SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

A Research Summary for Decision Makers

Edited by Joan Ogden and Lorraine Anderson

ITS UCDAVIS
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Editors

Joan Ogden, *Professor, Environmental Science and Policy; Director, STEPS Program, Institute of Transportation Studies*
Joan Ogden's primary research interest is technical and economic assessment of new energy technologies, especially in the areas of alternative fuels, fuel cells, renewable energy and energy conservation. Her recent work centers on the use of hydrogen as an energy carrier, hydrogen infrastructure strategies, and applications of fuel cell technology in transportation and stationary power production. She has served on California state committees on hydrogen and on California's greenhouse gas regulation AB 32, the U.S. Department of Energy Hydrogen Technical Advisory Committee, the Intergovernmental Panel on Climate Change's panel on Renewable Energy, and on National Academies committees assessing hydrogen fuel cell and plug-in hybrid vehicles. She holds a B.S. in mathematics from the University of Illinois and a Ph.D. in theoretical physics from the University of Maryland.

Lorraine Anderson is a freelance writer and editor with a special interest in nature and sustainability. Her edited works include *Sisters of the Earth: Women's Prose and Poetry about Nature*; *Literature and the Environment: A Reader on Nature and Culture* (with Scott Slovic and John P. O'Grady); and *At Home on This Earth: Two Centuries of U.S. Women's Nature Writing* (with Thomas Edwards). She is the coauthor (with Rick Palkovic) of *Cooking with Sunshine: The Complete Guide to Solar Cuisine*. She lives in Corvallis, Oregon.

Authors

Jonn Axsen, *Postdoctoral Research Associate, PH&EV Research Center*
Jonn Axsen's primary research interest is the nexus between human behavior, energy-using technology, and environmental policy. Research projects have included characterizing the market for plug-in hybrid vehicles, estimating energy impacts, and observing processes of social influence within car buyers' social networks. Jonn earned his Ph.D. in transportation technology and policy at UC Davis, preceded by a master's in environmental management at Simon Fraser University.

Andrew Burke, *Research Engineer, Institute of Transportation Studies*
Andrew Burke has researched and taught graduate courses on advanced electric driveline technologies specializing in batteries, ultracapacitors, fuel cells, and hybrid vehicle design, control and simulation. Since 1974, his career work has involved many aspects of electric and hybrid vehicle design, analysis, and testing. He was the head systems engineer on the U.S. Department of Energy (DOE) funded Hybrid Vehicle project while working at the General Electric Research and Development Center in Schenectady, NY. While a professor of mechanical engineering at Union College in Schenectady, he continued his work on electric vehicle technology through consulting with the Argonne and Idaho National Engineering Laboratories (INEL) on various DOE electric vehicle and battery programs. Andrew was employed from 1988 to 1994 at INEL as a principal program specialist in the electric and hybrid vehicle programs. He has authored more than 140 reports and papers on electric and hybrid vehicles, batteries, and ultracapacitors. Andrew

holds B.S. and M.S. degrees in applied mathematics from Carnegie Institute of Technology, an M.A. in aerospace engineering, and a Ph.D. in aerospace and mechanical sciences from Princeton University.

Joshua Cunningham, *Program Manager, STEPS (2007–2009)*
Joshua Cunningham is currently an engineer at the California Environmental Protection Agency, working in the area of zero emissions vehicle policy analysis. He is also Director of Programs for the California Plug-in Electric Vehicle Collaborative and a key author of their recent report "Taking Charge." From 2007 to 2009 Joshua was program manager of the Sustainable Transportation Energy Pathways (STEPS) research program. Joshua also helped launch the UC Davis Energy Efficiency Center (April 2006) and the CEC PIER-funded Plug-in Hybrid Electric Vehicle Research Center (February 2007). Prior to working at ITS-Davis, Joshua was a systems engineer at UTCFuelCells working on transportation applications. He holds a master's degree in Transportation Technology and Policy (TTP) from UC Davis where he focused on fuel cell systems modeling research, and a bachelor's degree in Mechanical Engineering from Michigan State University.

