Keynote

"DOE VEHICLE TECHNOLOGIES R&D ON HYBRID ELECTRIC SYSTEMS"

David HOWELL and James MILLER,
Office of Vehicle Technologies, United States Department of Energy
Email: james.miller@anl.gov

Abstract

This paper presents an overview of R&D activities funded by the Hybrid Electric Systems Team at the Vehicle Technologies Program Office of the U.S. Department of Energy (DOE). DOE has supported, over the long term, the development of advanced automotive technologies that could achieve significant improvements in fuel economy without compromising safety, environmental effects, performance, or affordability. DOE-sponsored R&D projects address the technical barriers that impede the market introduction of hybrid and electric vehicles. The effort also leverages resources and expertise from automobile manufacturers, technology developers, small businesses, national laboratories, and universities. The Hybrid Electric Systems team's R&D focuses on the modelling, development, and evaluation of advanced hybrid (HEV), electric (EV), and plug-in hybrid electric vehicle (PHEV) systems. It also funds the FreedomCAR and Fuel Partnership, the 21st Century Truck Partnership, and battery manufacturing and transportation electrification projects under the American Reinvestment and Recovery Act. The program includes electrical energy storage R&D which consists of a developer program – conducted in coordination with battery developers and original equipment manufacturers, applied battery research – which targets cross-cutting barriers for HEV, PHEV, and EV batteries; and a focused fundamental research program which addresses critical problems of chemical instabilities for advanced batteries and researches promising new materials. A second program area includes advanced power electronics and electric motors R&D which addresses the issue of electric and electronic devices delivering the battery power to the vehicle's power control circuits, charging circuits, electric motors, and other related components. A third program area is vehicle and systems simulation and testing, which include system-level simulations to help specify the necessary performance characteristics of the hardware and to predict overall vehicle efficiency and performance for a given configuration, as well as laboratory on on-road testing of vehicle systems. The paper also describes DOE's related R&D coordination efforts with other agencies.

Biography of the Speaker

Dr James Miller is a senior technical advisor at the US Department of Energy's Argonne National Laboratory, currently on assignment at DOE Headquarters in support of the battery R&D program. He has over 33 years of research experience at Argonne in transportation technologies, including advanced batteries for electric and hybrid vehicles, hydrogen storage materials, and fuel cells for automotive applications and distributed power. He served as Associate Director of Argonne's Chemical Technology Division, and has been Argonne's Electrochemical Technology Program Manager since 1999. He has served on numerous advisory committees for the National Academy of Sciences, the National Research Council, the International Council on Clean Transportation, and the Department of Energy. He holds a B.S. degree in physics from the University of Missouri, M.S. and Ph.D. degrees in physics from the University of Illinois, and an MBA degree from the University of Chicago.