

15 Years Anniversary of the European Center for Power Electronics ECPE

In 2018, ECPE European Center for Power Electronics is celebrating its 15 years anniversary. In 2003, the European Power Electronics Research Network was founded by the eight leading companies Infineon Technologies, SEMIKRON Elektronik, EPCOS, Siemens, STMicroelectronics, Conti Temic microelectronic, NMB-Minebea and SEW-Eurodrive. Main driver of the ECPE initiative was Prof. Leo Lorenz from Infineon Technologies at that time, who is still President of ECPE registered association.

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Together with Dr. Heinrich Heilbronner (Semikron) and Dr. Martin März (Fraunhofer IISB) Dr. Lorenz started the ECPE task force. Today the ECPE Network comprises 180 member organisations, 85 industrial companies who ensure their long-term financing through their membership fees in ECPE e.V. Furthermore, there are 95 university and research institutes, including alone 8 Fraunhofer institutes which belong to the research network as so-called ECPE Competence Centres.

The key objectives of the ECPE Network have not changed in the last 15 years. As the industry-driven Power Electronics Research Network covering the value chain from the materials and components to the systems and applications ECPE strengthens the cooperation between Power Electronics industry and universities & research centres on a European level. The ECPE concept developed by the founders focuses on R&D, innovation, training and education, public relations and technology transfer in the field of power electronics in Europe.

ECPE – the industry-driven Research Network
with 85 Industrial Members



Figure 1: Industrial Members

In the ECPE foundation phase 15 years ago it was a major challenge to emphasize the importance of power electronics. Despite the various power electronics applications already at that time, power electronics had an image problem. Students in electrical engineering found this technology discipline less attractive than telecommunications or nanotechnology. And in research funding programmes, power electronics hardly appeared, the actors had to place their research topics in general programmes of materials or microelectronics research. But driven by the megatrends to increase energy efficiency, the use of renewable energy and then later e-mobility, the importance of power electronics and the corresponding awareness has changed a lot. The topic has moved from the niche to the spotlight.

As a European technology and innovation platform, ECPE is driving precompetitive joint research and set up research & technology roadmaps for a strategic research agenda with future research directions according to the demands of European power electronics industry. The ECPE education and training program covers a wide range of current topics and addresses programme especially engineers from industry.

The aim of ECPE public relations and lobbying activities still is to increase awareness of the role and importance of power electronics for Europe which has two main directions, publicly funded research programmes addressing power electronics topics and future young engineers. The ECPE programme “Young Engineers Needed”, for example, offers a wide variety of activities including a student robotic competition with schools, the ECPE Students Day at PCIM Europe exhibition and the European PhD School which takes place annually in Gaeta, Italy.

ECPE Workshops and Tutorials

The backbone of the ECPE Network activities is the advanced training programme with expert workshops on the one hand, and tutorials for young engineers in industry and beginners on the other hand. ECPE is organizing about 20 events per year which are held in different countries in Europe with more than 800 participants in total. Flagship event in the ECPE workshop programme is the SiC & GaN User Forum organized biennially since 12 years where the potential of wide bandgap semiconductors in power electronic applications is discussed.

ECPE Roadmapping

The roadmapping activity is another highlight in the ECPE Network

with several programmes to develop power electronics roadmaps from the system and application perspectives e.g. the ECPE Roadmap 'Power Electronics 2025', see an example from automotive and aerospace power electronics. Presently, ECPE is working on a roadmapping programme identifying promising lead applications for the wide-bandgap power semiconductors SiC and GaN in cooperation with partners in Japan.

ECPE organizes the „Semikron Innovation Award“

The Semikron Innovation Award and the Young Engineer Award were initiated 2012 by the Semikron Foundation in cooperation with ECPE. These awards given for outstanding innovations in projects, prototypes, services or novel concepts in the field of power electronics in Europe, combined with notable societal benefits in form of supporting environmental protection and sustainability by improving energy efficiency and conservation of resources.

