IEEE Chapter Webinar Series

Modern Power System Technologies – Towards a Sustainable Energy Future

Date: Wednesday, November 23rd, 2022, Time: 2:00 PM – 5:30 PM (Time Zone: Vienna)
Location: Hybrid – ONLINE OR AT 1210 VIENNA, GIEFINGGASSE 2

Registration: To register for the event (FREE) please visit the IEEE registration page https://events.vtools.ieee.org/event/register/320493 or contact markus.makoschitz@ait.ac.at.
Login information for joining the online event will be provided right before the event starts!

Agenda

14:00 – 14:10: Welcome

14:10 – 14:15: **Opening** (DI Dr. Markus Makoschitz – Chapter Chair)

14:15 – 15:00: **Evaluation of the Impact of a Multi-Megawatt Charging Station on the Normal Operation of an MV Network**
(MSc Barbara Herndler – AIT Austrian Institute of Technology)

15:00 – 15:45: **Responsible Knowledge Management in Energy Data Ecosystems**
(DI Dr. Valentina Janev – Mihajlo Pupin Institute)

15:45 – 16:00: Coffe break

16:00 – 16:45: **A Way to go Beyond the Limits** (Prof. Petar Grbovic – University of Innsbruck)

16:45 – 17:30: **Environmental Impacts of Wide Band Gap Semiconductor Technology Applications**
(Dr. Rainer Pamminger & MSc. Sebastian Glaser – TU Wien)

17:30: End of Online Event

Organizers:

This event is jointly organized by the **IEEE IAS/PELS/IES Joint Chapter Austria**, the **IEEE PES Chapter Austria** and the **AIT Austrian Institute of Technolgy GmbH**.

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Speaker Information:

Title: Evaluation of the impact of a multi-megawatt charging station on the normal operation of an MV network

Abstract: The transition toward clean and efficient transport through electric mobility poses many new technical challenges to the modern electricity grid. The implementation of electromobility requires a large number of electric vehicle charging stations and electrification of roads fed from the low or medium voltage distribution networks. With the increasing demand for high-powered fast chargers, the impact of connecting a multi-megawatt charger to medium voltage networks should be evaluated to ensure the safe and reliable operation of the network is not compromised. This study evaluates the impact of integrating a multi-megawatt charging station within a MV network. Additionally, scalability scenarios are investigated to assess future large-scale implementations. Lastly, an evaluation of on-site PV/storage combinations which foster zero emission charging is presented.

Speaker: MSc Barbara Herndler, received her BSc in electrical Engineering in 2018 from the University of Cape Town, Republic of South Africa. Her keen thirst for knowledge and inquiring mind encouraged her to further pursue and attain a MSc Electrical Engineering in 2010. In 2013, after gaining 2 years' experience while working within the generation environment, she decided to further pursue her career as a Plant Performance Enhancement engineer by working for the local distribution system operation (DSO), ESKOM. In 2018, she started at Austrian Institute of Technology, Vienna, as a Research Engineer where she is currently working in the field of network simulations. Her main focus lies in scalability and replicability analysis of future technologies within various national and international smart grid projects. Her main areas of interest include smart grid technologies, advanced network simulation and analysis and TSO-DSO interaction. .

Title: Responsible Knowledge Management in Energy Data Ecosystems

Abstract: In this talk a new data- and knowledge-driven approach for management and processing of data in the energy domain will be presented. This approach aims to extend the analytics services portfolio of various energy stakeholders and achieve two-way flows of electricity and information for optimized generation, distribution, and electricity consumption. The approach is based on semantic technologies to create knowledge-based systems that will aid machines in integrating and processing resources contextually and intelligently. Thus, a paradigm shift in the energy data value chain is proposed towards transparency and the responsible management of data and knowledge exchanged by the various stakeholders of an energy data space. The approach can contribute to innovative energy management and the adoption of new business models in future energy data spaces.

Speaker: Dr. Valentina Janev is a Senior Researcher at the Mihajlo Pupin Institute, University of Belgrade, Serbia and Associated Professor at the Belgrade Metropolitan University. She was a Coordinator of recently finished EU project LAMBDA Learning, Applying, Multiplying Big Data Analytics. Currently, she is in the coordination team of EU project SINERGY Capacity building in Smart and Innovative eNERGY and leads the implementation of the Serbian Pilot in the EU project PLATOON - Digital PLAtform and analytic TOOls for eNergy.

