

Who Should Attend

Presidents, VPs, Directors, Heads, Managers, Engineers

- Decarbonisation
- Business Development
- Innovation
- Emission Control
- E-Mobility
- engine development
- Off-Road/Off-Highway
- Hydrogen
- Electrification
- Battery
- Sustainability
- Digitalization
- Thermal management
- Research and development
- Net zero

Confirmed Speakers



Nils Holta
Net Zero Advisor
Ecohz

Sebastian Ugglä
Mobile Machinery Sector
Manager
Nordics

Sahar Rashid Beigi
Head of Decarbonization
APM Terminals

Dariusz Pioro
CEO
Dariusz pioro
digital engineering

Yannick Dandois
Lead Contract Engineer
Vinçotte

Chris Perry
Managing Director
Timberwolf

Tomasz Turek
R&d Manager
BSPL 1 SPzoo

Lotfi Nazli
R&D Engineer
at Materials Technology
for Electrification
and Electronics,
Scania CV AB
Scania

Zeyd Okutan
Product Manager
Volvo Penta

Shan Tomouk
Senior Research Analyst
Rho Motion

Subhes Bhattacharyya
Professor of Net Zero
Carbon Energy Systems
University of Surrey

Jyri Kyla Kaila
Managing Director
Epec Oy

Nir Vaks
Vice President -
- Electrification
Carpenter Technology

Phil Roberts
Technical Specialist –
– Propulsion Research
and Development
Horiba Mira

Amr Moussa
AI Development Engineer
AVL List GmbH

Cesare D'Ippolito
Business
Development Director
NGV Powertrain

Mark Zwerner
VP Global Strategic
Partnerships Smart
Buildings Division
ABB

Justus Andreas
Team Lead
Bellona

Niall Caldwell
Senior Director, R&D
Danfoss

Alex Woodrow
Managing Director
Knibb Gormezano
and Partners

Tommaso Migliuolo
Business Development
Manager
Williams Advanced
Engineering

Pietro Boggia
Principal Consultant
& Business Development
Manager, Spain
& Portugal
Frost & Sullivan

Per Stjernqvist
Global Director Solutions,
Off Highway Equipment
Irdeto

Mats Hultman
Head of OEM
Partnerships
Neste Corporation

Dr. Wilfried G. Aulbur
Senior Partner
Roland Berger

Nils Holta
Net Zero Advisor
Ecohz

Stefan Hellfeld
CEO
Aradex AG

Karl Koch
Vice President R&D
REFUdrive GmbH

Tuesday 18th April 2023

08:30 Chairman's Opening Remarks and Address

THE FUTURE OF NRMM MARKET & TRENDS

08:40 Opening Keynote

Developments in NRMM Market and Forecasts

- An overview of supply and demand
- Key factors and main drivers of NRMM electrification and hybridization
- Long-term forecasts and challenges ahead
- Benefits and challenges in the adoption of net-zero in the NRMM industry

Dr. Wilfried G. Aulbur / Senior Partner / Roland Berger

09:05 Case Study

How to Meet Climate Targets with Renewable Fuels already today

- What are the key renewable fuel options for NRMM?
- Availability and forecast of renewable fuels and new technologies
- TCO impact and sustainability for renewable fuels
- Examples from NRMM customers switching to renewable fuels

Mats Hultman / Head of OEM Partnerships / Neste Corporation

09:30 Case Study

Electrification driving Features and performance as a Service

- Why operators and fleet owners are having interest in buying features and performance on demand and over the lifetime of the equipment
- Why Electrified equipment is more suitable for "as a service" business model
- Show cases and examples of business models

Per Stjernqvist / Global Director Solutions, Off Highway Equipment / Irdeto

09:55 Case Study

How can electric powertrain components from the forklift truck industry accelerate electrification of agricultural and construction machinery?

- Forklift truck are the only vehicles that have been designed and built as fully electric machines for over 70 years.
- Forklift truck manufacturers like Jungheinrich and many industry suppliers offer a large variety of proven, heavy duty, volume production electrical powertrain components available.
- Especially Wheel loaders, excavators and tele handlers are ideal fits for the electric powertrains from forklifts trucks.

10:20 Case Study

Ecosystem Collaboration to Drive Off-Highway Industry Growth

- Equipment electrification, digitization and automation trends have pushed the need for strategic synergies in the off-highway industry between OEMs, suppliers, and service providers, leading to increasing Industry Convergence.
- Post pandemic rebound is expected to accelerate ecosystem collaboration. In the next 2 to 4 years, Off-Highway OEMs are expected to expand their research in alternative powertrain technologies, where electrification is a key theme. Fuel cell electric vehicle research is also expected to expand. New participants will be entering the market in the electrification and digital technology space.
- In this presentation, Pietro Boggia will disclose the latest Frost & Sullivan Growth Outlook for the Off-Highway Industry, with a focus on electrification trends, autonomous technologies, and industry convergence.