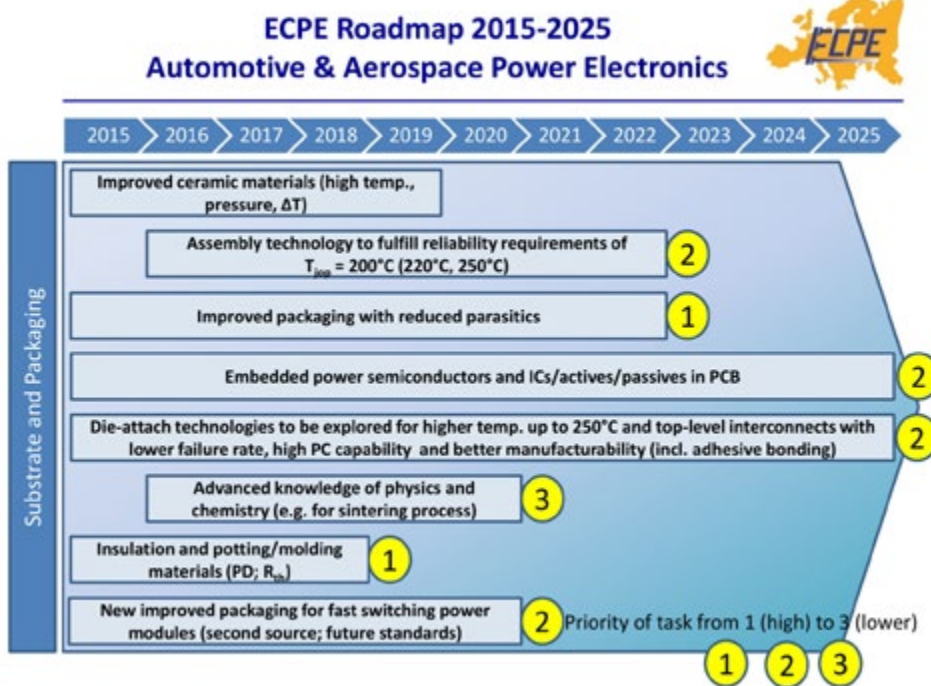


Figure 2: Roadmap 2015 – 2025

ECPE Guideline AQG 324 „Automotive Qualification Guideline“

Another recent highlight is the transfer of the German automotive qualification standard LV 324 to the European level as ECPE Guideline AQG 324 by an ECPE working group with more than 30 industry representatives from the automotive supply chain. The qualification guideline defines a common procedure for characterizing module testing as well as for environmental and lifetime testing of power electronic modules for automotive application. The ECPE Guideline AQG 324 'Qualification of Power Modules for Use in Power Electronics Converter Units in Motor Vehicles' has been released by the responsible ECPE Industrial Working Group comprising ECPE member companies from the automotive market. The present version dated 12 April 2018 focuses on Si-based power modules where future versions to be released by the ECPE Working Group will also cover the new wide bandgap power semiconductors.

ECPE Lighthouse Programme on modular and scalable Power Electronic Building Blocks (msPEBB)

In the frame of the its Joint Research Programme ECPE has started the msPEBB Lighthouse Programme in 2017 defining a heterogeneous system integration especially when fast switching SiC and GaN power devices are involved. Approaches like switching cell-in-package and power system-in-packages are developed to master the parasitic inductances in fast switching. The critical part of the circuit is integrated in a package and therewith, a more EMI robust msPEBB module can be supplied to the end users.

ECPE Outlook and Future Mega Topics

A key topic will be the future energy system and especially the role of power electronics in the energy transition towards an electricity grid dominated by power electronics on the generation side as well as on the load side. The stabilization and control of such grids without 50Hz backbone provided by conventional generation is a major challenge. Furthermore, the fusion of power electronics and information & communication technologies (ICT) will lead to a digitalization in energy systems e.g. with the smart grids. This will raise the problem of cybersecurity of energy systems. These topics will be discussed in an ECPE Network Meeting on 12 September 2018 in Brussels.

ECPE Joint Stand at PCIM Europe

ECPE and the Power Electronics Cluster once again organize a joint stand at PCIM Europe 2018 with 20 exhibiting companies and institutes (Hall 7, Booth 237). Take the chance and meet

experts from the largest power electronics network in Europe! ECPE celebrates its 15th anniversary on the joint stand. Highlights from the last 15 years as well as future research topics, will be presented on Wednesday, June 6, 2018 at 11:30 am at the industry forum in hall 6 by ECPE.

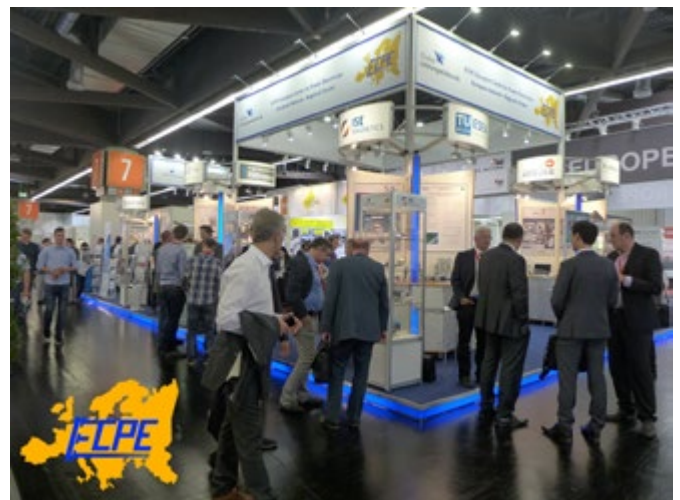


Figure 3: PCIM Booth

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