SAE 2015 Hybrid & Electric Vehicles Technologies Symposium

Technical Session Schedule

As of 02/16/2015 07:41 pm

Tuesday, February 10

Day One - SAE 2015 Hybrid & Electric Vehicles Technologies Symposium

Session Code: ***HYB100***

Room TBD ***Session Time:*** ***ALL DAY***

Time	*Paper No.*	*Title*
8:00 a.m.	***ORAL ONLY***	***Keynote Address by California Senator Fran Pavley***
		Senator Pavley will discuss how state greenhouse gas reduction and clean air policies are driving technology innovation in the transportation sector and spurring regional and international collaboration.
		Fran Pavley
8:30 a.m.	***ORAL ONLY***	***The Strategic Outlook of Electrification***
		Global emission regulations are becoming more and more stringent with every passing legislation. To meet these requirements, OEMs are turning to electrified powertrain technologies. Often conflicting global regulatory requirements prevent OEMs from offering a system that may provide the most benefit to society as well as realizing economies of scale. There are many levels of electrification ¿ from minimal electrification as in the start/stop application to an electric-only powertrain of the BEV ¿ with each variant of electrification having different levels of acceptance by the typical customer. The main challenge facing the OEMs is to put forth a portfolio of electrified vehicles that not only satisfy the regulatory requirements, but also are acceptable to the mainstream customer and do all this profitably.
		Kevin Layden, Ford Motor Co.
9:00 a.m.	***ORAL ONLY***	***Electrified Vehicles in the 2017-2025 Light-duty Greenhouse Gas Regulation and the Midterm Evaluation***
		The Environmental Protection Agency, in close cooperation with National Traffic Safety Administration and the California Air Resources Board, is currently preparing for the 2017~2025 MY Light-duty Greenhouse Gas Midterm Evaluation. This presentation will provide an brief overview of the final rule under which the EPA promulgated the GHG standards and information regarding a ¿midterm evaluation¿. The midterm evaluation will be a check point at which time the three agencies will determine if the standards from 2022 MY through 2025 MY should remain as set, become less stringent, or more stringent. In addition, the presentation will focus on the potential role of electrified vehicles in the agencies estimates of how the standards will be met and the work currently being conducted by the EPA to evaluate the latest electrified vehicle product offerings.
		Michael Olechiw, US Environmental Protection Agency

9:30 a.m.	***ORAL ONLY***	***Economics of Electrified Vehicles***
		In this Car of the Future report, we attempt to explain and evaluate those global automotive technologies that will shape tomorrow¿s cars ¿ from assembly to safety to fuel. In identifying and evaluating these future technologies, we also put together a basic investor framework that evaluates the potential for each technology by asking some simple questions ¿ things like ¿Is there a specific regulatory driver?¿ Or ¿Is it reasonably affordable to consumers?¿ We think this is a good starting point for sorting through the plethora of opportunity and change that¿s out there.
		Itay Michaeli, Citi Research
10:00 a.m.		***BREAK***
10:30 a.m.	***ORAL ONLY***	***US Consumers¿ Perceptions and Preference for Powertrain Systems and Technologies***
		Determining cost effective approaches and technologies to simultaneously meet the progressively higher Corporate Average Fuel Economy (CAFE) standards as well as changing customer needs and tastes is a key challenge for vehicle manufacturers.
		Veerender Kaul, Frost & Sullivan
11:00 a.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
11:30 a.m.	***ORAL ONLY***	***Electrified Vehicle Activities and Trends in France and Europe***
		The presentation will describe the situation and main trends in HEVs, PHEVs and EVs in Europe and France, considering the topics of the market, and the influence of incentives in various countries and according to time. The main characteristics of the European marketed vehicles and charging infrastructures will be compared. The presentation will detail research and development projects on innovative charging systems and infrastructures in Europe. As far as PHEVs are concerned, the specific evaluation procedures and induced results will be presented. The paper will be based on IFPEN experience on PHEVs testing, simulation and prototype realizations, mainly in collaboration with other French or European actors.
		Francois C. Badin, IFP Energies Nouvelles
12:00 p.m.	***ORAL ONLY***	***Networking Lunch***

1:00 p.m. ***ORAL ONLY*** ***INL Advanced Vehicle Testing Results from a Range of Usage Scenarios***

INL's accelerated vehicle testing has been collecting field data from the latest Plug-In Electric Vehicles. These vehicle vary in their ability to displace petroleum consumption by their design, as well as how they are used. Results from field testing show how the range of utility obtained under various usage conditions. Charging data is also being collected and analyzed for vehicles equipped with different battery thermal management systems, which can impact the energy transferred and the time required to charge.

