

# SAE 2014 Electric Powertrain Technologies Symposium

## Technical Session Schedule

As of 11/25/2014 07:40 pm

Wednesday, November 19

### SAE 2014 Electric Powertrain Technologies Symposium - Technical Program

Session Code: EPTS1

Room TBD

Session Time: ALL DAY

Time	Paper No.	Title
8:30 a.m.	ORAL ONLY	<p><b>Market Potential for Electrified Powertrains in Europe</b></p> <p>- Push and pull factors influencing xEV penetration in Europe and other major regions</p> <p>&lt;/p&gt;</p> <p>- OEM specific CO2 emission targets in Europe</p> <p>&lt;/p&gt;</p> <p>- Forecast of approaches of major OEMs in Europe (technology penetration rates in Europe=</p> <p>&lt;/p&gt;</p> <p>- Market outlook xEV volumes by region and global component markets (2020 / 2025)</p> <p>Wolfgang Bernhart, Roland Berger Strategy Consultants</p>
9:00 a.m.	ORAL ONLY	<p><b>Sensors in Electric Drives</b></p> <p>Current and angle sensors considerably influence the performance of electric drives. The sensors need to be safe and have limitations like limited bandwidth and signal processing delay times. Depending on the operating point, however, these effects may be more or less severe and have different effects, like torque ripple or lower efficiency. The presentation shows requirements, the impact and compensation methods for sensors parameters.</p> <p>Philip Brockerhoff, Infineon Technologies AG</p>
9:30 a.m.	ORAL ONLY	<p><b>Examining ways to Maximizing Power Density in Electric Machines for Traction and Power Generation in Hybrid Electric Vehicles</b></p> <p>In every electrification program, traction motor efficiency is paramount. Efficiency of electrical energy use is usually what is most discussed; however, there is another form of efficiency that is quite important: power density. This efficiency is carried out by maximizing performance and minimizing volume and weight.</p> <p>&lt;/p&gt;</p> <p>There are many aspects that impact power density. This presentation will investigate what the main drivers of power density. Designers will learn how voltage and/or current, cooling, winding selection and rotor speed can all impact electric motor performance. If the vehicle designer understands how these relate to one another and the impact they have on electric motor/generator performance, one can optimize and select the rest of the components in the powertrain to maximize power densities to reduce costs.</p> <p>Jay Schultz, Parker Hannifin Corp.</p>

10:00 a.m.	<b>ORAL ONLY</b>	<p><b>Increasing Efficiency of Electric Vehicle Powertrain Using IGBT Inverters</b></p> <p><i>With the rising cost of semiconductors and limited space for power inverters in electric and hybrid vehicle applications, the demand for efficient power electronics is increasing. Greater efficiency has a direct impact on the required size of both the surface area of the semiconductors and the cooling system. Power electronics efficiency also has a great impact on other powertrain components like the battery capacity further increasing the need for higher efficiency.</i></p> <p><i>This presentation discusses the different solutions used today that allows improved IGBT switching losses and expresses the limitations of these solutions. The new Reflex Gate Driver Technology is presented with description on how it can significantly improve IGBT switching losses. Reflex gate driver technology allows up to twice as much output current from the same IGBT die surface area. Additional improvements are presented like the use of variable switching frequency and optimized control algorithms for better energy management.</i></p> <p><i>Christian Pronovost, TM4 Inc.</i></p>
10:30 a.m.		<p><b>BREAK</b></p>
11:00 a.m.	<b>ORAL ONLY</b>	<p><b>EV Charging Technologies and Motorsport Applications</b></p> <p><i>The presentation will provide background information and overview of EVSE. Further, descriptions of the technologies and application features in motorsports will be shown.</i></p> <p><i>Klaus Rowecki, Schneider Electric; Claudia Brasse, Toyota Motorsport GmbH</i></p>
11:30 a.m.	<b>ORAL ONLY</b>	<p><b>Sport car Powertrain Electrification; Challenges and Potential Solutions</b></p> <p><i>Most, if not all, car manufacturers are looking to hybrid technologies in order to reduce fuel consumption and CO2 emissions. With the hybridisation of the powertrain come many technical and business driven challenges. When considering the hybridisation of the powertrain for a high performance vehicle, the following technical drivers are paramount: minimisation of on-cost, total powertrain efficiency, packaging and weight, and shifting performance equal to best-in-class.</i></p> <p><i>The presentation will give an overview on the technical needs and challenges for sport cars sector, and will show an overview of the solutions developed by Oerlikon Graziano</i></p> <p><i>Carlo Cavallino, Oerlikon Graziano SpA</i></p>
12:00 p.m.	<b>ORAL ONLY</b>	<p><b>Lightning Motorcycle - Design &amp; Technology of the World's Fastest Electric Motorcycle</b></p> <p><i>Lightning Motorcycle will present the technology choices applied at the Pikes Peak race as well as current innovations and future plans</i></p> <p><i>Richard Hatfield, Lightning Motors Corp.</i></p>
12:30 p.m.	<b>ORAL ONLY</b>	<p><b>Networking Lunch with Exhibits</b></p>
1:30 p.m.	<b>ORAL ONLY</b>	<p><b>Looking Ahead at Wireless Power packaging Size for Multiple Classes of Vehicles</b></p> <p><i>The principles of wireless charging are presented and discussed taking into consideration parameters that affect design, application, safety and packaging. Examples of charging applications are shown to describe the differences and advantages of some of the variables in wireless charging. The case is made for larger format packaging size with a recommended frequency of 20 kHz.</i></p> <p><i>Andrew Daga, Momentum Dynamics Corp.</i></p>

