

International VDI Conference

# Electrified Off-Highway Machines

May 14 - 15, 2019, Dusseldorf, Germany

- Developments in Powertrain Electrification
- Approach & Solution in Design and Development
- Emission Regulation and Treatment Technology
- Battery Technology for Off-Highway Applications
- Case Studies in Off-Highway Electrification

+ Workshop on Engine & Aftertreatment Enhancement

+ Panel Discussion on Battery and Fuel Cell Technology

Keynotes:  
DEUTZ AG  
& ZF

Meet international Experts from:



An event organized by VDI Wissensforum GmbH

[www.vdi-international.com/01K0934019](http://www.vdi-international.com/01K0934019)





## About us



The Association of German Engineers (VDI) is one of the largest technical-scientific associations in Europe. Throughout the years, the VDI has successfully expanded its activities nationally and internationally to foster and impart knowledge about technology-related issues. As a financially independent, politically unaffiliated and non-profit organization the VDI is recognized as the key representative of engineers both within the profession and in public.

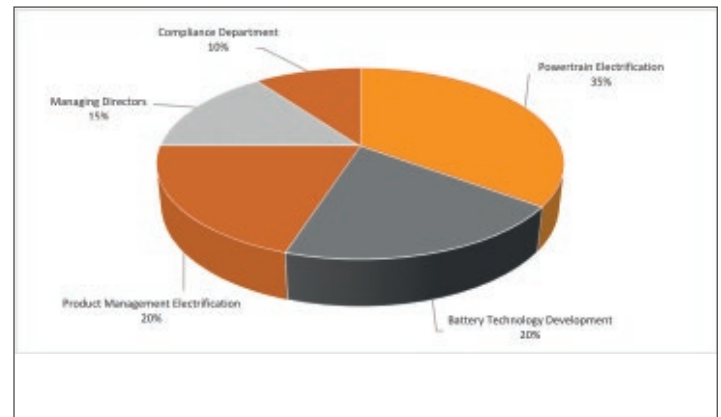
## Supporting Experts

Prof. Dr.-Ing. Dipl.-Ing. Thomas Herlitzius, Head of the of Professorship Agricultural Systems and Technology, Technische Universität Dresden, Germany

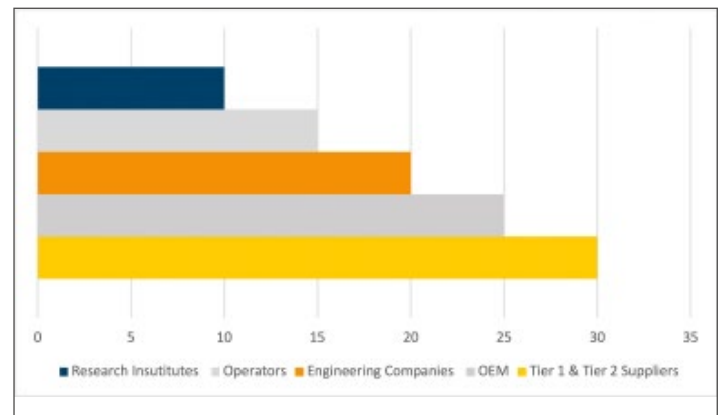
## Reasons to attend

- Meet international experts from the off-highway industry
- Learn about the latest trends and developments in electrification
- Hear about best practice examples from manufacturers and end-users
- Network with peers from different off-highway areas
- Benefit from case studies and practical insights
- Discuss the impact of electrification on your industry

## Expected Participants according to Functions



## Expected Participants according to Industries



08:30 Registration & welcome coffee

10:00 Chair's welcome and opening address

### I. Developments in Powertrain Electrification

Keynote

#### 10:15 Carbon-free Powertrains for future Mobile Machines

- The emission situation in the off-highway industry
- Ecological approach through sustainable fuels and powertrain electrification
- Case studies in electrification
- Agile development methodology for electrified powertrains

Dr.-Ing. Frank Hiller, CEO, DEUTZ AG, Germany

#### 10:45 Electric Drives in Mobile Machines

- Current drivers for electrification
- Resulting technical requirements
- Implementation considerations

Klaus Graner, Managing Director, Liebherr-Components Biberach GmbH, Germany

### II. Approach & Solution in Design & Development

#### 11:15 A holistic System Approach for the Design and Integration of the Powertrain in Off-Highway Applications

- System architecture of an all-electric and diesel-electric drive system
- Identification of functional components for an electric powertrain
- Design and selection of required components and exemplary vehicle integration