Matthew Shirk, Idaho National Laboratory

1:30 p.m. ***ORAL ONLY*** ***Understanding the `Why¿ Behind eVMT Variation in the Household: A Holistic Approach Linking Consumer Surveys to On-road Data Collection***

There are a variety of Plug-in Vehicles (PEVs) on the road today with different battery sizes and different powertrain strategies ranging from pure electric operation in a BEV to gasoline and electric operation in a PHEV. How are consumers using these vehicles and why do some households with the same vehicle type get more or fewer electric vehicle miles traveled (eVMT)? This presentation describes ongoing work comparing one year of in-use data from instrumented household vehicles including ICEs to different metrics: consumer characteristics (number of drivers, number of other vehicles, commute/travel needs), access to charging, price of electricity, attitudes (purchase motivation, motivation to plug-in), vehicle range and vehicle design.

Michael Nicholas, Univ. of California-Davis

2:00 p.m. ***ORAL ONLY*** ***eVMT Analysis of On-Road Data from Plug-In Hybrid Electric and All-Electric Vehicles***

Electric Vehicle Miles Traveled (eVMT) analysis was conducted on 158,000,000 miles of on-road data from 21,600 PHEVs and BEVs in collaboration with Honda, Ford, Toyota, and GM. The results showed the three all-electric vehicles ranged in annual eVMT from 9,550 mi to 9,700 mi and the PHEVs / EREVs annual eVMT ranged from 2,500 mi to 9,100 mi. These results were presented to the California Air Resources Board in regards to ZEV Credit on the Advanced Clean Cars Program Mid-Term Review.

Matthew Shirk, Idaho National Laboratory

2:30 p.m. ***ORAL ONLY*** ***Observed Variations in Blended PHEV Operation - Advantages and Limitations***

Whereas PHEVs with full ¿E-REV¿ capability have predicable operational characteristics in their respective modes, estimations regarding benefits for blended-type PHEVs in fuel displacement and reduced engine-start emissions can vary dramatically depending upon many design aspects. Using test results from several production PHEVs and analysis of driving patterns, expected benefits are presented along with outcomes that are highly uncertain. The conclusions highlight a pressing need for better understanding of in-use driving patterns in order to fully quantify the benefits of different PHEV designs for both certification and real-world use.

Michael Duoba, Argonne National Laboratory

3:00 p.m. ***BREAK***

3:30 p.m. ***ORAL ONLY*** ***Autonomous & Connected Vehicles - From Nissan's Perspective***

Maarten Sierhuis, Nissan Research Center Silicon Valley

4:00 p.m.	***ORAL ONLY***	***Impact of Connected and Automated Vehicles on Electrified Vehicle Energy Consumption***

Connected & Automated Vehicles (CAVs) have the potential to significantly affect future transportation technologies in the areas of safety, mobility and energy. So far, most of the research has been focused on safety. Related to energy, some preliminary work performed under the leadership of the DOT/AERIS program has focused on individual vehicles based on current conventional powertrain technologies. The objective of the project is to assess the energy impact of CAVs of individual vehicles as well as fleets (i.e. up to several million trips) for a wide range of powertrain configurations (i.e., conventional, BISG, CISG, HEV, PHEV, BEV, FCHEV) and component technologies (i.e. current & future). Due to the large number of technologies and use cases related to CAVs, several set of tools have been integrated and/or developed to evaluate the impact of multiple electric drive vehicles from start-stop to HEVs, PHEVs and BEVs. The presentation will describe the processes as well as provide examples of energy impact such as dedicated lanes for trucks, Cooperative Adaptive Cruise Control (CACC), eco-signals...