- 2:00 p.m.**      **ORAL ONLY**      **Requirements and Challenges to Power Supply Systems and Electrical Architectures - Today and Tomorrow**  
*The demand for electric energy in the vehicle has steadily grown within the last decades and more challenges are to come.*  
*Peter Schmitz, Ford Forschungszentrum Aachen GmbH*
- 2:30 p.m.**      **ORAL ONLY**      **Integration of Inductive Charging Systems into Hybrid and Electric Vehicles**  
*For a widespread adoption of Electric and Hybrid vehicles, a robust and convenient charging method is necessary. Economic cars in the near future will have limited electric driving range, and therefore will need frequent charging. Therefore, wireless automated charging will be most suitable for the widespread acceptance of electric and plug-in hybrid cars.*  
*Wireless inductive energy transfer systems are widely used in industrial applications. For the large-scale application in the automobile market they must be easy to use, safe and highly efficient. Also they have to comply with existing radio systems.*  
  
*So, besides the efficient, compact and cost-efficient implementation of the energy transfer systems, positioning assistance for the driver to find the optimum charging position, foreign metal object detectors to prevent joule heating of such objects in the charging air gap, living objects detectors and designs for electromagnetic compatibility, like with Keyless entry/go systems, are necessary.*  
  
*Carsten Kügeler, Hella KGaA Hueck & Co.*
- 3:00 p.m.**      **ORAL ONLY**      **360° of EV Charging: Technical Approaches, Challenges, Influencing Factors and Future Prospects**  
*The success of electric mobility is not only determined by the performance of the vehicles. From a customer perspective, the certainty to always be able to recharge the battery (private or public) is important.*  
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 Solving the charging infrastructure issues turns out to be almost as challenging, since a vehicle is parked at very different locations during the course of a day and the still limited range requires more charging events.
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 <p>
 Different technical environments and customer expectations require very different solutions ¿ from a basic cable with limited power and functionality to a fast charger with permanent communication skills between vehicle and grid.
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 <p>
 Based on our experience from multiple projects we will give an overview of the current situation in electric vehicle charging, describe the key challenges and provide insights for a successful way forward.
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- 3:30 p.m.**      **BREAK**  
*Michael Scholz, P3 Automotive GmbH*
- 4:00 p.m.**      **ORAL ONLY**      **High-Voltage Powertrain in the 918 Spyder**  
*Features of the battery concept, charging modes and descriptions of the drive experience of this performance plug-in Hybrid.*  
*Fabian Grill, Porsche Engineering Group GMBH*

- 4:30 p.m.**      **ORAL ONLY**      ***Future Diesel Powertrain Technologies to Support CO2 Emission Reductions***
- Competitive pressure and customer expectation is driving lower CO2 Emission over the last years and initiatives for future legislative emission targets reveal very challenging figures with the introduction of new homologation cycles. Powertrain and even whole vehicle development may be dominated by CO2 requirements and meeting legal emission requirements, while other vehicle attributes may be compromised to achieve these targets. This presentation discusses diesel and hybrid electric powertrain technology solution that support future CO2 reductions measures.*
- Servé Ploumen, Ford Research Centre Aachen*
- 5:00 p.m.**      **ORAL ONLY**      ***Modelling the Future Market of Electrified Powertrains in the United States: TCO and Customer Utility***
- The market for Plug-In Electric Vehicles (PEVs) in the U.S. is inherently uncertain; analysts have projected market penetrations ranging from near-nothing to near-market saturation over time. Two useful analytical frameworks for making sense of this uncertainty are 1) a total costs of ownership (TCO) comparison, which examine vehicle prices, operating costs, and payback period potential; and 2) vehicle choice models (VCM) that estimate consumer willingness-to-pay at the interface of vehicle characteristics and driver preferences. This presentation will introduce and apply a suite of U.S. Department of Energy and National Laboratory TCO and VCM models to explore technology and policy options that can help facilitate an electric mobility future*
- Jacob Ward, Department of Energy*
- 5:30 p.m.**      **ORAL ONLY**      ***Modelling the Future Market of Electrified Powertrains in Germany: TCO and Customer Utility***
- Looking at the future passenger car market and the competition of vehicle technologies and fuels to reach European corporate fleet CO2-targets, total costs of ownership (TCO) are certainly an important indicator for customer acceptance, especially in the case of BEVs and PHEVs. With Vector21 (Vehicles Technologies Scenario Model), DLR started in 2007 with agent-based vehicle choice modeling. We will compare TCO with a more recent, utility based approach and we will give insight to scenario results for the German market.*
- Stephan Schmid, DLR*