Assessment of Technologies for Improving Fuel Economy of Light-Duty Vehicles–Phase 3

Committee

Gary Marchant

Chair

Gary Marchant is a Regent's Professor of Law and Director of the Center for Law, Science and Innovation at Arizona State University. His research interests include legal aspects of genomics and personalized medicine, the use of genetic information in environmental regulation, risk and the precautionary principle, and governance of emerging technologies such as nanotechnology, neuroscience, biotechnology and artificial intelligence. He teaches courses in Law, Science and Technology, Genetics and the Law, Biotechnology: Science, Law and Policy, Health Technologies and Innovation, Privacy, Big Data and Emerging Technologies, and Artificial Intelligence: Law and Ethics. He was named a Regents' Professor in 2011 and also is a professor in ASU's School of Life Sciences, a Distinguished Sustainability Scientist in ASU's Julie Ann Wrigley Global Institute of Sustainability, and is a Lincoln Professor of Emerging Technologies Law and Ethics with the Lincoln Center for Applied Ethics at ASU. Prior to joining ASU in 1999, Professor Marchant was a partner at the Washington, D.C., office of Kirkland & Ellis, where his practice focused on environmental and administrative law. During law school, he was Editor-in-Chief of the Harvard Journal of Law & Technology and editor of the Harvard Environmental Law Review, and was awarded the Fay Diploma (awarded to top graduating student at Harvard Law School). Professor Marchant frequently lectures about the intersection of law and science at national and international conferences. He has authored more than 150 articles and book chapters on various issues relating to emerging technologies. Among other activities, he has served on five previous National Academy of Sciences committees (including Committee on Assessment of Technologies and Approaches for Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles, Phase 2, February 2013-present; Committee on Assessment of Solid State Lighting, May 2011-February 2013; and Committee on State Practices in Setting Mobile Source Emission Standards, 2004-2006), has been the principal investigator on several major grants, and has organized numerous academic conferences on law and science issues. He has a Ph.D. in genetics from the University of British Columbia.

Carla Bailo

Member

Carla Bailo is the President and CEO of the Center for Automotive Research (CAR). Ms. Bailo is a leader in engineering and vehicle program management with 35 years of experience in the automotive industry. In addition to her role at CAR, Ms. Bailo is the 2016-2018 vice president of automotive for SAE International, a global association of more than 138,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries. Prior to joining CAR, Ms. Bailo was the assistant vice president for mobility research and business development at The Ohio State University. In that capacity, she assisted the University in accelerating sustainable mobility and transportation innovation, while integrating related research and education across Ohio State's academic units. She also helped coordinate Ohio State's involvement as the primary research partner for Smart Columbus, a $140 million program to transform central Ohio into a premier transportation innovation region. Ms. Bailo has 25 years of experience at Nissan North America, Inc., where in her most recent role at Nissan she served as senior vice president of research and development. She was responsible for vehicle engineering and development operations in Michigan, Arizona, Mexico and Brazil, managing a $500 million budget and 2,500 employees. In this role, she improved the efficiency of Nissan's R&D functions. Ms. Bailo has a MS degree in mechanical engineering from the University of Michigan and a BS degree in mechanical engineering from Kettering University.

Nady Boules

Member

Nady Boules is president, NB Motors, LLC. He began his engineering and management consultancy practice with a focus on electrified, connected, and autonomous vehicles in September 2013 after 45 years of engineering experience (32 years with General Motors and Delphi), including 14 years as director of R&D, and Innovation. In his most recent capacity, as Director of GM's Research & Development's Electrical & Control Systems Research Lab, Boules was responsible for the development of advanced electrical systems and components for electrified, connected and automated vehicles to enhance vehicle safety, comfort and efficiency. He led all R&D activities in areas of electronics and control software globally and coordinated research in this area, internally with sister research labs and engineering customers; and externally with collaborators at universities, national labs, suppliers, and other automotive OEMs (USCAR). Boules first joined General Motors Research Laboratories in 1982. He held several positions leading and managing research activities in automotive mechatronic and electric drive systems. In September 1999, he was named director of research and development for Delphi Steering Systems in Saginaw, MI. His responsibilities expanded to cover brakes and suspension when he was named director of the dynamics innovation center in 2002. In 2005, he was named director, dynamics innovation center and materials engineering and his responsibilities expanded to materials to the energy and chassis division. From May 2006 until returning to GM, he held the position of director, innovation & technology leadership. Boules received his doctorate of engineering degree in 1978 from the Technical University of Braunschweig, Germany. He is the author of numerous patents, technical and invited papers and has received several awards from GM in recognition of his accomplishments, including John Campbell Award (for scientific accomplishments), Charles McCuen Award (recognizing contributions to the business success of GM), Extraordinary Accomplishment Award, and the President's Council Honors Award. Boules has been a fellow of the Institute of Electrical and Electronics Engineers (IEEE) since 1991 and was named a life fellow in January 2015. He is also the recipient of the 2011 IEEE Nikola Tesla Award. He is a member of the Industry Applications Society (IAS) and a past member of its executive board. He was also a member of the board of directors of Intelligent Transportation Society of America (ITS-A) and a member of the executive board of several University consortia, and currently serving on the Committee on Review of the U.S. DRIVE Research Program of the National Academies.

