

International Conference and Exhibition

SIA 2020 *DIGITAL* **POWERTRAIN & ENERGY**

The complete propulsion solution within its energy framework
for long range passenger cars and commercial vehicles

32ND
EDITION

16 - 29 NOVEMBER 2020

ONLINE DIGITAL
PLATFORM

Sponsors





Dear Participants,

It is again my great pleasure to extend to you all a very warm welcome on behalf of the SIA and the organization committee of this 32nd SIA Powertrain & Energy conference. **We are very grateful to all our sponsors, exhibitor companies and partners for the tremendous support they have provided.**

As the current health crisis lasts longer than expected and in order to highlight the great work provided by the speakers, we decided to hold the conference this year in a digital format offering to participants the possibility to view the presentations from mid-November till the end of the month. We hope that all of you and our partners emerge stronger at the end of this crisis.

Conference Chair
Dr Nouredine
GUERRASSI,

Chief Engineer –
Advanced Engineering Fuel Injection &
Combustion
BorgWarner

The requirement to address issues of global warming and oil independence is leading the automotive industry to explore simultaneously a wide range of competitive clean powertrain technologies in close connection with fuel and energy scenario development.

To evaluate the potential of each solution on GHG emissions, the scientific community and policy maker are pursuing a global system approach following a well-to-wheel basis and life cycle assessment. In this approach, energy production, distribution and usage in the vehicle all contribute to the overall CO₂ emissions reduction potential. As a consequence, the powertrain development should take a **comprehensive system approach including combustion, electrification and fuels to ensure sustainable energy and emissions.** Low carbon technologies for long range vehicles open up new opportunities but there are still important challenges. Their cost remains a major challenge in order to achieve customer acceptance and ensure a successful transition towards low and zero emissions vehicles.

In this context, the organizing committee decided to enlarge the scope of the 32nd SIA Powertrain congress, to consider **the complete propulsion solution within its energy framework with a specific focus on long range passenger cars and commercial vehicles.** Therefore, this new edition is called **SIA POWERTRAIN & ENERGY // 2020** and it will cover all the ongoing developments of highly efficient combustion engines, hybridization and battery & fuel cell electric propulsion. It will also address the energy framework and roadmap concerning renewable energy use in transportation. With the support of **PFA** - French Association of the Car Industry and the support of **EVOLEN** - French Association of Oil & Gas industry and Renewables.

I sincerely hope you enjoy our digital platform, the conference presentations and the virtual exhibition. Thank you for your participation to this event, your continuous support, flexibility and understanding.

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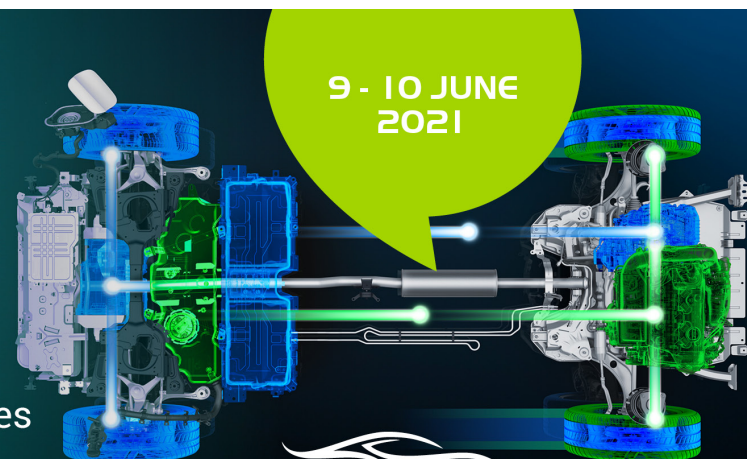
International Congress & Exhibition

SIA PARIS 2021 POWER TRAIN & ELECTRONICS

Hybrid and Pure Electric Drivetrain Technologies
for Next Decade Low Carbon Mobility

LES PYRAMIDES // PORT-MARLY, FRANCE

9 - 10 JUNE
2021



SIA SOCIÉTÉ DES
INGÉNIEURS DE
L'AUTOMOBILE

PROGRAMME

New European fuel & powertrain Well-To-Wheels Study

Marta YUGO - Concawe Science Executive for Economics & Modelling in the fields of CO₂ and Energy

Post Euro 6/VI emissions regulation for light and heavy duty vehicles

Panagiota DILARA - Senior Expert / Clean Vehicles Team Leader, European Commission