Aymeric P. Rousseau, Argonne National Laboratory

4:30 p.m.	***ORAL ONLY***	***15 MINUTE BREAK***
4:45 p.m.	***ORAL ONLY***	***Technology Quickly: Rapid Systems Development in F1 and Beyond***

With the quantum changes to Formula 1 drivetrains introduced in 2014, new technology had to be rapidly developed with a corresponding increase in costs. This made it difficult for the smaller teams to deliver appropriate solutions at a time when budgets were being reduced. Using a combination of motorsport and automotive design and quality techniques Rockfort Engineering delivered solutions into F1 on-time and correct-first-time. The techniques used are used in our other motorsport and non-motorsport projects. In this talk, Angus Lyon from Rockfort Engineering will give an insight into the winter of 2014 in Formula 1 and explain why what was learned is of relevance to next-generation motorsport and mainstream technology developments.

Angus Lyon, Rockfort Engineering

5:15 p.m.	***ORAL ONLY***	***Formula 1 - Lessons from 2014 and Expectations for 2015***

In 2014 Formula 1 has introduced revolutionary combustion engine and electrified powertrain regulations. Gerhard Schagerl will review these changes in Formula 1 and the resulting challenges for the competing race teams and power unit suppliers.
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At the same time an outlook to the 2015 season will be presented and potential developments will be discussed.

Gerhard Schagerl, AVL LIST GmbH

Wednesday, February 11

Day Two - SAE 2015 Hybrid & Electric Vehicles Technologies Symposium

Session Code: ***HYB200***

Room TBD ***Session Time:*** ***ALL DAY***

Time	***Paper No.***	***Title***

8:00 a.m. ***ORAL ONLY*** ***The Role of Electrified Vehicles in an Increasingly Urbanized Global Vehicle Market***

Despite forecasts that the global car park will essentially double in the next 15 to 20 years, a number of competing trends could put significant pressure on that growth including growing urbanization, increasing petroleum prices, and stabilizing vehicle prices in developed markets. Some evidence of this can already be seen in the emergence and growth of the car sharing industry. Electrified vehicles are uniquely qualified to play a significant and sustainable role in this environment.

Pamela Fletcher, General Motors Co.

8:30 a.m. ***ORAL ONLY*** ***Mild Hybrid and Enablers for Fuel Economy Features***

Global regulatory changes, coupled with the customer wants, are driving the need for various levels of electrification of powertrains. Depending on the customer drive cycle, Mild hybrids, operating at 48V, may provide an optimal cost-benefit solution. 48V Mild hybrids provide an intermediate level of electrification between a 12V start/stop system and 200V+ ¿Full¿ hybrid system offering minimal electric only propulsion and regen capture. A Mild hybrid architecture using a B-ISG is versatile enough to work with Gas and Diesel engines, Manual and Automatic transmissions. Due to their parallel configuration, Mild hybrids are well suited for high-speed driving while providing a premium start-stop experience on city driving. Furthermore, the presence of an onboard high voltage source enables the implementation and use of many other vehicle features which may enhance the vehicle experience for the customer.

Mazen Hammoud, Ford Motor Co.

9:00 a.m. ***ORAL ONLY*** ***2nd Generation FWD-Based One Motor Two Clutch Hybrid***

Nissan will add 2nd generation Front-wheel drive based hybrid electric vehicle successor. Whereas previous FWD Hybrid QX60/Pathfinder are mild hybrid, this hybrid is strong hybrid. We adopt our system to customer requirement using the good scalability of Nissan One Motor Two Clutch Hybrid Concept.

Seishi Shimamura, Nissan Motor Co., Ltd.

9:30 a.m. ***BREAK***

10:00 a.m. ***ORAL ONLY*** ***Toyota Presentation***

Shinichi Abe, Keita Hashimoto, Toyota Motor Corp.

10:30 a.m. ***ORAL ONLY*** ***Chevrolet Volt Electric Utilization***

Evaluation of one year of in-use operating data from first generation Chevrolet Volt Extended-Range Electric Vehicle (E-REV) retail customers determined initial trip Internal Combustion Engine (ICE) starts were reduced by 70% relative to conventional vehicles under the same driving conditions. These Volt drivers were able to travel 74% of their total miles in EV without requiring the ICE¿s support. Using this first generation Volt data, performance of the second generation Volt is projected. The Southern California Association of Governments (SCAG) Regional Travel Survey (RTS) data set was also processed to make comparisons between realistic PHEV constraints and E-REV configurations. A Volt characteristic E-REV was found to provide up to 40 times more all-electric trips than a PHEV over the same data set.

