

# 7th Annual UTC Spotlight Conference

## Sustainable Energy and Transportation Strategies, Research, and Data

November 8–9, 2012

The Keck Center of the National Academies  
Washington, D.C.



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Research and Innovative Technology Administration  
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U.S. Department of Transportation

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Transportation Research Board

[www.trb.org/Conferences/UTCSpotlight2012.aspx](http://www.trb.org/Conferences/UTCSpotlight2012.aspx)

## PLANNING COMMITTEE

Daniel Sperling, Director, Institute of Transportation Studies, University of California, Davis, *Chair*  
 Cynthia Jane Burbank, Vice President, Parsons Brinckerhoff  
 Mark S. Duvall, Director, Electric Power Research Institute  
 Genevieve Giuliano, Professor and Senior Associate Dean, University of Southern California  
 David L. Greene, Corporate Fellow, Oak Ridge National Laboratory  
 Lance R. Grenzeback, Senior Vice President, Cambridge Systematics, Inc.  
 Paula J. C. Hammond, Secretary, Washington State Department of Transportation  
 Michael D. Meyer, Senior Planning Adviser, Parsons Brinckerhoff, inc.  
 Robert B. Noland, Professor, Rutgers, State University of New Jersey  
 Ping Yi, Professor, University of Akron

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Thomas G. Bolle  
 Robin Kline  
 Caesar Singh

### *TRB Staff*

Ann R. Purdue, Senior Program Officer, Rail and Freight  
 Matthew A. Miller, Senior Program Associate

## Registration Fees

	<b>Early Bird</b> <i>Expires</i> Sept. 12, 2012	<b>Advance</b> <i>Expires</i> Oct. 11, 2012	<b>On Site</b> <i>After</i> Oct. 11, 2012
General	\$315	\$365	\$415
Speaker and TRB Sponsor <sup>1</sup>	\$215	\$265	\$315
Student <sup>2</sup>	\$125	\$175	\$225

<sup>1</sup> TRB sponsors only (including state DOTs). Must be a sponsor prior to registration.

<sup>2</sup> Full-time students age 35 or younger. Valid student ID must be presented on site.

## Hotel Information

Doubletree Washington D.C.  
 1515 Rhode Island Avenue  
 Washington, D.C. 20005  
 202-232-7000

## Online Reservations

November 8–9, 2012



## An Invitation to Join the Dialogue

The transportation sector currently accounts for about two-thirds of the petroleum consumption and one-third of greenhouse gas (GHG) emissions in the United States. Reducing petroleum consumption enhances energy security and slows climate change. Scientific analyses indicate that reducing worldwide GHG emissions by 80 percent over the next few decades is needed to stabilize concentrations of these gases in the atmosphere and avoid large increases in climate and global temperatures. Numerous challenges hinder the adoption of sustainable energy technologies, practices, and policies.



*Sperling*

This conference explores various opportunities to reduce dependence of surface transportation on petroleum, taking into account economic, social, and environmental impacts. Conference attendees will discuss these opportunities and challenges with the objective of identifying the research and data needed to promote informed and practical solutions and strategies.

The conference program includes the following:

- Challenges to reducing oil use and GHG emissions in surface transportation,
- Energy pricing and financing strategies,
- Emerging vehicle and fuel technologies,
- Freight transportation issues and opportunities, and
- Metropolitan transportation issues and opportunities.

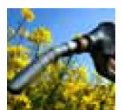
—Daniel Sperling  
*Conference Planning Team Chair  
University of California, Davis*

### TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES

The **Transportation Research Board** is one of six major divisions of the National Research Council, which serves as an independent adviser to the federal government and others on scientific and technical questions of national importance. The National Research Council is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied activities annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

[www.TRB.org](http://www.TRB.org)

November 8–9, 2012



# CONFERENCE AGENDA

Thursday, November 8

7:45 a.m.–8:30 a.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Breakfast**

8:30 a.m.–10:00 a.m., *Keck 100*

***The Challenge of Energy Sustainability in Surface Transportation***

Daniel Sperling, University of California, Davis, *presiding*

This session explores problems and potential solutions to current and future surface transportation energy challenges, including economic and environmental considerations. Key issues include uncertain world oil supply trends, including peaking of conventional oil, uncertain costs and environmental impacts of unconventional fuels, and uncertain climate change and energy security. The policy and technology options are equally complicated by a number of considerations that include pricing and financing, efficiency and GHG standards, alternative vehicle and fuel technologies, equity of access, energy and transportation infrastructure needs, and operational enhancements.