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IEEE Chapter Webinar Series

Title: A Way to go Beyond the Limits

Abstract: Power electronics and power conversion in general is today part of every segment of our life. Conversion efficiency, specific power, power density and converter cost are today the most critical requirements for new converters. One way to increase the efficiency and reduce cost/size/weight is to deploy multi-level and/or multi-cell converters and partial power processing power converters. A novel solution to ultra-high efficiency and specific power dc/dc converters has been proposed and theoretically investigated in this seminar.
Advantages of the Partial Power Rated Converter (PPRC) concept, such as significant reduction of the input/output filter size & weight, voltage rating of power devices and conduction/switching losses are theoretically investigated and discussed in the seminar. Various applications such as energy storage interface converters, isolated ac-dc converters and double feed electric machines are also discussed.
Several case studies and design examples are given in concluding part of the seminar. One particular design example presented in the seminar is 25kW battery interface dc/dc converter. An extraordinary efficiency of 99.5%, specific power of 30kW/kg and power density of 50kW/dm3 have been achieved.

Speaker: Univ. Prof. Dr. Grbovic received the Dipl. Ing. (B. Sc.) and the Magister (M.Sc.) degrees from the School of Electrical Engineering, University of Belgrade, Serbia, in 1999 and 2005, and the Doctor (Ph.D) degree from the Laboratoire ’Électrotechnique et d’Électronique de Puissance de Lille, l’Ecole Centrale de Lille, France in 2010. From March 1999 to February 2003, he was an R/D Engineer with RDA Co, Belgrade. From November 2000 to June 2001, he was a Consulting Engineer with CESET Italy (a division of Emerson Appliance Motors Europe). From March 2003 to April 2005, he was with the R&D Department, PDL Electronics, Ltd., Napier, New Zealand. Since April 2005 until July 2010 he was working with Schneider Toshiba Inverter Europe, Pacy-Sur-Eure, France, as Power Electronics Group Expert. Since September 2010 until August 2011 he was with General Electric Global Research, Munich, Germany. Since September 2011 until September 2018 he is with HUAWEI Technologies, Europe Energy Competence Centre in Munich/Nuremberg, Germany, where he works as a Senior Expert in the area of power electronics and power conversion. In March 2016 he was appointed to position of the scientific committee of Centre of Power Electronics and Drives, C-PED Lab., Roma TRE University, Italy. In June 2018 he was appointed to position of Full Professor at Innsbruck Power Electronics Laboratory (i-PEL), the University of Innsbruck, Austria. The focus of his research is on application of advanced energy storage devices, active gate driving for high power IGBTs and JFET SiC, power converter topologies, advanced power semiconductor devices and control of power converters and semiconductor switches. Dr. Grbović published over 80 IEEE conference/journal papers, 18 IEEE seminars and a book “Ultra-capacitors in power Conversion Systems: Analysis, Modelling and Design in Theory and Practice”. He has 17 US & EP patents granted and 9 patent applications pending.

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Title: Environmental impacts of wide band gap semiconductor technology applications

Abstract: Wide Band Gap (WBG) semiconductors have the potential to provide significant improvements in energy efficiency over conventional Silicon (Si) semiconductors. While the extent of the potential efficiency gains is widely researched, the environmental performance of WBG semiconductors over the whole life cycle is insufficiently understood. In this presentation we will give an insight into the Ecodesign field of research at the Vienna University of Technology, we will present our work in Task B: Energy and environmental related Life Cycle Assessment (LCA) of the Power Electronic Conversion Technology Annex (PECTA).

Speaker 1: Since 2002 **Dr. Rainer Pamminger** is researcher at the Vienna University of Technology, Institute for Engineering Design. Dr. Pamminger works in the area of sustainable product design and energy efficiency. He is leading various national and EU funded projects, with a focus on developing and applying tools and methods for environmental assessment of products and services, and well as on identifying process improvement and creating environmental communications.

Speaker 2: DI Sebastian Glaser is research assistant at the Vienna University of Technology, Institute for Engineering Design. His work is focusing on mechatronics, product development and Ecodesign. He is carrying out the environmental assessments of WBG semiconductors for PECTA´s Task B, and for the recently started EU funded project RHODAS – Reinventing high-performance power converters for heavy-duty electric transport.

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