DAVID J. FRIEDMAN

EXPERIENCE

CONSUMER REPORTS, Washington, DC
Vice President, Advocacy ***2018-Present***
Director, Cars and Product Policy ***2017-2018***

Lead the advocacy efforts of Consumer Reports—an independent, nonprofit member organization—to support policy and corporate change in the service of about truth, transparency, and fairness in the marketplace.

U.S. DEPARTMENT OF ENERGY, Washington, DC
Office of Energy Efficiency and Renewable Energy (EERE)
Assistant Secretary, Acting ***2016-2017***
Principal Deputy Assistant Secretary ***2015-2017***

Senior Executive Service (SES) political appointee in the Obama Administration: Lead a $2 billion organization of 700 federal employees to accelerate the clean energy revolution critical to America's economy, energy security, and efforts to address climate change. As Principal Deputy Assistant Secretary (SES): Chief Operating Officer, manage major policy issues, assist in all leadership roles.

U.S. DEPARTMENT OF TRANSPORTATION, Washington, DC
National Highway Traffic Safety Administration (NHTSA)
Administrator, Acting ***2014***
Deputy Administrator ***2013-2015***

SES political appointee in the Obama Administration: Lead a $819 million agency of 600 federal employees to save lives and prevent injuries from traffic crashes and save fuel through fuel economy standards. As Deputy Administrator (SES): Chief Operating Officer, manage vehicle fuel efficiency regulation process, assist in all leadership roles.

UNION OF CONCERNED SCIENTISTS, Washington, DC and Berkeley, CA
Clean Vehicles Program
Deputy Director ***2011-2013***
Research Director ***2003-2010***
Senior Engineer ***2001-2002***

Co-manage an interdisciplinary team of scientists, engineers, advocates, and outreach specialists on oil and transportation technology and policy (2011-2013). Direct research on oil and transportation technology and policy (2003-2010). Execute research on oil and transportation technology and policy (2001-2002).

UNIVERSITY OF CALIFORNIA, DAVIS
Graduate Research Associate ***1995-2001***

Lead graduate student researcher developing a detailed fuel cell stack and system simulation for the UC Davis Fuel Cell Vehicle Modeling Program and the UC Davis Advanced Vehicle Technology Evaluator simulation program (simulates electric and hybrid electric vehicles). Team lead: controls system, UC Davis FutureCar plug-in hybrid vehicle project.

ARTHUR D. LITTLE, Cambridge, MA
Research Associate ***1993-1995***

Design of vehicle configurations for a near term conversion hybrid electric vehicle, analysis in support of the Partnership for a New Generation of Vehicles, assessment of thermal management requirements for electric vehicles operating in cold weather conditions, evaluation of carbon and high temperature metal hydrides for storing hydrogen, assessment of building integrated photovoltaics and fuel cell co-generation.

EDUCATION

UNIVERSITY OF CALIFORNIA, DAVIS
Ph.D. Candidate, Transportation Technology and Policy

- Chevron Fellow
- NAS-IGERT Fellow
- California Energy Commission Intern

Doctoral Dissertation (in progress): Modeling and Optimization of Fuel Cell Vehicle and Stack and Systems. Development of a fuel cell stack and system model to evaluate key tradeoffs between sub-system components and a system based operating strategy to maximize fuel cell system efficiency for automotive applications.

Teaching Experience: Basic Principles of Transportation, Energy and Environmental Systems***.*** Designed and taught a graduate level course for non-engineering/science majors on many basic physical and chemical principles and their application to key transportation issues.

WORCESTER POLYTECHNIC INSTITUTE, WORCESTER, MA
B.S., Mechanical Engineering ***1993***

Member: Alpha Phi Omega co-ed service fraternity, Tau Beta Pi engineering honor society

INVITED CONGRESSIONAL TESTIMONY

Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy

Statement by David Friedman, Senate Committee on Energy and Natural Resources Hearing to Examine the Status of Innovative Technologies within the Automotive Industry, January 21, 2016.

