

Tutorial C

Date Sunday, October 12, 13:30 – 17:00
Venue SDKM, ITU, Workshop Room C

Electric Vehicle Charging in Electricity Distribution Systems



Johan Driesen, KU Leuven, ESAT-ELECTA, Belgium

Professor Johan Driesen (S'93–M'97–SM'12) was born in 1973 in Belgium. He received the M.Sc. degree in 1996 as Electrotechnical Engineer from the K.U. Leuven, Belgium. He received the Ph.D. degree in Electrical Engineering at K.U.Leuven in 2000 on the finite element solution of coupled thermal-electromagnetic problems and related applications in electrical machines and drives, microsystems and power quality issues. Currently he is a professor at the K.U.Leuven and teaches power electronics, renewables and drives. In 2000-2001 he was a visiting researcher in the Imperial College of Science, Technology and Medicine, London, UK. In 2002 he was working at the University of California, Berkeley, USA. Currently he conducts research on distributed energy resources, including renewable energy systems, power electronics and its applications, for instance in renewable energy and electric vehicles.

Abstract: This tutorial starts with an overview of the main charging principles that are in use for powering up battery electric vehicles and plug-in electric vehicles. After a short introduction on e-mobility, the main standardized systems (AC, DC, different modes) and advanced principles such as wireless charging are discussed, referring to practical cases where vehicles have to be charged in different environments and different use cases or business models. The link with power system integration is made by addressing the impact of this new type of power consumption on the power flow and stability. “Smart” solutions are proposed, such as droop control and demand side management implementation. Modelling techniques and hardware implementations are briefly discussed. Examples from on-going research and living-lab trials are given. This tutorial intends to make a bridge between developments in smart grids, e-mobility and intelligent hard- and software solutions enabling the deployment of electric vehicles.