

## Organisational Information

Sign up at: [www.ecpe.org/events](http://www.ecpe.org/events)

Registration Deadline:

28 February 2023

Participation Fee:

- € 720,- \* for industry
  - € 525,- \* for universities/institutes
  - € 180,- \* for students/PhD student (limited seats; copy of students ID required)
- \* plus VAT

- The on site participation fee includes dinner, lunches, coffee/soft drinks and digital proceedings. The reduced (PhD) students fee includes all except for dinner (can be booked for an extra fee of € 50,-\*)
- The online participation includes remote access via the meeting software Webex and digital proceedings.
- Digital proceedings will be provided by download link latest one day before start of the event. A printed handout is available on request (€ 50,-\*).
- Upon receipt of registration confirmation via email you are signed-up for the event. The invoice will be sent via email.
- Three participants from each ECPE member company free of charge. Allocation in sequence of registration.
- 10% discount on university/institute fee for participants from ECPE competence centres.
- Further information (hotel list and maps) will be provided after registration and can be found on the ECPE web page.
- Cancellation policy: Full amount will be refunded in case of cancellation upon to 2 weeks prior to the event. After this date 50 % of the fee is non-refundable (replacement is possible).

06/03/23

## Organisational Information

**Organiser** ECPE e.V.  
90443 Nuremberg, Germany  
[www.ecpe.org](http://www.ecpe.org)

**Technical Chair** Prof. Holger Borchering, Technische Hochschule Ost-Westfalen-Lippe, Germany  
Prof. Martin Maerz, Bernd Wunder, FAU Erlangen-Nürnberg, Fraunhofer IISB, Germany

**Technical Contact** Thomas Harder, ECPE e.V.  
[thomas.harder@ecpe.org](mailto:thomas.harder@ecpe.org)

**Organisation** Marietta Di Dio, ECPE e.V.  
+49 911 81 02 88 – 13  
[marietta.didio@ecpe.org](mailto:marietta.didio@ecpe.org)

**Venue** Stuttgart Marriott Hotel Sindelfingen  
Mahdentalstraße 68  
71065 Sindelfingen, Germany  
[www.marriott.com/sindelfingen](http://www.marriott.com/sindelfingen)  
or online via Webex



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## Hybrid Event

### ECPE Workshop

### Low Voltage DC Grids for Industry and Office

7 - 8 March 2023  
Sindelfingen, Germany or  
Online (Hybrid Event)



in cooperation with



# ECPE Hybrid Workshop

## Low Voltage DC Grids for Industry and Office

7 - 8 March 2023

Sindelfingen, Germany / hybrid

Technological advances in power electronics mean that in the future DC networks will be of increasing importance for the exchange of electrical energy. The reasons lie primarily in the penetration of electronics in all areas of application. Today, rectification of the mains voltage takes place in almost all devices. The DC voltage generated is then used directly (switched-mode power supplies, storage charging) or converted back into AC voltage (for example in frequency converters). Likewise, the cost of DC-DC converters has been steadily decreasing. In addition, today energy is increasingly generated in the form of DC voltage, e.g. by photovoltaics or fuel cells.

The basic advantages of DC Grids compared to AC:

- Energy exchange is bidirectional enabling direct use of recuperation.
- Material savings (less copper line to the elimination of reactive power as well as higher voltage in DC). Transmission losses and installation effort can be reduced.
- Electronics become smaller and more efficient (no internal grid rectifier).
- Renewable energies and storage systems can feed in their energy directly
- Storage within the DC installation provides ride-through capacity for power outages

This workshop covers low voltage DC networks in the areas of industrial plants and office buildings. In detail, the following contents will be covered in depth:

- DC use cases from manufacturing industry, the automotive industry and office
- DC system: network structures, voltage ranges and measurement results
- DC devices: requirements, design aspects, protection
- DC in standardization: status, activities and roadmap
- DC in research: focus areas, current projects

The ECPE Workshop is organized in cooperation with the DC-INDUSTRIE2 consortium (Joint Research Project 'Direct Current for the Factory of the Future' funded by the German Federal Ministry for Economic Affairs and Climate Action) and is chaired by:

Prof. Holger Borchering, Technische Hochschule Ostwestfalen-Lippe (TH OWL) and Scientific Leader of the DC-INDUSTRIE2 Project (DE)

Prof. Martin März, Friedrich-Alexander University FAU Erlangen-Nürnberg (DE)

Bernd Wunder, Fraunhofer IISB (DE)

All presentations and discussions will be in English.