Harald Dietel, Project Manager, Sensor-Technik Wiedemann GmbH, Germany

#### 11:45 Machine Electrification using simulation-based Approach for meeting conflicting Product Requirements

- Identification of main losses of an heavy excavator
- Electrification architecture definition
- Optimization of electrified systems towards maximum efficiency & productivity

M. Romain Nicolas, Business Developer, Siemens PLM Software, France

12:15  Lunch

### III. Emission Regulation & Treatment Technology

#### 13:45 The NRMM Stage V Regulation in Europe: Changes, Expectations and Challenges

- Review of stage V regulation and changes compared to stage IV
- Expectations towards stage V
- Challenges of stage V regarding requirements of in-service monitoring (ISM) of all NRMM engines

Dr. Adolfo Perujo, Project Leader, European Commission DG-JRC, Italy

#### 14:15 Exhaust Aftertreatment for future Non-Road Diesel Engines

- Regulation development
- How to meet ultra-low NOx emissions
- Thermal management and control
- How to match hybrid operation to exhaust aftertreatment: Pros and cons

Arno Amberla, Vice President, Technology, PROVENTIA OY, Finland

### IV. Battery Technology for Off-Highway Applications

#### 14:45 Challenges and Opportunities in Thermal Management Systems (TMS) of electric & hybrid Machines

- Thermal Management: Importance and challenges for the off-highway industry
- Integrated TMS for cooling and heating demands in various components
- Modular and scalable system with high energy efficiency through waste heat recovery and passive cooling

Josef Graubmann, Managing Director, Ymer Technology GmbH, Germany

15:15  Networking & coffee break

#### 15:45 Battery Electrification in Underground Mining

- Main drivers for electrification underground
- Challenge: Developing and producing the world's biggest battery machines
- How new business models change everything

Erik Svedlund, Head of Marketing, Epiroc Electrification, Epiroc Rock Drills AB, Sweden

#### 16:15 Developing Battery System Solutions for Heavy Duty and High Performance Applications

- Vehicle electrification as key driver for battery system development
- Battery requirements for heavy duty and high performance applications
- Challenges due to high performance duty cycles and long operational life
- Commercial challenges due to lower overall vehicle volumes

Ryan Maughan, Managing Director, AVID Technology Group Ltd, United Kingdom

#### 16:45 EV Power Challenges and Energy Management

- Charge control challenges for electrified fleet
- Energy management and sustainability
- EV batteries as energy storage
- Carbon and cost reduction by cloud-based charging solution

Daniel Troedsson, Managing Director, Felix Haberl, Business Manager India, both: Alelion Energy Systems AB, Sweden

17:15 End of conference day one



#### Get Together

At the end of the first conference day we kindly invite you to use the relaxed and informal atmosphere for in-depth conversations with other participants and speakers.

**09:00 Impact of e-Mobility on Supply Chain and related Market Expectation**

- Requirements for suppliers due to electrification
- Implications of these requirements
- ZF's strategy

Keynote

**Gerhard Stempfer**, Manager Industrial Technology - Business Unit Off-Highway Systems, ZF, Germany

**V. Case Studies in Off-Highway Electrification****09:30 Fossil-free and emissions free Construction Sites in Oslo**

- Overview of procurement strategy on fossil-free construction sites in Oslo
- Experiences with fossil-free and emissions free construction to date
- The way forward on emissions free construction sites

**André Aasrud**, Senior Adviser, Climate Agency, City of Oslo, Norway

**10:00 Journey towards Electrification – How to transfer a Research Project into a Machine Portfolio**

- Electrification of a complete worksite, different solutions for different machines
- Electrification, automation and connectivity as enablers for each other
- Environmental impact, reduction of carbon emissions
- Operational and soft learnings

**Uwe Müller**, Program Manager Commercial Pilots, Volvo Construction Equipment, Sweden

10:30 ☕ Networking & coffee break

**11:00 GridCON – A tethered and autonomous Tractor**

- Concept and prototype of a grid-connected electric & autonomous tractor
- GridCON: A new milestone of John Deere's (JD) for a fully sustainable energy supply for agricultural machinery (SESAM)
- Permanent electric power supply at doubled power density and productivity at significantly reduced machine and operational costs

