



**The 22<sup>nd</sup> European Conference on Power Electronics and Applications**  
**EPE'20 ECCE Europe**  
**FULL VIRTUAL | 7 – 11 September 2020**

[Register here](#)

NEWSLETTER CONTENTS :

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## 1 EPE'20 ECCE Europe: Full papers accessible On-line

The EPE'20 ECCE Europe Full papers are accessible online via this link:

<https://epe-ecce-conferences.com/epe2020/technical-programme/>

The participants who are duly registered for EPE'20 ECCE Europe have, since the 24<sup>th</sup> of August 2020, access to the scientific papers of the EPE'20 ECCE Europe conference. The papers are accessible through the dynamic programme on-line with your EPE conference-login and password.

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## 2 Whova Guided tour

Welcome to EPE'20 ECCE Europe and the Whova Platform!

Whova **Web** App: [https://whova.com/portal/webapp/epie\\_202009/sign\\_in/](https://whova.com/portal/webapp/epie_202009/sign_in/)

For the Whova Web app, please note that Google Chrome works best.

Please Sign in or Sign up if this is your first visit. To sign up, please make sure you use the e-mail address you used when you registered for the EPE '20 ECCE Europe Conference. You need to create a new password.

In order to guarantee you the best browsing experience, beside the Whova **Web** App (used with a desktop/laptop browser), the Whova **mobile** app has been specially developed for tablets and mobiles. The Whova mobile app will run on any Android or iOS mobile device.

Do not deprive yourself of exclusive options to these media! Some features are only available in the App. Such as:

- Explore the **professional profiles** of event speakers and attendees
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- Access the event agenda, GPS guidance, maps, and parking directions at your fingertips

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## 3 EPE'20 ECCE Europe: The Provisional Programme is on-line

Our International Scientific Committee gathered at the beginning of February in Brussels and the Technical Programme Schedule has been defined.

You will find the timetable via this link:

<https://epe-ecce-conferences.com/epe2020/technical-programme>



## 4 Industrial Forum

The EPE ECCE Europe conference brings together researchers, engineers, etc. working at the forefront of power electronics technologies. With the objective to exchange and meet fellow professionals and academics and on top of the tutorials, lecture and dialogue sessions, the organising committees **will propose several discussion sessions within the industrial forums on Friday 11 September 2020.**

### Hardware-in-the-loop demonstration of non-selective protection systems for meshed HVDC grids

#### Session 1 | 10:15 – 12:05

This session shows the results of a Hardware-in-the-loop demonstration of non-selective protection systems for meshed HVDC grids which was performed within PROMOTioN Project.

The objective of the WP9 of PROMOTioN project is to demonstrate operation of the DC grid protection systems developed in the project using hardware in the loop real-time methods and in which a plurality of protection methods (or strategies) are tested: A Non-selective fault clearing strategies demonstration tests are carried out at the SuperGrid Institute (France), including Converter Breaker Strategy (CBS) and Full-Bridge MMC-based Strategy (FBS). During this session, live demonstration with pedagogic explanations and video sequences will be provided to restore the different elements of the validation: supervised start-up of the MTDC, fault-clearing strategies, and voltage and power restoration. Also in this session, you will have the opportunity to exchange and ask questions to the **PROMOTioN project members.**

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### Novel power electronics technologies in power systems and transportation

#### Session 2 | 13:00 – 15:00

This session which is proposed by SuperGrid Institute will discuss how Power systems and transportation are changing with a significant contribution of power electronics. The power electronics converters are expected to be efficient, reliable and cost effective. The innovations in the domain are ranging from grid architectures, converter topologies and converter technologies. This session will provide some insights from the industry perspective through several presentations and a panel discussion. The session will give the opportunity for the power electronics community to exchange on the experience of the innovative industrial companies such as: **Compagnie Nationale du Rhône (France), ABB Power Grids Research (Sweden), Alstom (France), Siemens AG – Corporate Technology – Power Electronic Systems (Germany), Schneider Electric-Power Systems Center (France) and General Electric – Power Conversion (UK)** and in different areas : Role of power electronics in future power grids and these power network will evolve, Energy management in railways system, DC grids application fields and new structures/topologies in PV power plants.

