



PE:Region Newsletter - February 2017

PE:Region Demonstrator Workshops of 22 November 2016



Thank you for joining us! We hope to see you all at three follow up workshops on 28 June 2017

Demonstrator specifications and roadmaps

ENERGY EFFICIENT, RELIABLE AND COMPACT HIGH SPEED DRIVE

The objective of this project is to realize a demonstrator for a high-speed drive used with a permanent magnet synchronous machine (PMSM). A state-of-the-art control strategy for a high-speed motor was developed, the limits of the standard controllers were investigated and three different current control schemes were investigated. A dSPACE MicroLabBox was used to implement the investigated solutions into a three-level NPC Converter realized at the Chair

of Power Electronics.

INTELLIGENT GRID INTEGRATION OF WIND AND SUN

The demonstrator aims at realizing an intelligent low-voltage MW-class converter with embedded EtherCAT communication. The hardware to be used as a power stage is a 3-level, 1MVA PowerStack converter with custom gate-driving circuit. A control card based on an FPGA was developed, and a Beckhoff Ethercat Slave card is used to communicate with the central Beckhoff controller, that dispatches the power reference. The hardware realization is in progress.

HIGH-POWER ONBOARD BIDIRECTIONAL BATTERY CHARGER

An ultra-high efficiency battery charger for vehicles that can be used for fast-charging and vehicle-to-grid charging will be developed and demonstrated in this project. Achieving the highest possible conversion efficiency is a strong parameter for competitiveness, since it reduces system size and cost while increasing system reliability. A 20 kW unidirectional full bridge isolated dc-dc converter has been designed and demonstrated as an initial phase of the project. The proposed converter has achieved a maximum measured conversion efficiency of 98.7% at half load.

Li-ion Battery Seminar

– Bridging the Gap between Research and Industry

On 7 February, SDU Electrical Engineering together with CLEAN, Danish Battery Society, PE:Region and IDA, organized the Li-ion battery seminar entitled “Li-ion Battery Technology and Safety in Applications”. The main goal of the seminar was to foster an understanding of Li-ion battery safety, and to bridge the gap between high-level research institutes and local industry.

The seminar offered a wide variety of researchers who introduced their latest results – including a researcher from NASA, Dr. Eric C. Darcy, who presented the ways of which NASA works to reduce the risk of thermal runaway and overheating of batteries in manned space applications.



Other presenters were Dr. Ralph E. White from the University of South Carolina who presented a complex model used to simulate Li-ion batteries, Kjeld Nørregaard from Danish Technological Institute who presented the institute's work on battery degradation, Roberto Scipioni from Technical University of Denmark who presented his work on experimental analysis of LiFePO₄ cell degradation, as well as SDU's own PhD Paul Coman, who presented results of his dissertation on modelling thermal runaway and basic background of safety.

The seminar had an exceptional participation of 53 persons coming from industry and academia from both Denmark and Germany, fostering networking, and strengthening the Battery Community locally. The presentations of each speaker are available on request. Please contact Kasper Paasch, PhD and

Vice head of SDU Electrical Engineering by e-mail paasch@mci.sdu.dk for further information.

SPRING EVENTS 2017



PE:Region on FURGY CLEAN INNOVATION-CONGRESS 2017

Together with co-organizers FURGY CLEAN Innovation is anxious to foster the development of innovation in the clean energy area. Learn more about innovative technologies, best-practice and funding opportunities. You will have the opportunity to discuss matters with colleagues and meet partners from the fields of economy and science from Schleswig-Holstein and Denmark.

Co-organizers and partners:

IHK Schleswig-Holstein, WT.SH, CLEAN, FuE Zentrum/Fachhochschule Kiel, UdviklingsRåd Sønderjylland, Kalundborg Forsyning, watt_2.0 e. V., Investitionsbank SH, EKSH, Inno-SE, PE:Region, LSBL 2

PE:Region – Cross-border power Electronics

This workshop is held in English as part of the congress on **Friday 17 March at 13.30 - 15.30**. Here, we present the aims of the project, the demonstrators under development (please see above) and the involved partners. Furthermore, we hope to have an interesting discussion with all participants.

For further information such as detailed programme, bus shuttle from Odense, Aabenraa and Flensburg as well as registration, please refer to the official [FURGY CLEAN Innovation](#) homepage.

For registered congress participants the entrance to the fair is free.



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