**Prof. Dr.-Ing. Peter Pickel**, Deputy Director European Technology Innovation Center, John Deere GmbH & Co. KG, Germany

**11:30 Hydrogen for Off-Highway Machines – Case Study Excavator**

- The potential role of hydrogen in the renewable energy society
- Hydrogen as fuel to reduce emissions from transport applications
- „Zero Emission Digger“ hydrogen and batteries for an electrified 30-tons excavator

**Anders Ødegård**, Project Manager, New Energy Solutions, SINTEF, Norway

**12:00 Panel Discussion: Batteries and (Hydrogen) Fuel Cells - A critical View on Advantages and Disadvantages**

**Anders Ødegård**, SINTEF, Norway

**Ryan Maughan**, AVID Technology Group Ltd, United Kingdom

**Felix Habert**, Alelion Energy Systems AB, Sweden

12:30 🍴 Lunch

**VI. Mobile Machine Electrification****13:30 Balancing emerging Electrification Technologies with evolving Performance Expectations**

- Addressing challenges of widely varying duty cycles and work functions
- Scaling up for large-sized off-highway vehicles
- Optimizing vehicle performance in a connected, data-rich environment
- Managing accelerated development timetables in limited-volume markets

**Ettore Cosoli**, Vice President of Global Engineering for Off-Highway Drive and Motion Technologies, Dana Incorporated, Italy

**14:00 e-Tractor Fleets – Challenges and solutions for Powertrain Electrification and Charging Management of agricultural Fleets**

- Off-road application meets electrification: motivation and drivers
- Introduction to an agricultural fleet example: Challenges that come along with fleet electrification
- Future e-powertrain solutions: AVL e-tractor concept
- Battery system design and integration and charging concept
- Charging management of an e-tractor fleet and its impact on the grid

**Sabine Pretsch, M.Sc.**, System Development Engineer Off-Road, AVL Commercial Driveline & Tractor Engineering GmbH, Austria

**Thomas Wooten, M.Sc.**, Development Engineer Vehicle, AVL Tractor Engineering Germany GmbH, Germany

14:30 ☕ Networking & coffee break

**15:00 Electric Construction Machinery – Economical, environmentally friendly and low Emission**

- Overview of zero emission products at Wacker Neuson
- Advantages of electric drives
- Alternative drives for construction machinery
- Outlook / drive concepts of the future

**tba**, Wacker Neuson, Germany

**15:30 Electrification of Mini Excavator**

- Application of an electrified solution in a mini excavator
- Challenges and learning
- Electrification of actuator system

**Richard Lively B.Eng., MBA**, Executive Director, Electrified Power Business Unit, Cummins, United Kingdom

**16:00 Closing remarks**

16:15 End of conference



International VDI Workshop

# Enhanced Engine & After-treatment System through Virtual Optimization

## Workshop Chair

**Romain Nicolas**, Business Developer Simcenter Amesim, Siemens PLM Software, France

## Date and Venue:

May 13, 2019  
Dusseldorf

## Time:

10:00 - 16:00

## Content

Even if we are currently hearing a lot about electrification, off-road vehicles remain mainly powered by internal combustion engine (almost 100% for construction equipment). Nevertheless, heavy equipment OEMs still need to comply with the total cost of ownership reduction objectives and emission regulations. By 2020, they may reach the 50% engine efficiency target – positioned between 30-40% today. This requires investigating several means for OEMs and engine suppliers.

In this workshop, Romain Nicolas, Simcenter Amesim business developer, presents on the means to support the development of more efficient engines. He explains how system simulation is a key asset to develop efficient after-treatment systems.

- Improved engine and after-treatment system
- 50% engine efficiency in compliance with emission regulations through system simulation
- Design and optimization of exhaust line arrangement
- Prediction of pollutant emissions
- Development and verification of control strategies





Source: ©iStock.com - smallfrog

## 4th International VDI Conference

# Connected Off-Highway Machines

Connectivity and the Future of Autonomous Mobile Machines

### Date and venue:

May 14-15, 2019

Dusseldorf, Germany

### Renowned speakers will discuss the following topics:

- The Future of Autonomous Mobile Machinery
- The Benefits and Challenges of Connectivity for the Off-Highway Industry
- New Business Models for Connected Mobile Machines
- The Value of Data
- Facing Challenges of Machine Coordination
- Out-of-the-Box: Where are the Automotive and Aerospace Industries heading?