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### EMT-studies roadmap to tackle upcoming power transmission challenges at utilities - RTE, TransnetBW and Equinor

#### Session 3 | 15:30 – 17:30

This session will discuss modelling, simulation and studies within R&D activities of TSOs of power systems with more share of power electronic based equipment such as HVDC links, static VAR compensators and wind power plants. The French TSO (Transmission System Operator) RTE has considered electromagnetic transient (EMT) tools which offer detailed modelling HV components and controls while maintaining a good compromise between robustness, accuracy, and flexibility. EMT simulation can be performed in offline and in real-time mode to meet different study objectives. This session will provide an overview on interaction assessment related to VSC-HVDC links and practical experiences for real HVDC projects will be also presented. You will be able to exchange and ask questions to expert from **RTE, TransnetBW and Equinor in subjects such as** : Interaction studies between HVDC-LCC and HVDC-VSC links, Parallel connection of 2 HVDC-VSC links in an islanded grid, Interoperability of multivendor HVDC Systems and Usage of EMT tools during different project phases.

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## 5 Tutorials

Several tutorials will be organized on Monday 7 September 2020:

**TUTORIAL N° 1 – Characterization and impact of SiC and GaN on Power Drive Systems**  
*(Morning)*

- Bernardo Cougo, IRT Saint-Exupery (in Toulouse, France)

**TUTORIAL N° 3 – Control of Modular Multilevel Converters for Variable-Voltage Variable-Frequency Applications**  
*(Full day)*

- Prof. Dr.-Ing. Axel Mertens, Institute for Drive Systems and Power Electronics, Leibniz University Hannover, Hannover, Germany
- Dr.-Ing. Jakub Kucka, Institute for Drive Systems and Power Electronics, Leibniz University Hannover, Hannover, Germany
- Dr.-Ing. Dennis Karwatzki, Siemens AG, Large Drive Applications, Nuremberg, Germany

**TUTORIAL N° 4 – Electronic Design Automation and optimization algorithms for the next generation of optimal power converters**  
*(Morning)*

- Dr. Ing. Timothe Delaforge, Senior researcher Bern University of Applied Sciences, Switzerland

**TUTORIAL N° 5 – Model Predictive Control of Power Electronic Systems**  
*(Full day)*

- Tobias Geyer, ABB Corporate Research, ABB Switzerland Ltd., 5405 Baden-Dättwil, Switzerland
- Petros Karamanakos, Faculty of Information Technology and Communication Sciences, Tampere University, 33101 Tampere, Finland

**TUTORIAL N° 7 – Reliability-Oriented Thermal Modelling of Power Electronics Systems**  
*(Afternoon)*

- Dr. Amir Sajjad Bahman, Center of Reliable Power Electronics (CORPE), Aalborg University, Denmark
- Prof. Francesco Iannuzzo, Center of Reliable Power Electronics (CORPE), Aalborg University, Denmark

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## 6 Convenient Sessions

For our Asian and American participants, “Convenient Sessions” are planned during the main conference days at the following moments:

- Tuesday 8 September 2020 – 18:20-19:30 CET: Wrap-up America (Channel 1)
- Wednesday 9 September 2020 – 07:00-08:00 CET: Wrap-up Asia (Channel 1)
- Wednesday 9 September 2020 – 18:00-19:00 CET: Wrap-up America (Channel 1)
- Thursday 10 September 2020 – 07:00-08:00 CET: Wrap-up Asia (Channel 1)
- Thursday 10 September 2020 – 18:00-09:00 CET: Wrap-up America (Channel 1)
- Friday 11 September 2020 – 07:00-08:00 CET: Wrap-up Asia (Channel 1)

Our Asian, American, and other interested participants can then & there discuss what was presented during the previous sessions, which they might have missed because of the time shift...

## 7 Our Keynotes

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### Tuesday 8 September 2020

#### Keynote 1 (09:00 – 09:30 – Channel 1)

##### “ Roadmap for DC ”

By **Prof.Dr. eng. Pavol Bauer**, Delft University of Technology



##### Abstract:

DC grids are considered to be a key technology for the connection, collection and integration of renewable energy resources, for the realization of integrated power systems, for mobile applications (electric ships, aircrafts), for new types of urban and industrial distribution power networks and to bridge and support existing AC systems. Advanced power electronic components, power converters and system protection are enabling DC grids on multiple voltages levels. Especially medium voltage DC grids are expected to play a key role in managing the higher power flows in our future distribution grids. Roadmap for DC and different steps and research at the TUD is presented with focus on DC grids and DC microgrids. Problem of Power Flow control in DC grids is addressed first an Power flow controller introduced. A zonal protection framework where the low voltage dc grid is partitioned according to short-circuit potential and provided degree of protection, and several known protection schemes that ensure selectivity, sensitivity and security will be discussed.