Future Powertrains for Carbon-Neutral Trucks

Johan ENGEBRATT - VP Powertrain Strategic Development, Volvo Group

Hydrogen and Fuel Cell for Future Mobility: PFA Position

Nicolas LECLERE - Senior Manager Electrified Powertrains, Groupe PSA

Powertrain Technology Mix Outlook 2035

Robert LASSARTESSES & Rodica FAUCON, Groupe RENAULT

| GHG EMISSIONS & LIFE CYCLE ASSESSMENT | HYBRID SYSTEMS SMART MANAGEMENT | ICE EFFICIENCY IMPROVEMENT I | HYDROGEN & FUEL CELLS I |
|--|---|---|---|
| <p>Contribution of light and heavy vehicles to reducing energy demand and CO₂ emissions by 2035 worldwide</p> <p>Jean-Luc BROSSARD, PFA - French Automotive Industry & Mobilities</p> | <p>Advanced Thermal System Control Optimisation on Ricardo "CONNECT HEV" democar</p> <p>Peter FUSSEY, Ricardo</p> | <p>Air system challenges for an ultra-lean SI engine concept</p> <p>Cédric LIBERT, Groupe Renault</p> | <p>Hydrogen Combustion – a Puzzle Piece of Future Sustainable Transportation!</p> <p>Reza REZAEI, IAV</p> |
| <p>Life Cycle analysis - Base for Decision or Object for Discussion?</p> <p>Olaf TOEDTER, KIT</p> | <p>Intelligent Driving: Achieving CO₂ Reduction through Advanced Propulsion and Vehicle Control</p> <p>Karim AGGOUNE, BorgWarner</p> | <p>Dual-fuel RCCI OMEx-gasoline combustion to reduce the well-to-wheel CO₂ levels towards the 2025 horizon</p> <p>Olivier POUSSIN, Volvo Group</p> | <p>Fuel Cell Systems for Heavy Duty Applications</p> <p>Marius WALTERS, FEV</p> |
| <p>Greenhouse Gas Emissions of Passenger Vehicles from a Cradle-to-Grave Perspective</p> <p>Victor GORDILLO, Aramco</p> | <p>Powertrain Virtual Testing</p> <p>Hervé COLIN, Groupe Renault</p> | <p>Water injection system for future gasoline direct injection engine</p> <p>Gavin DOBER, BorgWarner</p> | <p>Design Criteria for cost-efficient Hydrogen Storage Systems (HSS's)</p> <p>Axel SEIFERT, Plastic Omnium</p> |
| 48V ARCHITECTURE | ALTERNATIVE FUELS I | ICE EFFICIENCY IMPROVEMENT II | HYDROGEN & FUEL CELLS II |
| <p>Benefit of 48 V mild hybridization of distribution trucks</p> <p>Christophe MAGNET, Volvo Group</p> | <p>reFuels – rethinking fuels for CO₂ neutral mobility</p> <p>Olaf TOEDTER, KIT</p> | <p>Passive MAHLE Jet Ignition: Capability for Whole Area Operation and its Influence of Ignition System Requirements</p> <p>Adrian COOPER, Mahle Powertrain</p> | <p>LEAN FC Powertrain, an Innovative Fuel Cell System Concept</p> <p>Ralf WASCHECK, IAV</p> |
| <p>48 Volt High Power – Highly Efficient Full Hybrid for Mass Market Segment</p> <p>Stefan LAUER, Vitesco Technologies</p> | <p>e-Fuel production via renewables and their impact on WtW Fleet CO₂ performance</p> <p>Martin ROTHBART, AVL</p> | <p>Definition of the configuration for future CNG SI engines operating with the passive pre-chamber ignition concept</p> <p>Ricardo NOVELLA, CMT - Motores Termicos</p> | <p>FCEV performance assessment during transient driving conditions – the impact of water conditioning</p> <p>Christoph POETSCH, AVL</p> |
| <p>48V eDrive Modularity: an answer to e-mobility complexity?</p> <p>Pierre CHOLVY, Valeo</p> | <p>Sustainable pathways towards transportation decarbonization by PtX-Fuels</p> <p>Thomas KÖRFER, FEV</p> | <p>Swumble In-Cylinder Fluid Motion for High Efficiency Gasoline SI Engines: development of the second generation</p> <p>Xavier GAUTROT, IFP Energies Nouvelles</p> | <p>Systemic fuelcell powertrain architecture simulation to optimize durability, efficiency and performances</p> <p>Gautier QUENEY, Faurecia</p> |