Pietro Boggia / Principal Consultant & Business Development Manager, Spain & Portugal / Frost & Sullivan

10:45 Case Study

From motorsport to Off Highway

- Introduction to WAE
- WAE heritage and look forward to motorsport series we are involved in
- Key electrification developments derived through motorsport
- How this can accelerate development of battery solutions in off highway

Tommaso Migliuolo / Business Development Manager / Williams Advanced Engineering

11:10 One-to -One Meetings & Networking Break

11:40 Panel Discussion

NRMM Regulation and Emission Standards

- Updates on latest emissions legislation for NRMM
- European emission standards for engines used in new non-road mobile machinery (NRMM)
- Exhaust aftertreatment and hybridization technologies: key to improving CO2 emissions in non-road mobile machinery (NRMM).

ACCELERATING TO NET- ZERO EMISSIONS FUTURE

12:05 Case Study

Digital Engineering as a step on the Roadmap to Net-Zero NRMM

- The Hows and Whys of Digital Engineering
- Digital Engineering in developing net-zero Non-Road Mobile Machinery
- Roadmap to zero prototypes: Real-time Digital Twins

Dariusz Pioro / CEO / Dariusz pioro digital engineering

12:30 Case Study

Energy efficiency – a shorter route to Zero

With rising fuel cost and environmental awareness, customers demand reduced fuel consumption, while OEMs commit to stretching emissions targets. But the off-road route to Zero seems long and uncertain.

The IEA estimates that 44% of the overall emissions reductions required, can be met by energy efficiency. In our industry, legacy components and architectures mean that systems often waste more energy than they deliver.

By combining Danfoss's efficient Ediron® electric drives and Digital Displacement® hydraulics, we can reduce emissions and lifecycle costs of today's machines and transform the economics of low-carbon sources.

The talk will share recent research results from our laboratories on key component and system development and outline a roadmap towards 50% reduction of energy consumption.

Niall Caldwell / Senior Director, R&D / Danfoss

12:55 Lunch Time Break

13:55 One-to -One Meetings & Networking Break

14:05 Case Study

Enabling Zero Emission Construction Sites

- Importance of construction machinery as part of cities' emission and WLCA of buildings
- Policy frameworks to create zero emission construction sites at the city level
- Presenting Bellona's Emission free Construction Machinery database

Justus Andreas / Team Lead / Bellona

14:30 Case Study

"ABB's Mission to Zero:

How we can help customers to turn their operations to carbon neutral and support building a self-sustaining energy supply as independent as possible from the main grid"

I would like to talk about how the solutions from the ABB Mission to Zero initiative can help to turn our customers operations (production site, buildings, other operations) to carbon neutral based on concrete examples and how this approach together with our latest energy management solutions can build a self-sustaining energy supply which is as independent as possible from the main grid.

Mark Zwerner / VP Global Strategic Partnerships Smart Buildings Division / ABB

14:55 Case Study

Benefits and challenges in the adoption of net-zero in the NRMM industry

- General benefits in product placement or promotion related to Net Zero action.
- The case of Oslo (where municipal authorities require zero-emission building construction sites).
- Pathways to Net Zero.

Nils Holta / Net Zero Advisor / Ecohz

15:20 One-to -One Meetings & Networking Break

15:50 Case Study

Net-Zero for Heavy-duty Vehicles using Low-carbon Fuels and hybridization

- Low carbon fuels in NRMM: The key challenges to overcome
- What are the key low carbon fuel options for NRMM?
- What role could these options play?
- What are the key barriers holding their deployment back?

Cesare D'ippolito / Business Development Director / NGV Powertrain

DIGITAL INNOVATIVE TECHNOLOGY FOR NRMM

16:15 Case Study

Realizing AI Solutions in Advanced Control Systems Development in the Automotive Sector

- Insightful analysis into the future AI-based technologies in control systems.
- The business potential of AI-based vs rule-based approaches complying with several control objectives simultaneously.
- The contributions of AVL in realizing reinforcement learning strategies into real vehicles including patents and publications.
- Utilizing cloud computing technologies to facilitate the transition towards intelligent vehicles ECUs.
- Applying RL methods to two industrial use cases in AVL with demonstrations:
- Plug-in Hybrid Electric Vehicles energy management strategies
- Battery Electric Vehicles thermal management systems and cabin comfort

Amr Moussa / AI Development Engineer / AVL List GmbH

16:40 Case Study

Digital Twinning – Improving machine and powertrain development and efficiency using virtual testing