+ World Cafés

+ Panel Discussion on Artificial Intelligence –  
Where is the Off-Highway Industry headed?

[www.vdi-international.com/01K0902019](http://www.vdi-international.com/01K0902019)

## 3rd International VDI Conference

# Smart Farming

### Date and venue:

May 14-15, 2019

Dusseldorf, Germany

### Renowned speakers will discuss the following topics:

- Internet of AgriThings: Case Studies – is the WWW the solution?
- Paving the Way to Smart Farming in real Practice
- Enabling Technologies and Solutions for Digital Farming
- Farming as a service – New Business Models
- Artificial Intelligence in Agriculture – From Assistive Technologies to Autonomy
- Data-driven Value – How to get the most out of Farming Data
- Start-Ups: Transforming the Agriculture Sector

+ Interactive Round Table Discussion

[www.vdi-international.com/12K0100019](http://www.vdi-international.com/12K0100019)

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## Exhibition / Sponsoring

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If you want to meet with and reach out to the first-rate experts attending this VDI conference and to powerfully present your products and services to the well-informed community of conference participants, please contact:

**Christoph Brockerhoff**  
Project Consultant  
Exhibitions & Sponsoring  
Phone: +49 211 6214-228  
Fax: +49 211 6214-97228  
Email: brockerhoff@vdi.de



## Become a speaker

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Become a speaker at our international VDI Conferences. Make yourself known in the industry and discuss best practice examples with other international experts. We are looking for speakers on: Road Construction and Sensor & HMI Technologies for the Off-Highway Industry.

Please submit your topic to:  
**Sam Sharifian Pour**  
Product Manager International Business  
Phone: +49 211 6214-621  
Email: sharifianpour@vdi.de

# Registration

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## Terms and Conditions

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**Registrations:** Registrations for conference attendance must be made in writing. Confirmation of your registration and the associated invoice will be mailed to you. Please do not pay your conference attendance fee until you have received our invoice and its invoice number to be stated for transfer. German VAT directives apply. Please state your VAT-ID with your registration.

**Conference venue**  
Crowne Plaza Düsseldorf - Neuss  
Rheinallee 1  
41460 Neuss, Germany  
Phone: +49 2131 7700  
Email: [mailus@cphotelduesseldorfneuss.com](mailto:mailus@cphotelduesseldorfneuss.com)  
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You will find more hotels  
close to the venue at  
[www.vdi-wissensforum.de/hrs](http://www.vdi-wissensforum.de/hrs)

**Hotel room reservation:** A limited number of rooms has been reserved for the benefit of the conference participants at the Crowne Plaza Düsseldorf - Neuss.

Please refer to "VDI Conference". For more hotels: [www.vdi-wissensforum.de/hrs](http://www.vdi-wissensforum.de/hrs)

**VDI Wissensforum service package:** The conference package includes the conference documents (online), beverages during breaks, lunch and the get together on May 14, 2019.

**Conference attendance conditions and terms:** By way of your registration you accept the conference attendance conditions and terms of VDI Wissensforum GmbH as binding. Any cancellation of your registration must be made in writing. We will charge you only an administrative fee of € 50.00 plus German VAT if you cancel your registration earlier than 14 days ahead of the conference date. Any cancellation that reaches us after this deadline will entail the conference attendance fee as stated in our invoice to be charged in full. The date of the post office stamp of your written cancellation will be the decisive criterion. In that case, we will gladly mail you the conference documents on request. Subject to agreement, you may name a substitute participant. Individual parts and sections of conferences and seminars cannot be booked. You will be informed without delay if an event has to be cancelled for unforeseeable reasons. In that instance, you will be entitled only to a refund of your conference attendance fee if already paid. We reserve the right to exchange speakers and/or change the program sequence in exceptional cases. In any case, the liability of VDI Wissensforum GmbH is restricted exclusively to the conference attendance fee.

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## Register online!

[www.vdi-international.com/01K0934019](http://www.vdi-international.com/01K0934019)



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Yes, I will participate as follows:

### Participation Fee + VAT

**VDI Conference 14.-15.05.2019**  
(01K0934019) € 1840

**Workshop 13.05.2019**  
(01S1939001) € 950

### Package Price (Please tick the boxes)

(Conference + 1 Workshop) € 2500

I am interested in sponsoring and/or exhibition

Participation Fee VDI-Members\* Save 50 € for each Conference Day.

\* For the price category 2, please state your VDI membership number

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