PROGRAMME

SIA Student Challenge Winner: Truck Electrification
Benjamin DUPONT & Brandon TEDONGMO, IFP School

| HYBRID DRIVETRAIN | ALTERNATIVE FUELS II | REAL DRIVING EMISSIONS | BATTERY SYSTEMS |
|---|--|--|--|
| Modular and highly functional Hybrid Platform for subcompact cars up to full-size SUV Erik SCHNEIDER, IAV | Working Operating Limits with Ammonia-Fuel for Spark-Ignition Engines Christine ROUSSELLE, Univer-sité d'Orléans | Thermal management strategies for optimum performance of NOx aftertreatment applied in a demonstrator vehicle Ludwig BUERGLER, AVL | Battery research at Renault Pierre TRAN-VAN, Groupe Renault |
| Forming the Transformation – How Electrification changes the Portfolio of Transmission Components Jerome LAUGEL, Schaeffler | TOTAL HVO100 a low carbon drop-in fuel reducing emissions Cyrille CALLU, Total | Emissions and Immissions – The Diesel perspective. An assessment of the future of internal combustion engines Thomas KOCH, KIT | |
| | EC H2020 Engine tests with new types of biofuels and development of biofuel standards - Stability and robustness of actual FAME report Gérald CREPEAU, Groupe PSA | REAL-e a compact measurement system for regulated and unregulated emissions Philipp SCHIFFMANN, IFP Energies Nouvelles | |
| DIESEL HYBRID POWERTRAIN | ICE EFFICIENCY IMPROVEMENT III | BATTERY THERMAL MANAGEMENT | ELECTRIC MACHINES AND POWER ELECTRONICS |
| Benefits and Limits of Waste-Heat Recovery with Rankine Cycle for Long-Haul Trucks Thomas REICHE, Vovlo Group | The potential of spark assisted auto-ignition combustions for high indicated efficiency gasoline engines Matthieu CORDIER, IFP Energies Nouvelles | Fast Charging of HV Battery Systems thanks to Efficient Thermal Management David LASUEN, IAV | 800V System Permanent Magnet Machine and Multispeed Transmission Camelia JIVAN, Valeo |
| FEV Diesel EMotion – Electrified Diesel Powertrain for Light Commercial Vehicles to Meet Stringent CO ₂ Emission Norms Thomas KÖRFER, FEV | Future Powertrain Concept Highly efficient combustion engines with near zero impact on air quality Martin KRUEGER, Robert Bosch | Battery thermal management systems development and vehicle integration for conventional and ultra-fast charging capabilities Cédric ROUAUD, Ricardo | Challenges and Solutions for LithiumIon Cell based Energy Storage Systems Markus EKLER, STMicroelectronics |
| On the way towards Zero Impact - Electrified Diesel Drivetrains to support sustainable and affordable Mobility Michael WEISSBAECK, AVL | Numerical Assessment of an Innovative Piston Bowl Concept in a Light-duty Diesel Engine Federico MILLO, Politecnico di Torino | Novel battery thermal management enabling near zero temperature gradient for fast charging while improving safety Rémi DACCORD, Exoes | Power Electronic Components based on Silicon Carbide Devices for Future Vehicle Power Systems Niklas LANGMAACK, TU Braunschweig |
| | | A nodal thermal model for a large prismatic Li-ion battery cell Marco SIMONETTI, Groupe PSA | Induction Machines for Electric Drive Systems Paul SIMS, Drive System Design |

Creating a world
fit for the future



Powering Sustainable Futures

Ricardo is working with customers to reduce environmental impact with clean and efficient propulsion solutions.

We create robust offerings through innovation, advanced systems and cutting-edge tools. Our world-class research and development team defines future technologies to ensure a safe, sustainable mobile world.

As pioneers of energy efficiency, emissions reduction, electrification and sustainable, low carbon fuels, our developments include alternative fuels, battery and fuel cell technologies and optimisation of internal combustion engines.

We offer a true end-to-end service - from concept to design to validation and manufacture - creating clean, efficient propulsion systems for the future:

- Air quality - we can increase your readiness for Euro 7/ VII and beyond
- Ricardo future car propulsion technology:
 - Ricardo has developed concepts for dedicated hybrid propulsion systems including dedicated hybrid engine, transmission and multi-speed electric drive unit
 - Battery and thermal management expertise
- Software and controls - to reduce hardware phase time and cost through virtual system optimisation
- Renewable fuels - guidance and the selection of the right low carbon fuels for the right applications for the right products and the accompanying technical solutions, including hydrogen for trucks

Find out how Ricardo can help your product development.

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