Mark A. Delucchi, *Research Scientist, Institute of Transportation Studies*
Mark Delucchi specializes in economic, environmental, engineering, and planning analyses of transportation systems and technologies. Mark's research is in seven areas: (1) comprehensive analyses of the full social costs of motor-vehicle use, with special emphasis on the external costs of air pollution, noise, oil use, accidents, and climate change; (2) detailed analyses of emissions of greenhouse gases and criteria pollutants from the life cycle of passenger and freight transport, materials, electricity, and heating and cooking; (3) detailed modeling of the energy use, manufacturing cost, operating costs, and external costs of advanced electric and conventional vehicles; (4) systems analyses of energy, economic, and air-quality impacts of transportation fuels and technologies; (5) design and analysis of a new dual-road transportation infrastructure and new town plan that minimizes virtually all of the negative impacts of transportation; (6) sustainable transportation and energy use; and (7) analyses of supplying 100 percent of the world's energy needs with wind, water, and solar power.

Peter Dempster, *Program Manager, STEPS (2009–2010)*
Peter is an Advanced Technologies Engineer for BMW of North America. He coordinates projects related to sustainable mobility, advanced energy storage devices, market and consumer studies, and innovative business strategies surrounding electro-mobility, including battery second-use and vehicle-to-grid. Prior to joining BMW, Peter managed the Sustainable Transportation Energy Pathways and Toyota Fuel Cell Vehicle Demonstration programs of the UC Davis Institute of Transportation Studies. He also co-managed the Plug-in Hybrid Electric Vehicle Research Project. For three years Peter was a researcher for the California Biomass Collaborative. Peter earned a Master of Science in Biological Systems Engineering and a Bachelor of Science in Aeronautical Engineering, both from UC Davis.

Yueyue Fan, *Associate Professor, Civil and Environmental Engineering*
Yueyue Fan's research interests are in transportation and renewable energy infrastructure system modeling and optimization, critical transportation and energy infrastructure protection, adaptive network routing and resource allocation processes, and stochastic and dynamic system modeling and computational methods.

Brendan Higgins is interested in modeling and experimental research on algal biofuels. Algae are fascinating organisms because they offer significant potential for environmentally friendly fuel production. While completing his M.S. in transportation technology and policy at UC Davis, he studies the life-cycle impacts of using algae to simultaneously treat dairy wastewater and produce electricity. He is also pursuing a Ph.D. in biological engineering. He will experiment with algae cultivation using biomass leachate as the growth medium. Preliminary experiments show that algae remove sugars from the leachate and exhibit high lipid productivity.

Bryan Jenkins, *Professor, Biological and Agricultural Engineering; Director, Energy Institute*
Bryan Jenkins teaches and conducts research in the areas of energy and power, with emphasis on biomass and other renewable resources. He has more than thirty years' experience working in the area of biomass thermochemical conversion, including combustion, gasification, and pyrolysis. His research also includes analysis and optimization of energy systems. He teaches both graduate and undergraduate courses on energy systems, heat and mass transfer, solar energy, and power and energy conversion, including renewable energy and fuels, economic analysis, environmental impacts, fuel cells, engines, electric machines, fluid power, cogeneration, heat pumps, thermal storage, and other technologies. Bryan is a recipient of an Outstanding Achievement Award from the U.S. Department of Energy for exceptional contributions to the development of bioenergy, and the Linneborn Prize from the European Union for outstanding contributions to the development of energy from biomass.

Nils Johnson is a Ph.D. candidate in transportation technology and policy at UC Davis. His research focuses on modeling large-scale infrastructure deployment for CO_2 mitigation technologies, including hydrogen fuel and carbon capture and storage. Nils employs expertise in geographic information systems and techno-economic modeling to evaluate the cost and design of roll-out strategies for these new technologies. He completed a B.A. at Haverford College and master's degrees in both forestry and environmental management at Duke University.

Alissa Kendall, *Assistant Professor, Civil and Environmental Engineering*
Alissa Kendall joined UC Davis in 2007 after completing a multidisciplinary Ph.D. in civil and environmental engineering and natural resource policy at the University of Michigan's Center for Sustainable Systems. Her research evaluates the environmental sustainability of transportation and energy systems from a life-cycle perspective. Her topics of analysis include transportation infrastructure materials and systems, biofuels, agricultural systems, advanced vehicle technologies, and climate change mitigation strategies. In parallel, she conducts research to advance the methods and practice of life-cycle assessment, with a focus on greenhouse gas accounting methods.