National Highway Traffic Safety Administration, U.S. Department of Transportation

Statement by David Friedman, House Committee on Energy and Commerce Subcommittee on Commerce, Manufacturing, and Trade Hearing Examining Takata Airbag Defects, December 3, 2014.

Statement by David Friedman, Senate Committee on Commerce, Science and Transportation Hearing Examining Takata Airbag Defects and the Vehicle Recall Process, November 20, 2014.

Statement by David Friedman, Senate Committee on Commerce, Science and Transportation Subcommittee on Consumer Protection, Product Safety, and Insurance Hearing on Oversight of and Policy Considerations for the National Highway Traffic Safety Administration, September 16, 2014.

Statement by David Friedman, Senate Committee on Commerce, Science, and Transportation Subcommittee on Consumer Protection, Product Safety, and Insurance Hearing Examining the GM Recall and NHTSA's Defect Investigation Process, April 2, 2014.

Statement by David Friedman, House Committee on Energy and Commerce Subcommittee on Oversight and Investigation Hearing on the GM Ignition Switch Recall, April 1, 2014.

Statement by David Friedman, House Transportation Highways & Transit Subcommittee Hearing on MAP 21 Implementation, March 12, 2014.

Union of Concerned Scientists, Deputy Director, Research Director, Senior Engineer

Statement by David Friedman, the role of electric vehicles in reducing America's oil use; United States Senate Committee on Energy and Natural Resources, June 22, 2010.

Statement by David Friedman, climate change and transportation; United States House Committee on Energy and Commerce Subcommittee on Energy and the Environment, April 24, 2009.

Statement by David Friedman, financial help for the automobile industry; United States Senate Committee on Commerce, Science, and Transportation, June 24, 2008.

Statement by David Friedman, policies and technologies to address climate change in the transportation sector; United States Senate Committee on Commerce, Science, and

Transportation, June 24, 2008.

Statement by David Friedman, legislation to raise fuel economy standards; United States Senate Committee on Commerce, Science, and Transportation; May 3, 2007

Statement by David Friedman, fuel economy standards, oil dependence and global warming pollution; United States Senate Committee on Commerce, Science, and Transportation, March 6, 2007.

Statement by David Friedman, fuel economy standards, vehicle safety and U.S. employment; United States Senate Subcommittee on Surface Transportation and Merchant Marine of the Committee on Commerce, Science, and Transportation, May 9, 2006.

Statement by David Friedman, the role of alternative fuels and fuel economy in reducing U.S. oil dependence and global warming pollution; United States Senate Committee on Commerce, Science, and Transportation, November 15, 2005.

Statement by David Friedman, the role of hydrogen and other vehicle technologies in reducing the energy and environmental impacts of transportation; United States Senate Subcommittee on Science, Technology, and Space of the Committee on Commerce, Science, and Transportation, May 7, 2003.

Statement by David Friedman, United States transportation energy demand and the role of hydrogen in reducing associated energy and environmental impacts; United States Senate Committee on Energy and Natural Resources, March 6, 2003.

Statement by David Friedman, fuel economy and advanced vehicle technologies; United States Senate Committee on Commerce, Science, and Transportation, Dec.6, 2001.

PUBLICATIONS AND MAJOR REPORTS

HIGHLIGHTS

S. Shulman, J. Deyette, B. Ekwurzel, D. Friedman, M. Mellon, J. Rogers, S. Shaw, *Cooler Smarter: Practical Steps for Low-Carbon Living: Expert Advice from the Union of Concerned Scientists*, Island Press, Washington DC, 2012.

National Research Council (NRC), *Assessment of Fuel Economy Technologies for Light-Duty Vehicles,* Washington, DC: The National Academies Press, 2011.

NRC, *Transitions to Alternative Transportation Technologies-Plug-in Hybrid Electric Vehicles,* The National Academies Press, Washington, DC, 2010.

R. Cleetus, S. Clemmer, D. Friedman, *Climate 2030: A National Blueprint for a Clean Energy Economy,* Union of Concerned Scientists, Cambridge, MA, 2009.

NRC, *Transitions to Alternative Transportation Technologies-A Focus on Hydrogen*, The

National Academies Press, Washington, DC, 2008.