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### Wednesday 9 September 2020

#### Keynote 2 (08:30 – 09:00 – Channel 1)

##### “ Thomas Edison vindicated – the resurgence of DC in MV and HV power grids ”

By **Colin Davidson**, Consulting Engineer – HVDC, at GE Grid Solutions HVDC Activity



##### Abstract:

From the very earliest days of electrical power transmission, in the 1880s, the advantages of DC (as promoted by Thomas Edison) were already clear but despite this, the “Battle of the Currents” was won by Westinghouse and Tesla’s AC solution, mainly because two 19th century inventions, the transformer and the circuit-breaker, were much easier to realise using AC than DC. Nevertheless, the use of DC in certain, niche point-to-point transmission applications never completely went away, with the first electromechanical conversion systems installed in the 1890s and electronic AC/DC conversion starting to appear in the 1930s. Today, HVDC is widely used for point-to-point power transmission applications where very high powers need to be transmitted for long distances, and the first commercial applications of meshed HVDC grids and medium-voltage DC (MVDC) for reinforcement of distribution grids, are starting to appear. With the drive for ever-increasing levels of renewable energy generation, along with drastic changes in consumption patterns as transportation and domestic heating are electrified, much greater use of DC for both transmission and distribution are inevitable. This talk will present a short historical perspective of how the industry got to its present position, a description of the present state of the art and predictions of how the grid will evolve in the coming decades.

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### Keynote 3 (09:00 – 09:30 – Channel 1)

#### “Integration of Electric Mobility in the French public electricity distribution network”

By Anne-Sophie Cochelin , ENEDIS



#### Abstract:

As a Distribution System Operator (DSO), Enedis is one of the key players in the development of electric mobility on the French territory. Indeed, charging infrastructures are directly or indirectly connected to the distribution network. In addition, Enedis runs electric vehicles on a daily basis and has the second largest electric fleet in France. More broadly speaking, Enedis is committed to working alongside industrial and public players. The aim is to develop charging solutions for the various use cases of electric mobility, to identify territories needs, and to facilitate electric vehicle charging control, in order to optimise its cost for users and for the community. In this presentation, we propose to present some key elements that were published by Enedis in 2019 about grid integration of electric mobility. We will also focus on the aVEnir project, led by Enedis with 11 industrial and academic partners, aimed at controlling in real conditions and in collaboration with users of electric vehicles, questions relating to charging flexibility.

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## Thursday 10 September 2020

### Keynote 4 – Part 1 (09:00 – 09:30 – Channel 1)

#### “A critical role for R&I for clean energy for the EU green and digital recovery”

By H el ene Chraye, European Commission, Head of Unit – Clean Energy Transition



#### Abstract:

The recovery from sanitary and economic crisis will imply massive investments and in depth reforms. Even before, the EU set up extremely ambitious objectives for a Green Deal, making the EU a carbon free economy at latest for 2050, now merged in the challenge of a green and digital recovery for Europe. Energy represents the major share of the GHG emissions and has a critical place in this challenge. The transition to clean energy should rely upon a massive switch towards green energy as well as innovative and breakthrough solution in the demand side, whether on technology, on business processes, on social. Research and innovation will play a critical role for this and as well on supporting private and public investment decisions.

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### Keynote 4 – Part 2 (09:00 – 09:30 – Channel 1)

#### “The role of collaborative research to support innovation for clean energy transition”

By Hubert de La Grandi ere, SuperGrid Institute



#### Abstract:

Making the transition towards clean energy requires a tremendous transformation of the current energy system. System structure, scale, economics, and energy policy must all be addressed in order to achieve significant change. Within the current sanitary crisis and its resulting impact on the economy, private sector industrial companies are looking to short term returns to boost their recovery rather than investing in long term R&D projects, thus further widening the gap between industrial and academic mind sets. But achieving energy transition requires coordination, collaboration & the creation of internationally recognised standards. How can we bridge the gap between academia and the private sector?

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## 8 Table-Top Students Project Exhibition

Master students and PhD Students are invited to present their latest prototypes in the frame of the EPE ECCE Europe 2020 Exhibition.

Each accepted project will have a virtual booth in the exhibition.