Daniel Kapp

Member

Daniel Kapp, is principal, D.R. Kapp Consulting providing consulting services in the area of automotive powertrain product technology and strategy, following his retirement from Ford Motor Company 2012. He was with Ford since 1977 upon graduation from Michigan Technological University with a BSME degree. He has spent his entire 35+ year career in the area of engine and powertrain product development. From the late 80's through the mid 90's, Kapp was involved in the design and development of the "Modular" V8 and V6 engines as Ford revamped its engine line-up to modern overhead cam designs. He was the Program Manager of the Triton V8 truck engines through their launch and then spent 3 years in the Truck Vehicle Center as the Powertrain Systems Manager for full size trucks and SUV's. In 2001, Kapp was appointed to his first executive position as Director of Core and Advanced Powertrain Engineering responsible for powertrain controls, catalyst and emission systems, and calibration. One year later, he became Executive Director for Powertrain Operations and for five years led the product development of all engines and transmissions in North America, during which time he also acted as a global powertrain product development lead for the enterprise. In late 2006, Kapp moved to Ford's Research and Advanced activity and remained there until retiring in 10/12. During that time he led the development of advanced powertrain technologies such as EcoBoost. In that role, he also led the development of Ford’s technology roadmaps for future sustainability and emission reduction strategy. He served as an internal technical consultant in the field of powertrain technologies and did significant external interfacing as a spokesman for Ford in this area.

Ulrich Kranz

Member

Ulrich Kranz currently directs research and development as Chief Technology Officer at Evelozcity, an electric vehicle startup company based in Los Angeles. Prior to his current role, Kranz spent more than 30 years working for BMW AG in the research and development division as an expert in suspension and chassis development. While at BMW, he led the development of highly innovative products and technologies including the introduction of BMW’s first SUV to the world market while working as a project leader in South Carolina. Kranz also led the reinvention of the MINI brand and its successful introduction to the world market. Kranz headed BMW i, the electric car division, and prepared BMW for the future of e-mobility, mobility services, car-sharing, charging, and lightweight materials such as carbon fiber and thermoplastics. He has served as committee member for innovations for the State of Bavaria and as a member of BMW’s supervisory board, representing BMW’s upper management.

Therese Langer

Member

Therese Langer is currently a consultant on transportation sector energy efficiency and emissions reduction. She was Transportation Program Director at the American Council for an Energy-Efficient Economy (ACEEE) from 2001 to 2020. Her current areas of activity include: technologies and policies to improve light- and heavy-duty fuel economy; energy impacts of vehicle automation; applications of information and communications technology to improve freight transportation system efficiency; and transportation electrification at the state and local levels. Prior to joining ACEEE, Langer was staff scientist for the Rutgers University Environmental Law Clinic, working to make the transportation system in the greater New York metropolitan area more sustainable. Langer holds a PhD in mathematics from UC Berkeley. She served as a member of the NRC Committee on the Assessment of Technologies for Improving Fuel Economy of Light-Duty Vehicles, Phase 2.

Zhenhong Lin

Member

Zhenhong Lin a senior R&D staff member at National Transportation Research Center of Oak Ridge National Laboratory and joint Associate Professor of University of Tennessee, Industrial & Systems Engineering. As PI and manager of the Transportation Energy Evolution Modeling (TEEM) program, he is interested in analyzing technologies, strategies and policies that can transform the transportation energy system for societal objectives. Lin received the 2017 Vehicle Technologies Office Distinguished Achievement Award on his contribution to a joint study on CAV energy impact. He also received the 2011 DOE Vehicle Technologies Office R&D Award for his work on modeling consumer choices of advanced powertrain technologies. Having authored over 30 peer-reviewed articles, Lin has studied electric vehicle market acceptance, range optimization for battery and fuel cell electric vehicles, on-road fuel economy, alternative fuel infrastructure optimization, diesel engine injection control and fuel cell powertrain simulation. Lin is a member of the Alternative Transportation Fuels and Technologies Committee of the Transportation Research Board and a Senior Member of Institute of Electrical and Electronics Engineers. He received his PhD in Transportation Engineering in 2008 and MS in Transportation Technology & Policy from University of California, Davis. Before that, Lin obtained his BE/MS in Automotive Engineering from Tsinghua University in Beijing.