**Overview and Context**

Daniel Sperling, University of California, Davis

**Global Perspective on Status and Future of Energy Resources and Demands**

Peter Blair, Division on Engineering and Physical Sciences, National Research Council

**Transportation Sector Issues**

David Greene, Oak Ridge National Laboratory

10:00 a.m.–10:30 a.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Break**

10:30 a.m.–noon, *Keck 100*

***Plenary Session: Interconnection of Energy Use, Pricing, and Finance***

Paula J. C. Hammond, Washington State Department of Transportation, *presiding*

Are current finance and pricing policies consistent with efforts to reduce energy use and GHG emissions? How will current and proposed energy policies affect the sustainability of transportation finance that is based on the gasoline tax? What research is needed to help identify new options in which transportation finance, pricing, and energy–GHG policies are compatible and sustainable?

**Overview of the Issue and Research Needs**

Keynote Speaker, Marty Wachs, RAND Corporation and University of California, Los Angeles

**Panel Discussion**

B. Starr McMullen, Oregon State University

Arlee Reno, Cambridge Systematics, Inc.

Noon–1:30 p.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Lunch**

1:30 p.m.–3:00 p.m., *Keck 100*

**Plenary Session: Emerging Vehicle and Fuel Technologies—Challenges and Opportunities**

Mark S. Duvall, Electric Power Research Institute, *presiding*

What is the role of fuels and propulsion technologies in reducing oil use and GHGs? The impact of public policies, such as fuel economy and GHG standards, zero-emissions vehicle mandates, and renewable lowcarbon fuel standards will be explored, as well as the analysis and data needed by government and industry in crafting effective policies and investment strategies.

**Overview of Emerging Vehicle and Fuel Technologies**

David Sandalow, U.S. Department of Energy

**Identifying Research Needs for Emerging Technologies**

Thomas Bradley, Colorado State University

**Customer Adoption Challenges**

Tom Turrentine, Institute for Transportation Studies, University of California, Davis

3:00 p.m.–3:30 p.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Break**

**Breakout Sessions**

During the Conference, there will be two periods, one on Thursday and the other on Friday, for the purpose of convening breakout sessions that will engage attendees in smaller group discussions of the issues and subject matter of the preceding general sessions. Please refer to your breakout group number on your badge to determine your assigned group.

3:30 p.m.–5:00 p.m. (*See Rooms Below*)

**Concurrent Breakout Sessions**

**Breakout Session 1A: New Financing and Pricing Strategies for Transportation Leaders**

What financing and pricing reforms could be pursued to simultaneously reduce petroleum energy use, provide a sound revenue base for transportation, and promote efficient transportation choices? What research is needed and how might it be framed and disseminated so that it contributes to public policy decisions?

**Group 1, Keck 101**

Cindy Burbank, Parsons Brinckerhoff

*Rapporteur*, Jonathan Dowds, University of Vermont Transportation Research Center

**Group 2, Keck 105**

Michael Meyer, Parsons Brinckerhoff and Paula Hammond, Washington State Department of Transportation

**Breakout Session 1B: Alternative Fuels and Vehicles: Obstacles to Implementation of Alternative Fuel and Vehicle Technologies**

What market or public education initiatives can accelerate the demand for alternative fuel vehicles? How will consumer demand drive adoption of the different fuels and vehicle

technologies, and what are the near- and long-term infrastructure requirements to support this adoption?

**Group 3, Keck 109**

Mark Duvall, Electric Power Research Institute

**Group 4, Keck 110**

Ping Yi, University of Akron

5:30 p.m.–7:00 p.m., Keck 3<sup>rd</sup> Floor Atrium

### **Poster Session and Reception**

Join us for the Conference Poster Session and Reception! In addition to poster presentations (listed below), Federal Highway Administration will host an exhibit that demonstrates its Infrastructure Voluntary Evaluation Tool (INVEST). Beverages and hors d'oeuvres will be served.