NRC, *Tires and Passenger Vehicle Fuel Economy: Informing Consumers, Improving Performance*. Washington, DC: The National Academies Press, 2006.

P. Monahan, D. Friedman, *The Diesel Dilemma: Diesel's Role in the Race for Clean Cars*, Union of Concerned Scientists, Cambridge, MA, January 2004.

D. Friedman, C. Nash, C. Ditlow, *Building a Better SUV: A Blueprint for Saving Lives, Money, and Gasoline*, Union of Concerned Scientists, Cambridge, MA, Sept. 2003.

D. Friedman, *A New Road: The Technology and Potential of Hybrid Vehicles*, Union of Concerned Scientists, Cambridge, MA, January 2003.

D. Friedman, et. al., *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*, Union of Concerned Scientists, Cambridge, MA, June 2001.

OTHER FIRST-AUTHOR PUBLICATIONS

D. Friedman, M. Goldberg, *Creating Jobs, Saving Energy, and Protecting the Environment: An Analysis of the Potential Benefits of Investing in Efficient Cars and Trucks, A 2007 Update*, Union of Concerned Scientists, Cambridge, MA, July 2007.

D. Friedman, D. MacKenzie, *Automaker Rankings 2004: The Environmental Performance of Car Companies*, Union of Concerned Scientists, Cambridge, MA, December 2004.

D. Friedman, D. MacKenzie, M. Goldberg, *Creating Jobs, Saving Energy, and Protecting the Environment: An Analysis of the Potential Benefits of Investing in Efficient Cars and Trucks*, Union of Concerned Scientists, Cambridge, MA, July 2004.

D. Friedman, *Paying at the Pump: 2002 Analysis of Vehicles and Gasoline Costs*, Union of Concerned Scientists, Cambridge, MA, August 2002.

D. J. Friedman, A. Eggert, P. Badrinarayanan, J. Cunningham, "Balancing Stack, Air Supply, and Water/Thermal Management Demands for an Indirect Methanol PEM Fuel Cell System", SAE International Congress & Exhibition, Detroit, MI, March 2001, SAE Paper 2001-01-0535.

D. J. Friedman, "Reformate Fuel Cell Stack Characteristics and System Interactions," 35th Intersociety Energy Conversion Engineering Conference, 24-28 July 2000, AIAA Paper 2000-3045.

D. J. Friedman, T. Lipman, A. Eggert, S. Ramaswamy, Karl-Heinz Hauer, "Hybridization: Cost and Efficiency Comparisons for PEM Fuel Cell Vehicles," SAE Future Transportation Technology Conference, Costa Mesa, CA, August 21-23, 2000, SAE Paper 2000-01-3078.

D.J. Friedman, T. Lipman, "Efficiency and Cost Considerations for Hybridized Direct Hydrogen PEM Fuel Cell Vehicles," SAE International Congress&Exhibition, Detroit, MI, March 6-9, 2000.

D.J. Friedman, “Maximizing Direct-Hydrogen PEM Fuel Cell Vehicle Efficiency – Is Hybridization Necessary?” Fuel Cell Power for Transportation (SP-1425), SAE paper: 1999-01-0530, Warrendale, PA, 1999.

D. J. Friedman, R. M. Moore, “Maximizing the efficiency of a direct-hydrogen PEM fuel cell System”, Proceedings of the 2nd International Symposium on PEM Fuel Cells, Boston, Electrochemical Society, November 1998.

D.J. Friedman, A.F. Burke, M. Miller, Modeling of Hybrid Electric Vehicle Power Systems, final report prepared for the National Renewable Energy Laboratory, 1998.

D. Friedman, J. Wright, D. Sperling, A. Burke, R. Moore, “Partial ZEV Credits: An Analysis of the California Aire Resources Board LEV II Proposal to Allow Non-ZEVs Earn Credit Towards the 10% ZEV Requirement of 2003,” Instutute of Transportation Studies, University of California, Davis, UCS-ITS-RR-98-5, 1998.

