

## Austrian and German Joint IEEE IAS/PELS/IES chapters meet in Timelkam and Altmünster (Austria)

Since the 1960s, the Austrian railway (ÖBB) has been filling the growing gap between the generated energy in its own power plants and the demand of the railway operations by converter plants mostly by the use of rotary converters.

In 2009, a static converter was installed in Timelkam directly between two masts of the 110 kV backbone network and in close proximity to the gas & steam power plant of Energie AG. The converter was built by ABB using more or less standard converter units operating at 2 x 2.5 kV DC link voltage. IGBTs were used as power switches in this converter.

The combined heat and power plant of the Energie AG is based on a gas & steam process. The nominal rating is 400 MW of electrical power + 100 MW of thermal power. The plant has a maximum efficiency of 59% with a turbine exhaust temperature of 1250°C.

Only a month after the official formation of the Austrian joint IAS/PELS/IES chapter, about 60 guests and members of the new Austrian and German joint chapter met in Upper Austria (Timelkam and Altmünster) for the first joint meeting. More of these common activities are expected to happen in the next years.

The foundation of the new Austrian joint IEEE IAS/PELS/IES chapter had been initiated and coordinated by Prof. Annette Mütze (Graz University of Technology). The meeting itself was organized jointly by Prof. Mütze and Prof. Helmut Weiß from the Montanuniversity of Leoben.

At about 30°C (86°F) and plenty of sunshine, the meeting started with an excursion to the static converter plant of the Austrian Railway (ÖBB) and the 50 Hz power plant of the Austrian Energie AG, both located in Timelkam.

The static converter power plant consists of two identical blocks that convert up to 2 x 30 MW of electric power between the public grid (110 kV/50 Hz) and the main electric network of the railway company (110 kV/16.7 Hz). This modern static converter plant has been operating since 2009.

The site of the 50 Hz plant comprises three units. The main unit is a combined heat and power gas/steam block. Despite its high efficiency of up to 59%, the unit is not usually operated during the summer as energy prices are low in Europe during this period and electrical power generated from gas cannot compete with the traditional mix. However, if necessary this plant can be start

up within 85 minutes. The second unit is a bio-mass plant with a capacity of up to 15 MW of electrical and 15 MW of thermal power. It is operated throughout the whole year – based on a (subsidized) fixed price for this type of electric power generation. The third unit within the site of the plant, a 180 MW gas turbine, is out of operation due to its low efficiency at approximately 30%.

The second day of the meeting consisted of two presentations by external speakers who had joined the meeting from abroad.

First, Prof. Frede Blaabjerg (Aalborg University, Denmark), distinguished lecturer of the IAS presented an overview on “Power Electronics – Key Technology for Renewable Energy Systems”. He claimed energy is the third in the row of human needs directly behind water and food. Future challenges will be establishing a sustainable energy production with increased efficiency. Using the Danish grid, he explained the resulting changes from a centralized infrastructure to decentralized one, based on renewables – here wind turbines – and combined heat and power stations. The installed power ratings of these two types already cover the mean power demand in Denmark, leaving the centralized power stations as backup only. In the second part of his lecture, he gave a detailed overview of the different types and techniques of wind turbines and their role within a modern decentralized grid, where wind turbines are already part of the frequency control of the network.

The second presentation was given by Dr. Mircea Popescu, assisted by Dr. Dave Staton (both Motor Design Ltd, UK), speaking on “Heat Transfer Analysis of Electrical Machines and Power Electronics”, in which he explained the challenges of thermal motor models. First, the different types of losses – copper, iron, magnetic, windage, ... were discussed and then an overview of the state of art modeling of the thermal transfers. He further discussed the uncertainties that have to be dealt with, where notably the latter topic is a task that requires a lot of experience and model fitting.

During the IEEE Business part of the chapter meeting Prof. Annette Mütze gave an overview over the status of the new Austrian Chapter, having 22 founding members, and explaining the necessary next steps such as election of officers. Then, Prof. Axel Mertens, chair of the German joint chapter presented some details over the planned events for 2011 and 2012. As a third part, Prof. Ralph Kennel expressed congratulations to the new Austrian chapter on behalf of the German IEEE Section as well as the PELS. He presented the concept of the recently started ECCE conference series where PELS cooperates with regional partners to establish a corner conference for power electronics in the three main regions US, Asia and Europe on an annual basis.

The next meeting of the German joint chapter will be held at KEB in Barntrop, Germany in the fall of 2011. The next joint meeting of the Austrian and German joint chapters is planned for spring 2012, likely to take place in the Fribourg region

For further information, please visit our websites: [ewh.ieee.org/r8/germany/ias-pels](http://ewh.ieee.org/r8/germany/ias-pels) (German chapter) or <http://iee.ict.tuwien.ac.at/> (Austrian section and chapter)

Dr. Andreas Wagener, IEEE Joint IAS/PELS/IES German Chapter and Prof. Annette Mütze, IEEE Joint IAS/PELS/IES Austrian Chapter; July 18, 2011