#### Exhibit

**Federal Highway Administration Sustainable Highways  
Infrastructure Voluntary Evaluation Tool (INVEST)**

### **Poster Presentations**

**U.S Transportation Sector in Year 2030: Results of Two-Part Delphi Survey**

Geoffrey Morrison, University of California, Davis; and Thomas Stephens, Argonne National Lab

**Analysis of Plug-In Electric Vehicle Infrastructure Needs**

Morgan Davis and Marcus Alexander, Electric Power Research Institute (EPRI)

**Driving Impact in Federal Vehicle Fueling Behavior**

Ryan Daley, Mackay Miller, Gabe Boeckman, and Mark Singer, National Renewable Energy Laboratory

**Maryland's Electric Vehicle Infrastructure Plan**

Crystal Saunders Hancock, Parsons Brinckerhoff; and Z. Andrew Farkas, National Transportation Center, Morgan State University

**Oregon Transportation Research and Education Consortium's Transportation Electrification Initiative**

John MacArthur, Oregon Transportation Research and Education Consortium (OTREC), Portland State University

**Improving Role of Electric Utilities in Supporting Plug-In Electric Vehicle Markets**

Kadir Bedir and Ken Kurani, PHEV Research Center, University of California, Davis

**How Low Can Biochemical Cellulosic Ethanol Go? Key Challenges to Reducing Lifecycle Carbon Footprint**

Colin Murphy and Alissa Kendall, Institute for Transportation Studies, University of California, Davis

**Impacts of Oil Price on Freight Transportation Modal Choice and Emissions**

Taesung Hwang, Yanfeng Ouyang, and Christopher Barkan, Department of Civil and Environmental Engineering, University of Illinois at Urbana–Champaign

**Developing Heuristics to Reduce Emissions from Last Mile Deliveries**

Erica Wygonik, Anne Goodchild, and Felipe Sandoval, University of Washington

**Freight Transportation Energy Analysis Tool**

Christopher Porter and Daniel Beagan, Cambridge Systematics, Inc.; and Austin Brown, National Renewable Energy Laboratory

**Effects of Alternative Fuel Infrastructure on Key Transportation Economic Metrics**

Kevin Heaslip, Utah State University

**Renewable Fuel Use and Flexible Enforcement Mechanisms**

Gabriel Lade, Department of Agricultural and Resource Economics, University of California, Davis

**Fuel Tax Per Gallon Versus VMT Fee: What Social Equity Issues Do They Raise?**

Eirini Kastrouni, Konstantina Gkritza, Shauna L. Hallmark, and Robert W. Stephenson, Iowa State University

**U.S. Aviation and High-Speed Rail under Climate Policy: Energy and Emissions Implications**

Regina Clewlow, Postdoctoral Scholar, University of California, Berkeley

**Climate Change Adaptation Practices to Support Sustainable Energy: Evaluating the Progress of Transportation Planning Agencies**

Michelle Oswald and Emily Liggett, Bucknell University; and Sue McNeil, University of Delaware

**Daily Travel and CO<sub>2</sub> Emissions: Comparison of Germany and the United States**

Ralph Buehler, Urban Affairs and Planning Program, Virginia Polytechnic Institute and State University

**Integrated Tool for Estimating Regional Transportation Greenhouse-Gas Emissions from Land Use Strategies**

Emily Moylan, Jack Faucett Associates, and Department of City and Regional Planning, University of California, Berkeley; Lewison Lem and Rami Chami, Jack Faucett Associates

**Spotlight on Modern Roundabouts**

Ken Sides, City of Clearwater, Florida; and Gene Russell, Kansas State University

**Greenhouse Gas Assessment Spreadsheet for Transportation Capital Projects**

Christopher Hanson and Robert B. Noland, Rutgers University

**Relationships between Vehicle Mass, Footprint, and Societal Risk**

Tom Wenzel, Lawrence Berkeley National Laboratory

**Reducing Energy Use by Using Data to Improve Multimodal Transportation Planning and Policy Decision Making in Metropolitan Areas**

Jennifer Dill, OTREC, Portland State University

**Bus Rapid Transit in Bay Area: How to Avoid Empty Buses**

Emily Moylan, University of California, Berkeley

**Public Bike-Sharing in North America: Early Understanding**

Susan Shaheen, Elliot Martin, Adam Cohen, and Rachel Finson, Transportation Sustainability Research Center, University of California, Berkeley

**Built Environment Energy Analysis Tool**

Christopher Porter and Anurag Komanduri, Cambridge Systematics, Inc.