Ken Kurani, *Research Engineer, Institute of Transportation Studies*
Ken Kurani is developing approaches and methods to evaluate user responses to new transportation and information technologies. This research includes activity-based approaches applied within quasi-experiments designed around interactive stated preference and reflexive survey methodologies.

Wayne Leighty joined the Institute of Transportation Studies in 2006 as a lifelong technological optimist and tinkerer. He built his first alternative-fuel vehicle at age 14, a battery-electric Honda CRX, and has since converted two diesels to waste-cooking-oil fuel. Wayne is employed as a commercial regulatory analyst with Shell Oil in Anchorage, Alaska. While at UC Davis, Wayne earned two M.S. degrees, an M.B.A., and a Ph.D. His master's thesis investigated the effects of tax structure on optimal oil production and his dissertation modeled dynamic transition paths to deep reductions in greenhouse gas emissions from the California transportation sector. At the Graduate School of Management, Wayne focused on general management, strategy, and emerging technology in the energy and transportation industries. Wayne was a Graduate Automotive Technology Education (GATE) Fellow for two years, the 2008–09 Chevron Graduate Fellow in transportation, and a Dean's Fellow at the Graduate School of Management.

Xuping Li is a Ph.D. candidate in civil and environmental engineering at UC Davis. She holds a master's degree in agricultural and resource economics from UC Davis. Xuping has strong interdisciplinary training in transportation engineering (civil and mechanical disciplines), economics, and policy analysis. Her research interests include modeling and experimenting on sustainable energy systems such as hydrogen energy systems and innovative renewable energy systems, and assessing the technical, economic, and environmental performance of these systems. She is particularly interested in the application of these systems in transportation (alternative fuels), retailers, and residences. She is also dedicated to linking the engineering performance of these systems to policy and economic analyses.

Timothy E. Lipman is an energy and environmental technology, economics, and policy researcher and lecturer with the University of California, Berkeley. He is serving as Co-Director for the campus' Transportation Sustainability Research Center (TSRC), based at the Institute of Transportation Studies, and also as Director of the U.S. Department of Energy Pacific Region Clean Energy Application Center (PCEAC). Tim's research focuses on electric-drive vehicles, fuel cell technology, combined heat and power systems, biofuels, renewable energy, and electricity and hydrogen energy systems infrastructure. Lipman received Ph.D. degree in Environmental Policy Analysis with the Graduate Group in Ecology at UC Davis (1999). He also has received an M.S. degree in Transportation Technology and Policy, also at UC Davis (1998), and a B.A. from Stanford University (1990).

Ryan McCarthy, *Research Analyst, Institute of Transportation Studies*
Ryan McCarthy was chief writer for the strategic plan for plug-in electric vehicles in California, written by researchers at the Institute of Transportation Studies in conjunction with the California Plug-In Electric Vehicle Collaborative. He completed the CCST Science and Technology Policy Fellowship in the office of California Assembly Member Wilmer Amina Carter, where he advised on issues associated with energy, utilities, and the environment, among others. McCarthy holds a master's degree and Ph.D. in civil and environmental engineering from UC Davis, and a bachelor's degree in structural engineering from UC San Diego. His expertise lies in transportation and energy systems analysis, specifically regarding the electricity grid in California and impacts of electric vehicles on energy use and emissions in the state.

David McCollum, *Research Scholar, International Institute for Applied Systems Analysis, Laxenburg, Austria*
David McCollum received his Ph.D. from the Transportation Technology and Policy Program at UC Davis in 2011. His dissertation focused on scenario analysis, developing and using energy-engineering-economy-environment (4E) models to understand the evolution of energy systems over time. Before arriving at UC Davis, David studied chemical engineering at the University of Tennessee and also lived and worked in Japan as an English teacher. His main research interests include the modeling of energy and climate systems, scenario and policy analysis, and assessment of low-carbon technologies.

Marshall Miller, *Research Engineer, Institute of Transportation Studies*
Marshall Miller studies electric and hybrid vehicle propulsion systems and how to integrate these systems in vehicles to optimize performance. He is the technical manager of the Hydrogen Bus Technology Validation Program, which will operate hydrogen-fueled buses in a real transit environment. He also manages the Hybrid Vehicle Propulsion Systems Laboratory where he studies storage battery, ultracapacitor, and fuel cell technology. He develops computer models to simulate the performance of electric and hybrid vehicles using a variety of propulsion systems, using data generated in the lab. Before joining ITS-Davis full-time, he held a joint appointment with ITS-Davis and the Union of Concerned Scientists where he studied technology and policy implications of fuel cell vehicles and hydrogen fuel infrastructure.