D.J. Friedman, A.F. Burke, B.D. Johnston, Modeling of the UC Davis AfterShock, final report prepared for the National Renewable Energy Laboratory, 1997.

D. J. Friedman, J. Bentley, "HVAC Solutions for Cold Weather EV Operation," Sustainable Transportation and S/EV94 Conference, NESEA, October 3-5, 1994, Providence, RI.

OTHER CONTRIBUTING AUTHOR WORKS

D MacKenzie, L. Bedsworth, D. Friedman, Fuel Economy Fraud: Closing the Loopholes that Increase U.S. Oil Dependence, Union of Concerned Scientists, Cambridge, MA, August 2005.

R.M. Moore, K.H. Hauer, D. Friedman, J. Cunningham, P. Badrinarayanan, S. Ramaswamy, A. Eggert, “A dynamic simulation tool for hydrogen fuel cell vehicles,” Journal of Power Sources, 141 (2005) 272-285.

D. Doniger, D, Friedman, R. Hwang, D. Lashof, J. Mark, Dangerous Addiction: Ending America’s Oil Dependence, Natural Resources Defense Council and Union of Concerned Scientists, January 2002.

F. An, D. Friedman, M. Ross, “Near-Term Fuel Economy Potential for Light-Duty Trucks,” SAE Future Car Congress, Arlington, Virginia, June 4-5, 2002, SAE Paper 2002-01-1900.

A. Eggert, D. Friedman, S. Ramaswamy, K. Hauer, J. Cunningham, R. Moore, “Simulated Performance of An Indirect Methanol Fuel Cell System”, SAE International Congress & Exhibition, Detroit, MI, March 2001, SAE Paper 2001-01- 0544.

Eggert, D. J. Friedman, K. H. Hauer, R. M. Moore, J. M. Cunningham, S. Ramaswamy, "Simulation and Performance of an Indirect-Methanol PEM Fuel Cell System, "Proceedings of the 17th International Electric Vehicle Symposium & Exposition, October 15-18, 2000, Montreal, Canada.

K.H. Hauer, D.J. Friedman, et.al., “Dynamic Response of an Indirect-Methanol Fuel Cell Vehicle,” Fuel Cell Power for Transportation 2000 (SP-1505), SAE paper # 2000 01 0370, Society of Automotive Engineers, Warrendale, PA, 2000.

A.R. Eggert, D. J. Friedman, P. Badrinarayanan, S. Ramaswamy, Karl-Heinz-Hauer, "Characteristics of an Indirect Methanol Fuel Cell System," 35th Intersociety Energy Conversion Engineering Conference, Las Vegas, NV, July 2000, Paper 2000-3040.

A.R. Eggert, Badrinarayanan, P., Friedman, D. and Cunningham, J., “Water and Thermal Management of an Indirect Methanol Fuel Cell System for Automotive Applications”, Proceedings of the 2000 ASME International Mechanical Engineering Congress and Exposition - Heat Transfer Division, Ed. J.H. Kim, The American Society of Mechanical Engineers, New York, Vol. 1, pp 35-42, 2000.

J. M. Cunningham, M. A. Hoffman, A. R. Eggert, and D .J Friedman, "The Implications of using an Expander (turbine) in an Air System of a PEM Fuel Cell Engine," Proceedings of the 17th International Electric Vehicle Symposium & Exposition, Montreal, Canada, October 15-18, 2000.

J. Cunningham, M. Hoffman, R. Moore, D. Friedman, “Requirements for a Flexible and Realistic Air Supply Model for Incorporation Into a Fuel Cell Vehicle (FCV) System Simulation” Electric and Hybrid Electric Vehicles and Fuel Cell Technology (SP-1466), SAE paper: 1999-01-2912, Warrendale, PA, 1999.

B. Johnston, D. J. Friedman, K. Burch, C. Frasier, T. Sheiblich, D. Kilmer, R. Carlson, T. McGoldrick and E. Chattot, "The Design and Development of the 1996 UC Davis FutureCar", SAE, 1996.