Steven Tarnowsky, General Motors Co.

11:00 a.m. ***ORAL ONLY*** ***The Second-Generation ¿Voltec¿ Extended-Range Electric Vehicle Propulsion System***

The Chevrolet Volt is an electric vehicle with a gasoline range extender. For 2016, GM has developed second generation of the Volt vehicle and ¿Voltec¿ propulsion system. Building on the experience of the first generation Volt, the second generation targeted improved all-electric range, improved charge sustaining fuel economy, improved performance, and significant cost reduction. All of this was to be accomplished while maintaining the EV character of the first generation Volt which customers clearly valued. This presentation describes the next generation ¿Voltec¿ system and the realized improvements in efficiency and performance.

Timothy M. Grewe, GM Engineering

11:30 a.m. ***ORAL ONLY*** ***Networking Lunch with Exhibits***

12:30 p.m. ***ORAL ONLY*** ***2nd Generation Volt Electric Motors - Design and Optimization for Performance and Rare-earth Mitigation***

This presentation describes the design and performance details of electric propulsion system for GM's second generation Extended Range Electric Vehicle (EREV). Since its introduction in 2011 Chevy Volts have been driven over half a billion miles, (TBD %) of which in EV mode. The second generation of Volt brings a significant mass reduction and increased performance, EV driving range and fuel economy while simultaneously reducing rare earth content in its traction electric motors.
</p>
The electric propulsion system is built on two electric machines; both PMAC topology. While hybrid-electric vehicles are gaining in popularity in hopes of addressing cleaner, energy sustainable technology in transportation, materials sustainability and rare earth dependence mitigation has not been the first priority in the hybrids available on the market today. Design robustness to material cost volatility is crucial in automotive industry success and therefore designing electric propulsion to minimize or eliminate rare earth usage plays a major role in HEVs success. The objective of this work is to present the newly redesigned propulsion system for added performance while simultaneously reducing the rare earth and heavy rare earth content by over 85% and 50% respectively and in turn the cost of the system and yielding all around "cleaner" and more sustainable vehicle.
</p>
From an engineering point of view, this is a tall order by any measure so various technologies were utilized to achieve this goal. The presentation will discuss grain boundary dysprosium diffusion process in permanent magnets as means to rare earth reduction in PMAC machines and design challenges surrounding such material use. We will also examine innovative PMAC topologies employing ferrite magnets to completely eliminate rare earth usage while maintaining the electric drive unit performance. The design of electric machines will be discussed in detail along with performance measurement results as well as thermal and NVH aspects.

Sinisa Jurkovic, General Motors

1:00 p.m. ***ORAL ONLY*** ***The 2016 Chevrolet Volt Inverter***

The 2016 Chevrolet Volt is uses an all-new propulsion system that results in significant size and mass reductions and at the same time, efficiency improvements for breakthrough vehicle range and energy consumption as well as vehicle performance improvements. The two motor traction drive, all-electric oil pumping system featured in the new Voltec 5ET50 drive unit are controlled and driven by a unique drive unit integrated inverter assembly. This assembly features a variety of new technologies to enable the benefits and integration and performance and has industry leading specifications. This presentation will look at a few of these power electronics and packaging technologies.

Peter Savagian, General Motors Co.

1:30 p.m. ***ORAL ONLY*** ***Optimized Strategy for Hybrid Powertrain Control to Reduce the GMP Fuel Consumption***

In order to be in line with strict fuel consumption norms and legislatives, and an important demanding market we developed an optimized strategy for hybrid GMP technologies that can be applied for the design of hybrid powertrain systems. The aim of our developed control strategy is to reduce the diesel engine consumption in a hybrid powertrain system, while insuring at the same time its feasibility with regard to the design constraints considered such as vehicle dynamics and architecture implementation.