## Programme

### Tuesday, 7 March 2023

09:30 Registration / Webex started

#### Introduction

10:00 **Welcome, Opening and Introduction**  
Leo Lorenz, Thomas Harder, ECPE (DE)  
Holger Borchering, TH OWL (DE)

10:15 **The System Concept of the Open Industrial DC Grid Industry**  
Holger Borchering, TH OWL (DE)

10:45 **Load Zones, Grounding and Insulation of an Industrial DC Grid**  
Martin Ehlich, Lenze (DE)

#### System Aspects of an Industrial DC Grid

11:15 **Stress on the Power Section of Drive Inverters in the Event of Grid Faults**  
Simon Puls, Weidmueller / TH OWL (DE)

11:45 **Power Modules for Hybrid DC Breaker**  
Kenan Askan, Eaton Industries (AT)

12:15 **Discussion**

12:30 Lunch break

13:30 **Devices for Precharge of the DC Grid**  
Johann Austermann, Weidmueller Interface (DE)

#### System Aspects of an Industrial DC Grid

14:00 **DC|hyPAMod – Use-Case Dependent Modeling of DC Components and Grids**  
Raffael Schwanninger, FAU Univ.of Erlangen-Nuremberg (DE)

14:30 **Resource Efficiency, Results of Calculations and Measurements**  
Holger Borchering, TH OWL (DE)

15:00 Break

15:30 **Intelligent Management of DC Grids**  
Isabella Bianchini, Fraunhofer IPA (DE)

16:00 **Transfer Centers of DC INDUSTRIE and their Possibilities**  
Slavi Warkentin, TH OWL (DE)

16:30 **Discussion**

17:00 **End of 1<sup>st</sup> Day**

19:30 Dinner  
Parkrestaurant Sindelfingen | Schillerstr. 22

## Programme

### Wednesday, 8 March 2023

08:30 Webex started

#### Distribution Systems for Industrial Applications

09:00 **Roadmap to DC: From DC House to a DC Neighbourhood**  
Pavol Bauer, TU Delft (NL)

09:30 **A View from the Social Domain and a other View by DC Microgrids**  
Harry Stokman, DC Systems (NL)

10:00 **Comparison of Industrial and Public DC Distribution from Systems Engineering Perspective – Common Features and Key Differences**  
Tero Kaipia, LUT University (FI)

10:30 **Industrial DC Distribution Systems in Medium Voltage and Low Voltage**  
Stephan Rupp, Maschinenfabrik Reinhausen (DE)

11:00 Break

11:30 **NEXt Factory: Direct Connected Power Supply for Industrial Applications**  
Guido Bachmann, Schaltbau (DE)

#### Protection and EMC in DC Grids

12:00 **Solid State Circuit Breakers for Protection of LVDC Grids**  
Antonello Antoniazzi, ABB (IT)

12:30 **HybSchaDC Project**  
Dieter Volm, Panasonic Electric Works Europe (DE)

13:00 Lunch Break

14:00 **EMC of an Industrial DC Grid**  
Winfried Hovestadt, KEB Automation (DE)

14:30 **Fault Modeling and Detection**  
Christian Strobl, E-T-A Elektrotechn. Apparate (DE)

15:00 **Simulation of Short Circuit Currents in Industrial Distribution Systems**  
Kilian Gosses, Fraunhofer IISB (DE)

15:30 **Sum-up and Final Discussion**

16:00 End of Workshop