### **E-Sense Power: Non-Invasive Condition Monitoring of Power Converters**

This project has developed a non-invasive method to measure the on-state voltage of semiconductors based on a filed patent. Compared to existing methods, it reduces the complexity and cost by at least 70% and with enhanced noise immunity. One of the applications for the measured signals is for condition monitoring of power semiconductor devices in power electronic converters.

The current status of the project is:

- 1) the proof-of-concept laboratory testing has been accomplished; and
- 2) a more industry-oriented prototype design has been finished, expected to be tested in both laboratory and field testing.

We plan to exhibit a prototype of the proposed measurement circuit, and a converter demonstrator which the measurement circuit is used. By the time of the exhibition, we expect to be able to disclose more details about the invented technology.

More information: <https://www.patent.aau.dk/Aktuelle+Teknologier/E-Sense+Power/>

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### **SyCCo-Bus: A High Speed Synchronous Control Bus for Modular Converter Systems**

The Synchronous Converter Control Bus (SyCCo-Bus) is a field bus tailored to the control of modular converter systems. It enables a fast data exchange and a synchronized control of the modules of modular power electronic systems. With increasing switching frequency, an accurate synchronization of the individual modules and a very low latency are necessary requirements for a control bus. The proposed field bus is based on the 1 GBit Ethernet standard but almost erased the protocol overhead while providing a synchronization accuracy of +/-4ns. In this virtual project stand, application examples of the SyCCo-Bus are shown from the Laboratory of High Power Electronic Systems (ETH Zürich) and the basic working principles are explained.

More information: <https://www.hpe.ee.ethz.ch/en/hpe/publications/videos/sycco-bus.html>

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### **Advanced Solid-State Transformers (ASSTRA)**

Wide bandgap devices are enabling new application opportunities for Solid-State Transformers, thanks to their superior switching performances. However, the short rise time of their PWM voltage waveforms increases the harmonic content at higher frequencies, which can excite the resonances of Medium-Frequency Transformers (MFTs). This can cause internal overvoltages and failures in the insulation due to unexpectedly high electric field. Therefore, a high-frequency model of a litz wire MFT is developed to predict such overvoltages.

More information: <https://www.asstra-itn.eu/>

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## 9 EPE'20 ECCE Europe - Exhibition!

**EPE ECCE Europe is the largest Power Electronics event in Europe.**

Like no other event, this conference is a unique balance between industry and academia. It is your opportunity to meet developers and specialists from academia and to be informed of the latest technologies in your fields of expertise (before anyone else).

Already confirmed:

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	Speedgoat GmbH
	SuperGrid Institute
	Typhoon HIL

## Virtual EPE'20 ECCE Europe-Conference

**Let's meet on-line to work on the future!**

[Register here](#)

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### Conference Programme:

<b>Monday 7 September:</b>	<b>Tutorials</b>	(09:30 – 17:30 CET)
<b>Tuesday 8 September:</b>	<b>Conference Day 1</b> (Keynotes, Lectures, Dialogue Sessions...)	(08:30 – 17:30 CET)
<b>Wednesday 9 September:</b>	<b>Conference Day 2</b> (Keynotes, Lectures, Dialogue Sessions...)	(08:30 – 17:40 CET)
<b>Thursday 10 September:</b>	<b>Conference Day 3</b> (Keynotes, Lectures, Dialogue Sessions...)	(08:30 – 17:40 CET)
<b>Friday 11 September:</b>	<b>Industrial Forum-Day</b>	(09:30 – 17:30 CET)



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**For More Information, visit our website:**



**EPE 2020 ECCE Europe Conference Chairman:**



- **Abdelkrim BENCHAIIB**, SuperGrid Institute / Le Cnam

**EPE 2020 ECCE Europe Conference Co-Chairs**

- Seddik BACHA – G2ELab – Grenoble
- Françoise LAMNABHI-LAGARRIGUE – L2S CNRS, Paris Saclay
- Bruno ALLARD, AMPERE-lab, Lyon

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- Jean-Luc THOMAS, Le Cnam, Paris

**Programme Chairman**

- Sjoerd BOSGA, ABB Corporate Research, Sweden

**Local Organising Committee**

- Amiel KAPLAN, SuperGrid Institute, Villeurbanne (Chairman)
- Jing DAI, SuperGrid Institute, Villeurbanne
- Kosei SHINODA, SuperGrid Institute, Villeurbanne

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