- With tightening emissions limits and the move to electrified propulsion systems, vehicle, machine, and powertrain development has become even more complex.
- Utilizing virtual engineering for powertrain development is ultimately required to mitigate the inevitable increase in development and certification timescales of new powertrains.
- An empirical digital twin of a contemporary NRMM powertrain was created accounting for typical and non-typical machine operation, altitude, and temperature.
- Performance and emissions attributes were resolved for several machine handling cycles with suitable levels of hybridization proposed to mitigate unfavorable performance and emissions hotspots.
- By adopting this digital twinning methodology, hotspots could be determined and resolved before prototype machines/vehicles are required; ultimately shortening development timescales.

Phil Roberts / Technical Specialist – Propulsion Research and Development / Horiba Mira

17:05 Panel Discussion

Vision 2030- Accelerating Electrification to Achieve Net-Zero

- How can the NRMM industry meet ever tighter carbon targets?
- What will be the biggest difficulties and obstacles to introduce more stringent emissions legislation for the NRMM sector?
- EV and EU politics: How to reach zero-emission in the NRMM Industry?
- Is the industry prepared for a rapid, large-scale roll out of electrified applications? What about consumers? Are the 2030/ 35 targets achievable?

Panelists

**Mats Hultman / Head of OEM Partnerships / Neste Corporation
Dr. Wilfried G. Aulbur / Senior Partner / Roland Berger
Nils Holta / Net Zero Advisor / Ecohz
Niall Caldwell / Senior Director, R&D / Danfoss**

17:45 Chairman's Closing Remarks and End of Day One

Wednesday 19th April 2023

08:30 Chairman's Opening Remarks and Address

13:10 Lunch Time Break

A DEEP DIVE INTO THE FUTURE OF NRMM ELECTRIFICATION AND HYBRIDIZATION

08:40 Case Study

Electrification without Softwareization? – forget it!

- Software not only inside vehicle controller but as well as real-time software inside inverters enables easy generation of added value, as different application scenarios can be addressed on the same hardware through easy extensibility.
- Electrification offers massive disruptive potential if we not only electrify the powertrain, but also think about "softwareization" of the powertrain.
- We present our VirtualSensor, our technology as a "game changer" for electrification, especially of mobile working machines and agricultural machinery: control and drive system become more convenient to use.
- We show some exemplary applications and the associated value-added functions that can be realized with our platform for "softwareization" of the inverter in the powertrain.

Stefan Hellfeld / CEO / Aradex AG

09:05 Case Study

Exploring the electrifying future of NRMM

- Electrification of NRMM - why electrifying of NRMM is so important.
- Electrification technologies in NRMM - future electrification technologies for NRMM on how these differences are compared to on-road electrification trends.
- Architectures used in NRMM - potential motor, drivetrain, and energy storage architectures (including Battery vs. Hydrogen).
- Player in NRMM market - review of major OEMs and Tier-1 suppliers (including pros/cons).
- Overcoming electrification challenges - future of NRMM electrification (short- to long- term).

Nir Vaks / Vice President - Electrification / Carpenter Technology

09:30 Case Study

NRMM electrification example – case PONSSE EV1, electric forest machine

This case study includes simulation-based software engineering and technology development of an electric forest machine PONSSE EV1 considering sustainability in the supply chain, manufacturing and lifetime operations.

Electronics, the main components and the system software play a key role in electrified power trains of heavy machinery. At least as important in modern machines are data flow, remote data analytics, optimizations and updates. An intelligent power distribution unit optimizes and updates the current flow to components that need it at the moment. It also protects the system components in high voltage environment. Integration with the main components in the system, such as hydraulics, thermal management, battery and gearbox must be seamless.

As the amount of electronics and software is increasing, the benefits they offer for OEMs and end customers grow significantly as well.

Jyri Kyla Kaila / Managing Director / Epec Oy

09:55 Case Study

The role of mobile non-transport machinery electrification in off-grid areas towards net-zero transition

- This will consider the case of off-grid electricity markets in developing countries
- Potential for using non-transport machinery as a load diversification strategy
- Economic and environmental benefits

Subhes Bhattacharyya / Professor of Net Zero Carbon Energy Systems / University of Surrey

10:20 Case Study

Addressing Charging Strategies in NRMM

- Outlining obstacles faced in the industry and outlining the solutions we might see in: Construction, mining, and agriculture
- How the above markets are likely to develop in future.

