Abstract tutorial "How to understand and perform Life Cycle Assessment of electric vehicles"

The tutorial is intended for vehicle propulsion experts with none or basic LCA expertiseand gives an introduction to LCA of electric vehicles(BEVs, EREVs, FCEVs) and important influencing factors on the environmental impacts of these vehicles.
The tutorial openswith an introduction concentrating on the methodology and application of LCA at the example of the automotive sector (e.g. LCA standards, software and databases, ecodesign approaches and combination of LCA with economic and social factors).
The first main topic is an overview of current LCA studies on electric vehicles. This topic concentrates on differences of LCA structures and shows the participants how to read and interpret existing studies. Additionally, an overview ofcurrent resultsof electric vehicle LCAs from research studies and OEMs is given.
The second main topic addresses the proceeding during an LCA of electric vehicles. Relevant factors and differences during production, use stage and end of life of BEVs, EREVs and FCEVs are summarized. The environmental impacts induced by the production of electricity to propel the vehicles and the manufacturing of the battery are discussed in detail. In a further step, uncertainties influencing the results of LCAs of EVs are shown. The methodology to include uncertainty propagation in LCA is exemplified.
At the end of the tutorial the main conclusions are drawn and the participants have the possibility to discuss with the tutors.

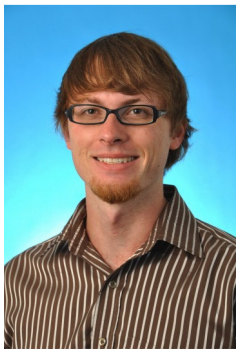
Tutors:

Daniel Wehner (M.Sc. Environmental Process Engineering)
Chair of Building Physics of the University of Stuttgart
"Energy and Mobility" Group - Dept. Life Cycle Engineering (GaBi)

Dipl.-Ing. Michael Baumann
University of Stuttgart
Chair of Building Physics (LBP)
Dept. Life Cycle Engineering (GaBi)

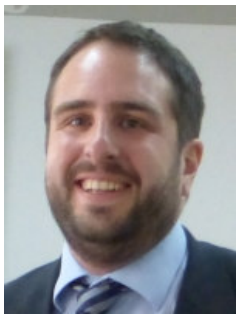
Dr. Maarten Messagie
Vrije Universiteit Brussel
Faculty of Engineering
Department of Electrical Engineering (ETEC)
Research centre MOBI - Mobility, Logistics and Automotive technology research centre

Prof. Dr. ir. Joeri Van Mierlo
Vrije Universiteit Brussel
MOBI – Mobility, Logistics and automotive technology research centre



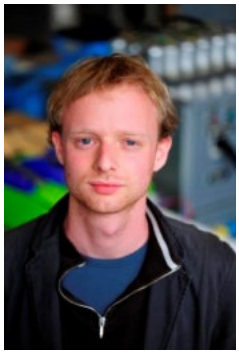
Daniel Wehner

Daniel Wehner (M.Sc. Environmental Process Engineering) works as a research engineer and project manager in the group “Energy and Mobility” of the Department Life Cycle Engineering (GaBi) at the Chair of Building Physics of the University of Stuttgart. His main fields of research are eco-design and life cycle assessment in the aviation and automotive sector with special focus on resource efficiency and environmental performance of lightweight solutions and e-mobility.



Michael Baumann

Mr. Michael Baumann has a Master (German Diploma (Dipl.-Ing.)) in Mechanical Engineering and has been working at the Department Life Cycle Engineering (LBP-GaBi) at the University of Stuttgart as research engineer since 2010. At the Department GaBi he is member of the Group “Energy and Mobility”. He is coordinating and working on public and industry financed projects concerning the Life Cycle Assessment (LCA) of electric mobility concepts (LCA of battery and range extended electric vehicles), energy systems and renewable energies (electricity storage), lightweight vehicle materials as well as ecodesign considerations of product and energy systems.



Maarten Messagie

Dr. ing. Maarten Messagie is a full-time post-doc researcher at the Vrije Universiteit Brussel, where he leads the LCA team of MOBI – Mobility, Logistics and automotive technology research centre (http://mobi.vub.ac.be). MOBI is an interdisciplinary and growing team of +50 staff members focused on sustainable mobility and logistics. Maarten Messagie graduated in 2006 as engineer specialized in industrial design. In 2008 he obtained a Master degree in "Sustainable Development and Human Ecology" at the Vrije Universiteit Brussel. He studied Life Cycle Assessment as PhD student at the Aalborg University and at the University of Trondheim (NTNU). In 2013 he received his PhD in engineering from the Vrije Universiteit Brussel. He is an active member of EARPA (European Automotive Research Partner Association) and collaborates intensively to the vehicle LCA task of the International Energy Agency. Maarten develops and coordinates several large European and national projects and supervises PhD students. He is a guest lecturer teaching Life Cycle Assessment at the VUB and ULB. His expertise and research focus is on uncertainty propagation in Life Cycle Assessment, vehicle-LCA, sustainable energy systems, mineral and metal depletion, electric vehicles, energy storage technologies, transition pathways, sustainability concepts, consequential LCA, ecodesign, life cycle management, environmental business model generation and market driven environmental consequences of consumption.

Joeri Van Mierlo

Prof. Dr. ir. Joeri Van Mierlo is a full-time professor at the Vrije Universiteit Brussel, where he leads the MOBI – Mobility, Logistics and automotive technology research centre (http://mobi.vub.ac.be). A multidisciplinary and growing team of +50 staff members.

Prof. Van Mierlo was visiting professor at Chalmers University of Technology, Sweden (2012).

He is expert in the field of Electric and Hybrid vehicles (batteries, power converters, energy management simulations) as well as to the environmental and economical comparison of vehicles with different drive trains and fuels (LCA, TCO).

Prof. Van Mierlo was Vice-president of AVERE (2011-2014)(www.avere.org), the European Electric Vehicle Association and board member its Belgian section ASBE (www.asbe.be). He chairs the EPE chapter “Hybrid and electric vehicles” (www.epe-association.org). He is member of ERTRAC’s Working Groups (European Research Transport Advisory Council). He is an active member of EARPA (European Automotive Research Partner Association) and member of EGVIA (European Green Vehicle Initiative Association). He is member of the board of Environmental & Energy Technology Innovation Platform (MIP) and chairman of the steering committee of the sustainable mobility platform of ENERGIK.

He is IEEE Senior Member.

He is the author of more than 300 scientific publications. He is editor in chief of the World Electric Vehicle Journal and co-editor of the Journal of Asian Electric Vehicles and member of the editorial board of “Studies in Science and Technology” as well as of “ISRN Automotive Engineering”.