Gouri Shankar Mishra, *Researcher, Institute of Transportation Studies*
Gouri Shankar Mishra is involved in research on water impacts of renewable transportation fuels and electricity, and life cycle analysis. He received a master's degree in transportation technology and policy at UC Davis. Before UC Davis, Mishra provided business and technology consulting services to shipping, ports, and railroad operators and was involved in projects related to business process restructuring and automation, project appraisal and valuation, project financing, and corporate communications strategy.

Michael Nicholas, *Postdoctoral Researcher, PH&EV Research Center*
Michael Nicholas completed his undergraduate degree in physics and natural science, and he received his Ph.D. in transportation technology and policy from UC Davis in 2010. He is currently continuing his work as a postdoctoral researcher at UC Davis. His work has centered on understanding refueling behavior from a geographic perspective. His work has assisted in the policy process with respect to hydrogen infrastructure planning, and he is currently researching electric vehicle charging network needs to help future planners and policy makers make informed decisions in this rapidly expanding and poorly understood subject area. He is currently managing a team of researchers in the PH&EV Research Center constructing a GIS toolbox that will allow for a methodical approach to the understanding, planning, and deployment of electric vehicle infrastructure.

Joan Ogden, *Professor, Environmental Science and Policy; Director, STEPS Program, Institute of Transportation Studies*
Joan Ogden's primary research interest is technical and economic assessment of new energy technologies, especially in the areas of alternative fuels, fuel cells, renewable energy and energy conservation. Her recent work centers on the use of hydrogen as an energy carrier, hydrogen infrastructure strategies, and applications of fuel cell technology in transportation and stationary power production. She has served on California state committees on hydrogen and on California's greenhouse gas regulation AB 32, the U.S. Department of Energy Hydrogen Technical Advisory Committee, the Intergovernmental Panel on Climate Change's panel on Renewable Energy, and on National Academies committees assessing hydrogen fuel cell and plug-in hybrid vehicles. She holds a B.S. in mathematics from the University of Illinois and a Ph.D. in theoretical physics from the University of Maryland.

Nathan Parker is a postdoctoral research associate at the Institute of Transportation Studies. His research focuses on modeling the infrastructure needed to enable transitions to alternative fuels. While at UC Davis, Nathan has studied hydrogen pipelines, the production of hydrogen from biomass, and assessments of biofuel supply. Nathan has developed a spatially explicit infrastructure model of national biofuel supply and applied it to analyzing the federal Renewable Fuel Standard. He received his B.S. in physics from Wake Forest University in 2001, his M.S. (2007) and his Ph.D. (2011) in Transportation Technology and Policy at UC Davis.

Daniel Sperling, *Professor and Director, Institute of Transportation Studies; Co-Director, STEPS Program*
Daniel Sperling is a professor of civil engineering and environmental science and policy, and founding director of the Institute of Transportation Studies at UC Davis. He also holds the transportation seat on the California Air Resources Board, where he plays a prominent role in designing and adopting climate policies for vehicles, fuels, and urban travel. He received a 2010 Heinz Award for his "achievements in the research of alternative transportation fuels and his responsibility for the adoption of cleaner transportation policies in California and across the United States."

Since 2009, Dan has been a keynote speaker at thirty universities and conferences; has been featured on *The Daily Show* with Jon Stewart, NPR's *Science Friday*, *Talk of the Nation*, and

Fresh Air; and has published op-eds in the *New York Times*, *Washington Post*, and *Los Angeles Times*. He is author or editor of more than two hundred papers and reports and twelve books (including *Two Billion Cars*, Oxford University Press), has served on thirteen National Academies committees, was selected as a National Associate of the National Academies, recently chaired the Future of Mobility committee of the (Davos) World Economic Forum, testified seven times to the U.S. Congress on alternative fuels and advanced vehicle technology, and was a lead author on the United Nations' Intergovernmental Panel on Climate Change, which shared the 2007 Nobel Peace Prize with former vice president Al Gore.