Joshua Linn

Member

Joshua Linn is an Associate Professor at the University of Maryland and a Senior Fellow at Resources for the Future (RFF). Linn’s research centers on the effect of environmental regulation and market incentives on technology, with particular focus on the electricity sector and markets for new vehicles. His work on the electricity sector has compared the effectiveness of cap and trade and alternative policy instruments in promoting new technology, including renewable electricity technologies. Studies on new vehicles markets investigate the effect of CAFE standards and fuel prices on new vehicle characteristics, technology, consumer well-being, and manufacturer profits. He has published in leading general interest and field journals in environmental, energy, and health economics. Linn, who joined the University of Maryland in 2018, joined RFF in March 2010, was an assistant professor in the economics department at the University of Illinois at Chicago and a research scientist at MIT. Linn holds a PhD in economics from Massachusetts Institute of Technology and a BA in Astronomy and physics from Yale University.

Nic Lutsey

Member

Nic Lutsey is Program Director at the International Council on Clean Transportation (ICCT), where he directs its electric vehicle research and co-leads its U.S. activities. Nic manages the ICCT’s role as the Secretariat for the International Zero-Emission Vehicle Alliance. He has co-authored 19 peer-reviewed journal articles and dozens of reports on technology potential, regulatory design, and policy cost-effectiveness. He has received awards from the U.S. Department of Transportation, the University of California at Davis, the Transportation Research Board, and the California Air Resources Board for his research contributions. In 2015, he received the SAE International Barry D. McNutt Award for Excellence in Automotive Policy Analysis. Previously, with the California Air Resources Board, he participated in the regulatory development of the 2004 and 2012 greenhouse gas emission regulations for automobiles. He received a B.S. in Agricultural and Biological Engineering from Cornell University and a Ph.D. in Transportation Technology and Policy from the University of California, Davis.

JoAnn Milliken

Member

JoAnn Milliken is currently self-employed as a Senior Energy Consultant. She has 34 years of Federal program management experience, more than 20 of those with the Department of Energy, where she developed and directed clean energy R&D portfolios having budgets of up to $200 million per year. She has a strong track record of success in advancing energy efficiency and renewable energy technologies, practices and policy, working in collaboration with industry, universities, small businesses and national laboratories. Dr. Milliken is a recognized expert in hydrogen and fuel cell systems, and experienced in leading Federal programs in energy efficient buildings, solar, wind, and geothermal energy. Prior to joining DOE in 1994, Dr. Milliken was a research chemist at the U.S. Naval Research Laboratory and a program manager at the Office of Naval Research where she conducted and managed mission-related materials research. She earned a B.A. degree in chemistry from LaSalle University and a Ph.D. in chemistry from the University of Pennsylvania, researching electronically conducting polymers under Nobel Laureate Professor Alan MacDiarmid. Dr. Milliken retired from DOE in 2015.

Randa Radwan

Member

Randa Radwan is currently a vehicle safety and engineering consultant with over 27 years of experience in transportation safety and vehicle crashworthiness research, including 17 years as a research program manager at US DOT National Highway Traffic Safety Administration (NHTSA). Dr. Radwan has forged alliances and successfully collaborated with the safety community at large from government and industry on both national and international levels. She led a multi-disciplinary research program from concept to the Notice for Proposed Rulemaking for NHTSA’s 2007 FMVSS 214 upgrade forecast to save over 300 lives and reduce 400 serious injuries per year. She has received multiple awards while at NHTSA, including the Secretary of Transportation Award and the NHTSA Administrator’s Award, which she received four times. Dr. Radwan then spent nine years as the Director of Advanced Research and Senior Research Scientist at the George Washington University (GWU) National Crash Analyses Center where she engaged in and directed innovative analyses and methodologies in vehicle and transportation safety research. Dr. Radwan created strategy and modeling methodology to assess safety performance of new vehicle designs, resulting in the Vehicle Fleet Simulation methodology used for NHTSA’s “Corporate Average Fuel Economy Standards (CAFE) and Midterm Evaluation for Light-Duty Vehicles, Model Years 2022-2025” safety studies. She also served as adjunct faculty in the School of Engineering and Applied Sciences at GWU (2009-2013). Dr. Radwan has authored 29 peer reviewed professional publications on vehicle safety, including two reports to the US Congress. She has a PhD in transportation safety engineering from GWU and a master’s and BS in electrical engineering from Rice University.