Nesrine Ben Beldi, PSA Peugeot Citroen

2:00 p.m. ***ORAL ONLY*** ***The High Voltage System of the Porsche Panamera S E-Hybrid***

The Panamera S E-Hybrid offers an entirely new electric mobility driving experience. It is an advanced development of the parallel full hybrid with a more powerful electric motor and a higher-performance battery that supplies more energy and can be charged externally from the electrical grid. The electric drive produces 95 hp (70 kW). It draws its energy from a newly developed lithium-ion battery. Combined with the supercharged V6 motor, which produces 333 hp (245 kW), the Panamera S E-Hybrid attains a system power of 416 hp (306 kW). Even more than the previous model, it masters the connection between efficiency and emotion, superior performance and sportiness, and the avant-garde and everyday utility.

Nora Lobenstein, Christian Jung, Porsche AG

2:30 p.m. ***BREAK***

3:00 p.m. ***ORAL ONLY*** ***Analysis on Customers¿ Usage Data of Fit EV***

Honda started leasing Fit EV with lithium-ion battery in Japan and in the USA in 2012 summer. With telematics function Fit EV periodically transmits various data of vehicle and battery usage to Honda¿s servers for analysis (Honda obtained the consents of all customers to the data transmission and usage). As of August 2014 the servers stored the usage data of more than 10 million-mile driving from about 1,000 EVs, amounting to 400 million records. By analyzing the large volume of data, we categorized various characteristic usage patterns; we categorized distinctive usage patterns that influence battery durability.

Koichiro Takemasa, Honda R&D Co., Ltd.

3:30 p.m.	***ORAL ONLY***	***Nissan e-NV200 2nd Electric Vehicle Overview***
		Nissan has started production and sales of e-NV200 in 2014. Introduction of overview of e-NV200 which is 2nd EV following LEAF and 1st Light commercial vehicle EV. Combination of competitive packaging of NV200 and EV technology of LEAF has made e-NV200. This session contains how e-NV200 is fitted e-powertrain and battery to original NV200 and some technical points and features including power plug. Also some sample driving case of actual EV operation will be presented.
		Hideyuki Tateno, Nissan Motor Co., Ltd.
4:00 p.m.	***ORAL ONLY***	***Expert Panel Discussion***
		Moderators - *Robert Larsen, OboTech. LLC* ***Panelists -*** *Shinichi Abe, Toyota Motor Corp.; Pamela Fletcher, General Motors Co.; Kevin Layden, Ford Motor Co.; TBD, Nissan;*

Thursday, February 12

Day Three - SAE 2015 Hybrid & Electric Vehicles Technologies Symposium

Session Code: ***HYB300***

Room TBD ***Session Time:*** ***ALL DAY***

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Progress on FCEV and H2 Infrastructure Commercialization in California***
		California is ground zero for launching fuel cell electric vehicles and hydrogen stations into the retail market, having combined regulatory policies with collaboration, incentives and outreach to create the market conditions for success. The California Fuel Cell Partnership, a collaboration comprised of automakers, fuel providers, technology companies, and government agencies, published A California Roadmap in 2012. This presentation describes the progress taking place in vehicle deployments, infrastructure development, community preparations, and next steps.
		William Elrick, California Fuel Cell Partnership
8:30 a.m.	***ORAL ONLY***	***Technical Overview of the Toyota Mirai***
		Jacquelyn Birdsall, Toyota Motor Engineering & Mfg NA Inc.
9:00 a.m.	***ORAL ONLY***	***Designing a Durable, Low-cost and High Volume Fuel Cell***
		Over the past two years, Honda and General Motors have been working jointly on next generation fuel cell and hydrogen storage systems for the automotive market. These subsystems present unique challenges to balance cost, reliability and performance - all while implementing the new and quickly developing technologies required for a commercial product. The presentation will focus on the integration of new materials, advanced processes and novel designs into a commercially viable product. We will also explore the remaining opportunities and barriers to high-volume production and the role of suppliers in the enterprise.
		Andrew D. Bosco, General Motors Co.