Yongling Sun, *Ph.D. Recipient, Transportation Technology and Policy (2010)*
Yongling Sun is a research associate at the International Council on Clean Transportation in San Francisco. Her current research interests include life-cycle cost comparison of alternative fuel/propulsion options, benefit-cost analysis of renewable energy options, life-cycle emissions of various hydrogen pathways, and economic and environmental assessments of advanced power systems. She obtained a B.S. in automotive engineering in 1998 at Tsinghua University, an M.S. in vehicle engineering in 2001 at Tongji University, and an M.S. in agricultural and resource economics at UC Davis in 2008, and a Ph.D. in Transportation Technology and Policy at UC Davis in 2010.

Jacob Teter has research interests that include life-cycle analysis and the intersection of environmental policy and resource economics. Currently, Jacob is completing his master's research on Chinese rural vehicles (CRVs) and has begun research on the water-energy nexus with Gouri Mishra, under Sonia Yeh. In summer 2010 he conducted research on the impacts of national industrial and economic policies on CRVs. He visited industry sites and interviewed vehicle owners under an NSF EAPSI fellowship. He recently completed research funded by Shell Hydrogen and hosted by Tsinghua University, for which he used dynamic programming to estimate the societal costs and benefits of building an infrastructure supporting hydrogen fuel cell vehicles in Beijing. Before UC Davis, Jacob was a fellow with the Oberlin Shansi Memorial Association in rural China, where he interviewed farmers about how their agricultural practices had changed since China's reform and opening.

Peter Tittmann is a Ph.D. candidate in Geography at UC Davis. His interests include fire, forest management, bio-energy and bio-fuels, network modeling, remote sensing, Geographic Information Systems (GIS), and regional geography.

Tom Turrentine, *Director, PH&EV Research Center, Institute of Transportation Studies*
Tom Turrentine studies the role of travel and movement in the evolution of culture, society, and lifestyle. He focuses on understanding automobile-based lifestyles, applying anthropological methods and theories to explore potential responses of car users to new technologies and policies aimed at mitigating the negative impacts of automobile infrastructure and use. He has studied consumer responses to electric vehicles, alternative fueled vehicles, micro-vehicles, station car systems, advanced traveler information, and other intelligent transportation systems. Tom also studies travel behavior and road systems in environmentally sensitive areas, focusing on Yosemite National Park and the Sierra Nevada region in California.

Eric Winford conducts research on how resources can be managed to accommodate the needs of humans, wildlife, and ecosystems. Currently, he is working on analyzing the landscape-scale impacts of policies that seek to utilize forest biomass as a fuel. His research utilizes a combination of life-cycle analysis, GIS analysis, and forest growth models to understand the multiple implications of forest management. Eric's research revolves around ecosystem management, energy, and regional planning. Before coming to UC Davis, Eric worked at the Nevada Tahoe Conservation District as an environmental scientist helping homeowners plan, design, and implement conservation practices to prevent erosion, protect against wildfires, and reduce the spread of invasive plant species. Prior to that, Eric was employed by the USDA Forest Service, El Dorado National Forest, as a forestry technician working on recreation and wilderness management issues. Eric is an M.A. candidate in the geography graduate group. He holds a B.S. in journalism from the University of Tennessee, Knoxville.

Julie Witcover, *Postdoctoral Researcher, Institute of Transportation Studies*
Julie Witcover is working on indirect land-use effects of biofuels policy. Her interests include spatial bioeconomic modeling and sustainable development. She received her Ph.D. in agricultural and resource economics from UC Davis in December 2008 (dissertation: *Shaping Land Use Along an Agricultural Frontier: A Dynamic Household Model for Early Small-Scale Settlers in the Brazilian Amazon*), an M.A. in international economics from the Johns Hopkins School of Advanced International Studies, and an A.B. in government from Harvard. Before her Ph.D., she developed her interests in sustainability policies as a research analyst at the International Food Policy Research Institute in Washington, DC; publications included, with Stephen A. Vosti and Chantal Line Carpentier, the research report *Agricultural Intensification by Smallholders in the Western Brazilian Amazon: From Deforestation to Sustainable Land Use*.