L. Frantzis, D. J. Friedman, S. Hill, W. P. Teagan and S. Strong and M Strong, "Building-Integrated Photovoltaics (BIPV): Analysis and US Market Potential," prepared for Building Equipment Division, Office of Building Technologies, U.S. DOE by Arthur D. Little, Feb. 1995.

S. Hynek, D. Friedman, “High Efficiency Stationary Hydrogen Storage: Final Technical Report,” prepared for National Renewable Energy Laboratory by Arthur D. Little, February 1995.

L. Frantzis, W. P. Teagan, D. J. Friedman, "High Value Utility Applications for Solar Hot Water," prepared for the Solar Energy Industries Association.

S. Hynek, D. Friedman, “Assessment of Hydrogen Storage Technologies: Program Summary, Carbon Sorption Test Result and an Advanced Compressed Low Temperature System,” phase 2 final report prepared for Office of Transportation Technologies, U.S. DOE by Arthur D. Little, December 1994.

W. P. Teagan, D. J. Friedman, "Fuel Cells for Building Applications: Definition of Performance/Cost Requirements," 29TH Intersociety Energy Conversion Engineering Conference, AIAA, August 1994, CA.

S. Hynek, W. Fuller, D. J. Friedman, "High Efficiency Stationary Hydrogen Storage," Proceedings of the 1994 DOE/NREL Hydrogen Program Review, NREL, April 18-21, 1994, Livermore, CA.

W. P. Teagan, R. Topping, D. J. Friedman, Fuel Cells for Building Applications: Definition of Performance/Cost Requirements, prepared for Building Equipment Division, Office of Building Technologies, U.S. DOE by Arthur D. Little, February 1994.

MAJOR INVITED PRESENTATIONS PRIOR TO NHTSA AND DOE (SAMPLE)

“Oil Choices: Policy and the Public Interest,” Carnegie Endowment Unconventional Oil Symposium, Washington DC, January 9, 2013.

“State of Charge: Electric Vehicles and the Grid,” 5th International Environmentally Friendly Vehicle Conference, Baltimore, MD, September 12, 2012.

“Oil Change: Ending Auto Oil Use by 2050,” Western States Petroleum Association 2011 Issues Conference, San Diego, CA, October 5, 2011.

“How to Cut our Nation’s Oil Dependence in Half,” SAE World Congress, Detroit, MI, April 13, 2011.

“Climate 2050: A Blueprint for Clean Transportation,” SAE World Congress, Detroit, MI, April 14, 2010.

“High Performance in the 21st Century: Redefining Fuel Economy,” SAE World Congress, Detroit, MI, April 17, 2007.

“Ending U.S. Oil Addiction: Sorting through the Solutions,” SAE Government/Industry Meeting, Washington DC, May 10, 2006.

“The Hydrogen Roller Coaster,” SAE Government/Industry Meeting, Washington DC, May 10, 2004.

“Oil Dependence, Climate Change, and Future Powertrains: A Comprehensive Approach,” presented at the Automotive News World Congress, MI, January 14, 2004.

“Hydrogen, Fuel Cell Vehicles and the Transportation Sector,” 5th meeting of the NRC panel on Alternatives for Future Hydrogen Production and Use, Washington DC. June 10, 2003.

“Renewable Hydrogen and the Transportation Sector,” American Solar Energy Society’s Renewable Hydrogen Forum, Washington DC, April 10-11, 2003.

“The Role of Partnerships in Energy and Environmental Progress,” SAE Future Car Congress,

Arlington, VA, June 5, 2002.

"Comments on the NRC/NAS Report on the Effectiveness and Impact of CAFE Standards," before the NRC committee on the Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, Washington DC, October 5, 2001.

Presentation on the potential for high fuel economy vehicles before the NRC committee on the Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, Washington DC, March 12-14, 2001.

"PEM Fuel Cell System Optimization: Redefining the Fuel Cell Stack and Air Supply," 16th International Grove Symposium on Fuel Cells, June 1999, London, England.

"Hybrid Electric Vehicles: Filling the Gap," Second Annual UC Transportation Graduate Student Conference: The Future of Transportation, October, 1995.