors with high-temperature conductors. Dynamic rating of overhead lines, e.g. by operating them according to the surrounding wind conditions that may have a cooling effect on the line, provides capacity gains in the order of 30-50 percent during operation.

For stability reasons it was found that wind turbines should at least be able to run through grid faults without disconnection. Moreover, the support of the grid voltage during a fault by a high reactive current can improve the system's voltage stability.

The paper will conclude with a list of recommendations for the short, medium and long term.

Selected References

[1] C. Ensslin; K. Burges; J. Boemer: Market introduction perspectives of innovative technologies supporting integration of RES-E. Technical Report for the study "Grid Integration of Electricity from Renewable Energy", International Energy Agency, to be published in 2008

[2] J. Bömer, M. Ferdinand: Current Developments and Activities to Improve the Integration of Wind Energy into the German Interconnected System, Global Windpower, Adelaide, September 2006