Shan Tomouk / Senior Research Analyst / Rho Motion

10:45 Case Study

Paving the way for electromobility

- Creating a modular electromobility platform for wide NRMM applications
- A complete system supply approach for electrification and end to end approach
- Challenges and opportunities for electrifying mobile machinery
- Considerations when switching from internal combustion to electromobility

Zeyd Okutan / Product Manager / Volvo Penta

11:10 One-to -One Meetings & Networking Break

11:40 Panel Discussion

Where are we on the Journey to Hybridization and Electrification

- Evaluate the progress that has been made and the objectives being set by OEMs as we climb up the levels of electric & hybrid.
 - Find out when OEMs expect to introduce fully electric NRMM systems
 - As we settle into what is the new normal, how will OEMs prepare for the most promising segment of fully electric NRMM
- Hear from the leading innovators as they overcome the potential obstacles in their path towards hybridization and electrification.

Panelists

Nir Vaks / Vice President - Electrification / Carpenter Technology

Jyri Kyla Kaila / Managing Director / Epec Oy

Shan Tomouk / Senior Research Analyst / Rho Motion

Zeyd Okutan / Product Manager / Volvo Penta

BATTERY TECHNOLOGY AND THERMAL MANAGEMENT FOR NRMM

12:20 Case Study

Battery Recycling from the industrial perspective

- The need.
- Recycling in industry.
- Disassembly issues.

Loffi Nazli / R&D Engineer at Materials Technology for Electrification and Electronics, Scania CV AB / Scania

12:45 Case Study

The benefits and costs of digitalization in hybrid, battery electric and FCEV thermal management for Non-Road Mobile Machinery

- Overall trends in digitalization for Mobile machinery
- How digitalization can be utilized in Thermal management applications?
- What are benefits and outcomes from digitizing Thermal management?
- What are challenges and costs related to Thermal management digitization?

Tomasz Turek / R&d Manager / BSPL 1 SPzoo

14:10 One-to -One Meetings & Networking Break

14:20 Case Study

48v Mild Hybrid Woodchipper – Use in the real world

- Interpreting a traditional ICE duty cycle into a hybrid powertrain duty cycle.
- PEMS testing and results – laboratory-based emissions data vs in use emissions data, ICE vs mild hybrid.
- In service data acquisition – performance improvement through programming refinement using in service data
- Reducing the cost of ownership – does the theory match with reality, powertrain uptime, service intervals and costs, fuel consumption etc.

Chris Perry / Managing Director / Timberwolf

14:45 Case Study

From the Smoking Exhaust to the Clean Socket. Design Steps from the Diesel-powered Mobile Machine to the all-electric Mobile Machine.

Part 2 – The triad of Battery, Motor and Inverter.

- How the path from a diesel-electric application to a full hybrid looks like
- What needs to be considered when setting up a powertrain consisting of a battery and an electric drive
- How to achieve a perfect triad in the interaction of the system components!

Karl Koch / Vice President R&D / REFUdrive GmbH

15:10 Panel Discussion

Evaluation of Battery Requirements for Hybrid and Electric NRMM

- Selection of battery requirements
- Battery power and energy for the charge sustaining HEV mode
- Battery consortium, vehicle analysis and battery sizing
- Integrate the battery system with other electrical components in electrified machinery

Panelist

Tomasz Turek / R&d Manager / BSPL 1 SPzoo

Chris Perry / Managing Director / Timberwolf

Loffi Nazli / R&D Engineer at Materials Technology for Electrification and Electronics, Scania CV AB / Scania

15:50 One-to -One Meetings & Networking Break

PATHWAY TO NRMM DECARBONIZATION

16:20 Case Study

The safety issues of a containerized hydrogen electrolysis solution

Yannick Dandois / Lead Contract Engineer / Vinçotte

16:45 Case Study

Global Non-Road Powertrains – Decarbonisation Opportunities and Challenges

- Market Outlook
- Drivers for Decarbonisation and Alternative Fuels
- Challenges for Battery Electric Machinery
- Lessons from other sectors

Alex Woodrow / Managing Director / Knibb Gormezano and Partners

17:10 Case Study

Decarbonisation - Perspectives of a terminal operator

- Product and supplier/OEM maturity and ambitions
- Operational and implementation challenges for large and fragmented fleets
- Role of other pathways e.g. hydrogen fuel cell, ammonia etc.

Sahar Rashid Beigi / Head of Decarbonization / APM Terminals

17:35 Case Study

Electric linear motion: it makes sense!

- How does electric cylinders aid Net zero MM? (an overview)
- How to achieve lower cost of ownership
- Hydraulic setup vs. electric setup: speaking the same language
- Known challenges and hurdles
- Examples where successful electrifications made for linear motion on non-road mobile machinery applications

Sebastian Ugglä / Mobile Machinery Sector Manager / Nordics

18:00 Chairman's Closing Remarks and End of Conference