Christopher Yang, *Project Scientist, Institute of Transportation Studies*
Christopher Yang is a researcher and the co-leader of the Infrastructure System Analysis research group within the STEPS program. His research interests lie in understanding the role of advanced vehicles and fuels in helping to reduce transportation greenhouse gas emissions through infrastructure and system modeling. He works on hydrogen infrastructure systems, vehicle and electric grid interactions, and scenarios for long-term reductions in greenhouse gases from the transportation sector. He completed his Ph.D. in mechanical engineering from Princeton University and his B.S. and M.S. in environmental science and engineering from Stanford University.

Sonia Yeh, *Research Engineer, Institute of Transportation Studies*
Sonia Yeh's primary research interest is to advance the understanding of future energy systems and their environmental and social impacts, and to seek policy solutions and improve the sustainability of our future energy systems. Sonia's research can be divided into four key tracks: (1) fuels and fuel greenhouse gas emissions regulations, (2) sustainability, (3) energy system modeling, and (4) technological change and learning by doing. She has been involved with the design and implementation of California climate policies, specifically the California Global Warming Solutions Act (AB 32), the Low Carbon Fuel Standard, and the Sustainability Plan for the Alternative and Renewable Fuel and Vehicle Technology Program (AB 118).

Hengbing Zhao, *Research Engineer, Institute of Transportation Studies*
Hengbing Zhao obtained his Ph.D. in 1999 from Zhejiang University. His research has involved many aspects of uninterruptible power sources, distributed power generation systems, fuel cell systems and vehicles, and electric and hybrid vehicles. He was a key contributor to developing battery electric vehicles and distributed power generation systems while working at Myway Labs in Yokohama, Japan. Since 2002, he has worked on fuel cell systems for automotive applications as a research associate at the IFCI-NRC in Vancouver, Canada. He joined the STEPS program as a research engineer in 2007, working on vehicle modeling and evaluation. His recent research includes fuel cell systems and vehicles, hybrid electric vehicles, and applications of batteries and ultracapacitors for electric vehicles.

STEPS Researchers (2007–2010)

STEPS Directors

Joan Ogden, *Professor, Environmental Science and Policy; Director, STEPS Program, Institute of Transportation Studies*

Daniel Sperling, *Professor and Director, Institute of Transportation Studies; Co-Director, STEPS Program*

Research Leaders

Jonn Axsen, *Postdoctoral Research Associate, PH&EV Research Center*

Andrew Burke, *Research Engineer, Institute of Transportation Studies*

Mark A. Delucchi, *Research Scientist, Institute of Transportation Studies*

Yueyue Fan, *Associate Professor, Civil and Environmental Engineering*

David Greene, *Visiting Senior Research Scientist, Institute of Transportation Studies (2008–2009)*

Bryan Jenkins, *Professor, Biological and Agricultural Engineering; Director, Energy Institute*

Alissa Kendall, *Assistant Professor, Civil and Environmental Engineering*

Chris Knittel, *Associate Professor, Economics*

Ken Kurani, *Research Engineer, Institute of Transportation Studies*

Cynthia Lin, *Assistant Professor, Agricultural and Resource Economics and Environmental Science and Policy*

Nic Lutsey, *UC Davis Transportation Technology and Policy Ph.D. 2009; Senior Researcher, International Council on Clean Transportation*

Marshall Miller, *Research Engineer, Institute of Transportation Studies*

Gouri Shankar Mishra, *Researcher, Institute of Transportation Studies*

Michael Nicholas, *Postdoctoral Researcher, PH&EV Research Center*

Nathan Parker, *UC Davis Transportation Technology and Policy Ph.D. 2011; Postdoctoral Research Associate, Institute of Transportation Studies*

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Julie Witcover, *Postdoctoral Researcher, Institute of Transportation Studies*

Christopher Yang, *Project Scientist, Institute of Transportation Studies*

Sonia Yeh, *Research Engineer, Institute of Transportation Studies*

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Graduate Researchers

Alexander Allan is an M.S. candidate in Transportation Technology and Policy at UC Davis, and is currently an engineer at PG&E.

Obadiah Bartholomy received an M.S. in Transportation Technology and Policy at UC Davis in 2009, and is currently an engineer at SMUD.

Adina Boyce is a Ph.D. student in Civil and Environmental Engineering at UC Davis.

Joel Bremson is a Ph.D. candidate in Transportation Technology and Policy at UC Davis.

Chien-Wei (Steven) Chen is a Ph.D. candidate in Transportation Technology and Policy at UC Davis.