9:30 a.m. ***ORAL ONLY*** ***Meeting F-CELL Customer Expectations through Data Analysis***

Mercedes-Benz has been researching and developing fuel cell vehicles for over 20 years. Its latest generation B-Class F-CELL passenger vehicle has been operating in Europe and the U.S. since 2010. 200 vehicles have been deployed worldwide, and 70 of them in California. In an effort to bring fuel cell vehicles from the research, development and demonstration phase to the commercial phase, Mercedes-Benz has chosen to lease the B-Class F-CELL to individuals at select dealerships following the same processes and procedures as used with conventional vehicles. In this customer acceptance phase, data from real-world driving is collected through a fleet data acquisition system and feedback from customers as they drive the vehicle just like any other one in their garage.
</p>
This presentation will focus on the feedback and data collected from customers and vehicles, points of analysis, and how results of the analysis were used to improve and ensure that customer expectations are met.

Tim McGuire, Mercedes-Benz RDNA Inc.

10:00 a.m. ***ORAL ONLY*** ***An Overview of DOE¿s and CARB¿s Zero Emission Truck Activities***

The United States and the state of California have challenging air quality and petroleum reduction missions to meet. The successful commercialization of advanced clean technology vehicles, including zero-emission vehicle technologies, in all vehicle classes is key to meeting the air quality and petroleum reduction missions. This presentation will provide an overview of the suite of activities at the U.S. Department of Energy (DOE) and at the California Air Resources Board (ARB) to accelerate the commercialization of a portfolio of zero-emission medium duty (MD) and heavy duty (HD) trucks and buses, which will improve air quality and reduce petroleum usage of Class 3-8 vehicles. DOE topics will include development and demonstration of battery electric, PEM fuel cell electric, and fuel cell ¿ battery hybrid electric truck and bus technologies, including both on-road and off-road MD & HD vehicles, and auxiliary power systems for refrigeration units on trucks. ARB topics will include an overview of ARB¿s mobile source emission reduction strategies, including zero emission and near-zero emission MD & HD vehicle deployment, and current and future funding opportunities.

Pete Devlin, US Dept. of Energy; Yachun Chow, California Air Resources Board

10:30 a.m. ***BREAK***

11:00 a.m. ***ORAL ONLY*** ***System Parameters, Modeling, Design, and Simulations of High Power Wireless Charging for Heavy Duty EV Applications***

Near-field electromagnetic resonant induction based wireless power transfer systems have achieved great developments in recent ten years for charging portable electronics, medical devices, home and industrial devices, and electric vehicles.
</p>
Currently, for electric vehicles, most of developments are designed for 3.3kW power levels and only very few applications can demonstrate >10kW power transfer rate. For heavy duty vehicles including fleet and cargo trucks and shuttles, a minimum 30-80kW would be required for reasonable charging times. For larger busses and semi-trucks, >100kW power transfer rate is typically desired.
</p>
For high power applications important challenges remain for areas in electromagnetic coupler architecture and design, high power ¿ power electronic converter (inverter and rectifier) design, and the thermal management for both the coupler and the power electronics. The other significant challenge is the greater air gaps that is likely to occur for a WPT deployment in heavy duty vehicles that results in lower coupling factor, reduced efficiency, higher field emissions, and higher reactive power burden on the high frequency power inverter to magnetize the mutual inductance branch.
</p>
Although high power WPT systems have been investigated recently, there is limited literature work that has focused on the design methodology of the high power WPT system with high efficiency, low fringe field emissions, and low flux density. This study presents a design methodology for a high power WPT system along with component models and preliminary simulation results.

Perry Jones, Oak Ridge National Laboratory

11:30 a.m. ***ORAL ONLY*** ***DOE's Efforts to Develop Hybrid Powertrain Technologies for Heavy-Duty Vehicles***

The light-duty vehicle market has already capitalized on the implementation of hybrid vehicles, whereas the heavy-duty vehicle segment is currently evaluating the benefits from hybrid powertrains. The U.S. Department of Energy, with the initiation of its SuperTruck Program, has provided a nationwide stage for the demonstration of advanced fuel saving technologies in heavy-duty vehicles. This presentation will provide an overview of the DOE SuperTruck program, and proceed to focus on its overall success with reference to individual efforts involving the application of hybrid powertrains and additional electrification components to Class 8 trucks. Gain insights into the current HD industry perspective on hybridization and the economic barriers to be addressed.