Anna Stefanopoulou

Member

Anna G. Stefanopoulou is the William Clay Ford Professor of Manufacturing at the University of Michigan. She has been on the faculty of the Department of Mechanical Engineering since 2000. She obtained her Diploma (1991, Nat. Tech. Univ. of Athens, Greece) in Naval Architecture and Marine Engineering and her Ph.D. (1996, University of Michigan) in Electrical Engineering and Computer Science. She served as the Director of the Automotive Research Center a multi-university U.S. Army Center of Excellence in Modeling and Simulation of Ground Vehicles (2009-2018). She was an assistant professor (1998-2000) at the University of California, Santa Barbara and a technical specialist (1996-1997) at Ford Motor Company where she developed and implemented multivariable controllers for advanced engines and powertrains. She has been recognized as a Fellow of three different societies; the ASME (08), IEEE (09), and SAE (18). She is an elected member of the Executive Committee of the ASME Dynamics Systems and Control Division and the Board of Governors of the IEEE Control Systems Society. She is the Founding Chair of the ASME DSCD Energy Systems Technical Committee and a member of a U.S. National Research Council committee on the 2025 US. Light Duty Vehicle Fuel Economy Standards. She is a recipient of the 2018 Rackham Distinguished Graduate Mentor Award, the 2017 IEEE Control System Technology award, the 2012 College of Engineering Research Award, the 2009 ASME Gustus L. Larson Memorial Award, a 2008 Univ. of Michigan Faculty Recognition award, the 2005 Outstanding Young Investigator by the ASME DSC division, a 2005 Henry Russel award, a 2002 Ralph Teetor SAE educational award, a 1997 NSF CAREER award and selected as one of the 2002 world’s most promising innovators from the MIT Technology Review. She has co-authored a book, 20 US patents, and more than 250 publications (5 of which have received awards) on estimation and control of internal combustion engines and electrochemical processes such as fuel cells and batteries.

Deidre Strand

Member

Deidre Strand is Chief Scientific Officer at Wildcat Discovery Technologies. Dr. Strand has over twenty five years of experience in materials research, development, and commercialization, primarily in the areas of energy storage (lithium ion batteries) and electronic applications. Prior to joining Wildcat in 2012, Dr. Strand served as a Research Fellow at Dow Chemical, where she was the technical lead in Dow Energy Materials, as well as the Principal Investigator on external research programs with universities and national labs on battery materials. Dr. Strand also has extensive experience in patent analysis and technical due diligence of new technologies. Dr. Strand completed her Ph.D. in Analytical Chemistry at the University of Wisconsin-Madison, under the supervision of Professor John Schrag. Her Ph.D. research focused on rheology and birefringence of polymeric solutions. Dr. Strand also holds a Master of Science degree in Chemistry from the California Institute of Technology and a Bachelor of Science degree in Chemistry from North Dakota State University.

Kate Whitefoot

Member

Kate Whitefoot is an Assistant Professor of Mechanical Engineering, and Engineering and Public Policy at Carnegie Mellon University. She is a thrust leader of Technology Commercialization for the NextManufacturing Center and a Faculty Affiliate at the Carnegie Mellon Scott Institute for Energy Innovation. Prior to her current position, she served as a Senior Program Officer and the Robert A. Pritzker fellow at the National Academies of Sciences, Engineering, and Medicine where she directed the Academies' Manufacturing, Design, and Innovation program. Professor Whitefoot's research bridges engineering design theory and analysis with that of economics to study the design and manufacture of energy efficient and low-carbon products and processes and their adoption in the marketplace. Her areas of expertise include vehicle fuel efficiency, consumer choice, design and adoption of green products, energy-efficient and productive manufacturing, and energy and environmental policies. Professor Whitefoot has gained recognition nationally and internationally for her research and teaching. She served on the National Academies Committee on the Review of the National Institute of Standards and Technology (NIST) Engineering Laboratory. Her research is featured in the Washington Post, Popular Mechanics, Bloomberg Business, and Business Insider, and referenced in the 2017-2025 Corporate Average Fuel Economy rulemaking. She has worked with several companies in automotive, aerospace, and high-tech industries, and has been invited to present briefings at the White House, Capitol Hill, the Department of Commerce, and the Environmental Protection Agency. Dr. Whitefoot earned three degrees from the University of Michigan: a B.S. and M.S. in Mechanical Engineering, and a Ph.D. in Design Science—a multidisciplinary program where she concentrated in Mechanical Engineering and Economics, completing course sequences and having an advisory committee across both disciplines.

Elizabeth Zeitler

Staff Officer