Yuche Chen is a Ph.D. candidate in Civil Engineering at UC Davis and a graduate student researcher at the Institute of Transportation Studies.

Gustavo Collantes received a Ph.D. in Transportation Technology and Policy at UC Davis in 2007, and is currently with the Department of Transportation, State of Washington.

Jamie Davies is a master's candidate in Transportation Technology and Policy at UC Davis.

Abbas Ghandi is a Ph.D. student in Transportation Technology and Policy at UC Davis.

Reid Heffner received a Ph.D. in Transportation Technology and Policy at UC Davis in 2009. He is currently an analyst at Booz Allen Hamilton.

Brendan Higgins is pursuing a Ph.D. in Biological Engineering at UC Davis.

Ryohei Hinokuma received an M.S. in Transportation Technology and Policy at UC Davis in 2008, and is currently at SF Power.

Eric Huang received a Ph.D. in Civil and Environmental Engineering at UC Davis in 2010. He is currently a senior associate the Energy and Environment Division at International Resources Group in Washington DC.

Jonathan Hughes received a Ph.D. in Transportation Technology and Policy at UC Davis in 2008. He is currently an assistant professor in economics at the University of Colorado, Boulder.

Nils Johnson is a Ph.D. candidate in Transportation Technology and Policy at UC Davis.

Matt Jones is a Ph.D. student in Transportation Technology and Policy at UC Davis.

Wayne Leighty earned four graduate degrees at UC Davis: two M.S. degrees (in Agricultural and Resource Economics in 2008 and in Transportation Technology and Policy in 2007), an M.B.A. in 2010, and a Ph.D. in Transportation Technology and Policy in 2010.

Xuping Li is a Ph.D. candidate in Civil and Environmental Engineering at UC Davis.

Zhenhong Lin received his Ph.D. in Civil and Environmental Engineering at UC Davis is 2008. He is currently a research engineer at Oak Ridge National Laboratory.

Ryan McCarthy received his Ph.D. in Civil and Environmental Engineering at UC Davis is 2009. He is currently a special assistant to the Chairman of the California Air Resources Board.

David McCollum received his Ph.D. in Transportation Technology and Policy at UC Davis in 2011. He is currently a Research Scholar, International Institute for Applied Systems Analysis, Laxenburg, Austria.

Geoff Morrison is a Ph.D. candidate in Civil and Environmental Engineering at UC Davis.

Colin Murphy is a Ph.D. student in Transportation Technology and Policy at UC Davis.

Kalai Ramea is a Ph.D. student in Transportation Technology and Policy at UC Davis.

Brent Riffel received his M.S. in Transportation Technology and Policy at UC Davis in 2007. He is currently an analyst at Lifecycle Associates.

Yongling Sun received a Ph.D. in Transportation Technology and Policy at UC Davis in 2010. She is currently a research associate at the International Council on Clean Transportation in San Francisco.

Jacob Teter is completing his master's research in Transportation Technology and Policy at UC Davis.

Peter Tittmann is a Ph.D. candidate in Geography at UC Davis.

Guihua Wang received his Ph.D. in Transportation Technology and Policy at UC Davis in 2008. He is currently an air quality engineer at the California Environmental Protection Agency.

Jonathan Weinert received his Ph.D. in Transportation Technology and Policy at UC Davis in 2007. He is currently an engineer at Chevron Technology Ventures.

Brett Williams received his Ph.D. in Transportation Technology and Policy at UC Davis in 2007. He is currently a researcher at the Transportation Sustainability Research Center (TSRC), UC Berkeley.

Eric Winford is an M.A. candidate in the Geography Graduate Group at UC Davis.

Justin Woodjack is master's student in Transportation Technology and Policy at UC Davis.

Sahoko Yui is a master's candidate in Transportation Technology and Policy at UC Davis.

Jane Zeng is a master's student in Transportation Technology and Policy as well as in Statistics at UC Davis.

Jessie Zheng is a Ph.D. student in Civil and Environmental Engineering at UC Davis.

Program Management

Paul Gruber, *Program Manager, STEPS and NextSTEPS (2010–present)*

Peter Dempster, *Program Manager, STEPS (2009–2010)*

Joshua Cunningham, *Program Manager, STEPS (2007–2009)*