Glenn Keller, Argonne National Laboratory

12:00 p.m. ***ORAL ONLY*** ***Networking Lunch with Exhibits***

1:00 p.m. ***ORAL ONLY*** ***Testing of Electrified Powertrains and their Components***

With the challenging global targets in reducing C02 and fuel consumption, with today's known technologies there is no way around to replace fossil power sources by alternative energies. Depending on the car model, application and market strategy the OEM has the choice from Micro/Mild Hybrids to Full-/Plugin Hybrids and even BEVs or FCVs. Especially the high voltage electric power trains of Full- and Plugin Hybrids require significant development work, validation and resources. The presentation will give an insight into typical test equipment for components and (sub) system integration along the development-V and how recorded data and simulation models can be shared/reused.

Volker Niemeyer, AVL LIST GmbH

1:30 p.m. ***ORAL ONLY*** ***Wireless Power Technology: Moving from Lab to Feld Test***

Wireless power transfer systems have received increasing attention over the past few years, with substantial interest and investment from OEMs as well as the aftermarket community.
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As part of a Department of Energy supported WPT project, ORNL and partners have been maturing their resonant induction WPT technology, vehicle integration strategy and site preparation for fleet evaluation which will take place in 2015.
</p>
This presentation will discuss recent hardware developments, interoperability questions and test site development and planning to allow for WPT systems evaluations to improve knowledge and create systems level characterizations required for large scale deployments.

Perry Jones, Oak Ridge National Laboratory

2:00 p.m. ***ORAL ONLY*** ***SAE Cooperative Research Project to support E-Mobility: Development of Industry Standards and Test Procedures for Plug-In Electric Vehicle Safety and Interoperability with Electric Vehicle Supply Equipment***

The presentation will concentrate on a brief overview of SAE electro-mobility ground vehicle standards development activities. The main focus of the presentation will provide an overview of an industry/government cooperative research project to establish requirements, specifications, test procedures and certification processes to ensure the interoperability of PEV¿s and PHEV¿s and Electric Vehicle Supply Equipment (EVSE).

Keith Wilson, SAE International

2:30 p.m. ***ORAL ONLY*** ***Status Summary of PEV Connectivity and Communication Standards***

Plug-in electric vehicles, both battery only and hybrids, are widely deployed in the US today with more new models being announced each year. Public and private charging infrastructure rely on stable and open standards for connectivity and communication to the infrastructure as well as to the vehicle. This presentation covers the current state published connectivity standards as well as validation activities to improve existing and near term draft standards. This includes AC charging, DC charging, wireless charging as well as point of dispensing compliance standards.

Theodore Bohn, Argonne National Laboratory

3:00 p.m. ***ORAL ONLY*** ***Mitsubishi Motors Outlander PHEV V2H Capabilities***

Mitsubishi Motors Corporation recently announces that the Outlander PHEV is now also able to supply electrical power to home using a V2H system in addition to be able to be charged from a domestic outlet. To date, the use of a V2H system had only been approved for all-electric vehicles such as the Mitsubishi i-MiEV series. However, it has recently been approved that the Outlander PHEV will be treated as an all-electric as its engine does not run while the vehicle is connected to a V2H system. The V2H system makes it possible to use the Outlander PHEV as an emergency power source, supplying electricity stored in the vehicle's drive battery to run domestic appliances in a power outage or a natural disaster. This is a world-first for a plug-in hybrid electric vehicle. As a result, both current and future owners of the Outlander PHEV will be now able to use a V2H system. </p>
This presentation will provide an update on this technology and process to bring into North American market.

David N. Patterson, Mitsubishi Motors R&D of America Inc.

3:30 p.m. ***BREAK***

4:00 p.m. ***ORAL ONLY*** ***Expert Panel Discussion: Energy Storage - Global Trends***

Moderators - *Justin Ward, Toyota Motor Engineering & Mfg NA Inc.*
Panelists - *Menahem Anderman, Advanced Automotive Batteries; Zonghai Chen, Argonne National Laboratory; Prabhakar B. Patil, LG Chem Power Inc.; Robert Taenaka, Ford Motor Co.;*
Menahem Anderman, Advanced Automotive Batteries; Prabhakar B. Patil, LG Chem Power Inc.; Zonghai Chen, Argonne National Laboratory; Robert Taenaka, Ford Motor Co.