

INTERVIEW WITH:



DAIMLER

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As the number of components in EV/HEV and PEV that require active thermal management increases, new challenges directly arise. When it comes to thermal efficiency and adherence to environmental regulations, the demands become stronger by the day. Recent Regulations added to European Union Directives strengthen the existing measures on greenhouse gas emissions, thus making imperative the charge minimization of refrigerant gas and the use of environmentally friendly refrigerants among others. In this interview, our speakers Alfred Jeckel and Jan Gärtner both from Daimler and Mounir Nasri from the German Aerospace Center (DLR), Institute of Vehicle Concepts discuss these challenges and provide us with a first overview of their presentation.

The advantages of electric and plug-in vehicles are various; however, what is the major disadvantage of electric or plug-in vehicles?

Alfred Jeckel: In the public eye, one of the major disadvantages of an electric or plug-In vehicle is considered the dependency of range due to temperature. Everybody knows by now that winter temperatures are challenging. The connection between problems which occur in the daily use and the thermal characteristics of the battery, the power electronics and the other electrical components will be shown in my presentation. Especially the high voltage battery is a very sensible part of electrically driven vehicles which needs a special treatment.

How can the reduction of thermal influence both in the operation and the life cycle of electrical powertrains be achieved?

Alfred Jeckel: The European Union is funding a common project called: Optimized and Systematic Energy Management in Electric Vehicles (OSEM-EV), in order to achieve progress in reducing the thermal influence on operation and lifetime of electrical powertrains. In my presentation, the project will be presented, as well as the different work packages and their targets.

Why is there a need for new drive concepts when it comes to thermal management?

Jan Gärtner: Today's demands for thermal management are getting stronger and stronger because of efficiency and environmental regulations. As a consequence several new drive concepts are introduced. This implements a system and component optimizing for thermal management which requires new tempering concepts and modules.

Which are the drive types to be detailed in your presentation?

Jan Gärtner: In this presentation different drive types like conventional power units, PHEV, BEV are investigated in terms of their thermal request with respect to regulations. Further, different techniques with effects and consequences for fulfilling the tasks will be presented and discussed. For every drive type there is a focal point on certain systems in the future.

How can the disadvantage of range reduction caused by climate control be mitigated?

Mounir Nasri: Range reduction caused by climate control is a barrier to widespread adoption of electric vehicles (EV). Higher efficiency and lower energy consumption by the air conditioning system will mitigate this disadvantage, as power consumption inside electric vehicles is a very relevant issue. Moreover, several European Union directives prohibit the use of HFC 134a or any other fluorinated greenhouse gas with a Global Warming Potential (GWP) higher than 150 in new mobile air conditioning systems by

January 2017. The Adoption of environmentally friendly refrigerants and minimizing the charge of refrigerant gas would be a viable option to endorse the EU directives. To summarize, we need to develop alternative climate control systems in order to resolve all of these issues.

When it comes to alternative climate control systems and their suitability and efficiency, what should we expect to be presented by you?

Mounir Nasri: Alternative climate control systems which profit from the advantages of thermochemical energy storage will be presented. In order to investigate the suitability of these systems for the high temperature fuel cell range extender vehicle (HTFC-REX) developed by the DLR Institute of Vehicle Concepts, suitable climate control systems based on the use of hydrogen are developed, modeled and designed using the simulation environment Modelica/Dymola and the Air Conditioning Library. Based on simulation results, the alternative climate control systems are compared with regard to their efficiency, weight, volume and performance. These systems exhibit a reduction of 5 % to 22 % of electrical energy consumption depending on the system design in comparison to the reference HVAC.

Thank you very much! We are looking forward to meeting you at the event and hearing your interesting contributions.