**Measuring Transportation Sustainability at Municipal, Regional, and State Levels**

Anna Gartsman, Dukakis Center for Urban and Regional Policy, Northeastern University; and Stephanie Pollack, Northeastern University

**Proactive Signal Timing Maintenance to Promote Energy and Environmental Sustainability**

Yeganeh Mashayekh, Chris Hendrickson, and Scott Matthews, Carnegie Mellon University

**Ecodriving and Carbon Footprinting: Understanding How Public Education Can Result in Reduced Greenhouse Gas Emissions and Fuel Use**

Elliot Martin, Susan Shaheen, and Nelson Chan, Transportation Sustainability Research Center, University of California, Berkeley

**Development of Sustainable Transportation Indicators for Greater Boston**

Stephanie Pollack, Kitty and Michael Dukakis Center for Urban and Regional Policy, Northeastern University; and Anna Gartsman, Northeastern University

**Travel Activity and Emissions Impacts of Implementing Transportation Control Measures**

Anjali Mahendra, Beverly Bowen, Mark E. Simons, and Kenneth Adler, ICF International

**Parametric Analysis of Technology and Policy Tradeoffs for Conventional and Electric Light-Duty Vehicles**

Dawn K. Manley, Garrett E. Barter, David Reichmuth, Jessica Westbrook, Leonard A. Malczynski, Todd H. West, Katherine D. Guzman, and Donna M. Edwards, Sandia National Laboratories

**A Roadway Wind/Solar Hybrid Power Generation and Distribution System: Towards Energy-Plus Roadways**

Jerry Hudgins, University of Nebraska, Anuj Sharma, University of Nebraska, and Wei Qiao, University of Nebraska

**Friday, November 9**

7:45 a.m.–8:30 a.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Breakfast**

8:30 a.m.–10:00 a.m., *Keck 100*

**Plenary Session: Freight Transportation—Challenges and Opportunities**

Genevieve Giuliano, University of Southern California, *presiding*

This session explores the complexities of the freight transportation industry, including factors affecting freight transportation operations, supply and demand, and opportunities to provide freight service more efficiently. Particular attention will be given to long-haul transportation and intermodal choices (especially truck and rail), and metropolitan freight transportation—the last mile, as well as emerging fuel and vehicle technologies.

**Freight Transportation Systems Overview**

Paul Bingham, CDM Smith



### **Long-Haul Freight Transportation Systems: Intermodal Choices**

Lance Grenzeback, Cambridge Systematics, Inc.

### **Metropolitan Freight Transportation**

Laetitia DaBlanc, Institute of Science and Technology for Transport, Development and Networks

10:00 a.m.–10:30 a.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Break**

10:30 a.m.–noon, *Keck 100*

### **Plenary Session: What Can Metropolitan Areas Do to Reduce Transportation Energy Consumption and GHG Emissions?**

Robert B. Noland, Rutgers University, *presiding*

What strategies might be employed by metropolitan planning organizations and local governments to reduce vehicle travel and promote the use of more energy-efficient transportation practices? Such strategies include transit-oriented development, ride sharing, telecommuting, eco driving, traffic smoothing, and other operational improvements to the transportation network that reduce GHG emissions at relatively low cost in the near term. Attention will also be given to the impact of consumer demand and demographic trends and increased energy efficiency on the viability of those strategies.

### **Land Use Policies**

Michael D. Meyer, Georgia Transportation Institute

### **Eco-Driving and Highway Operations**

Matt Barth, University of California, Riverside

### **MPO Experience**

Mike McKeever, Sacramento Area Council of Governments

Noon–1:00 p.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Lunch**

1:00 p.m.–2:30 p.m., *(See Rooms Below)*

### **Concurrent Breakout Sessions**

#### **Breakout Session 2A: Freight**

##### **Group 1 Topic: Urban Fleet Technologies and Operations, Keck 101**

Genevieve Giuliano

What strategies are available to increase fleet efficiency and operations? What is the role of local public policy (loading, truck routes, vehicle regulation) in reducing energy consumption and GHG emissions?

##### **Group 2 Topic: Supply Chains and Next-Generation Distribution Networks, Keck 105**

Lance Grenzeback

What are the implications of structural changes in supply chains and distribution networks for freight operations, energy use, and GHG emissions?

## **Breakout Session 2B: Metropolitan Areas**

### **Group 3 Topic: Data, Models, and Planning Tools for Metropolitan Areas to Create More Energy-Sustainable Cities, *Keck 109***

Michael Meyer

What data and models are needed to support policies and initiatives to reduce vehicle use, energy use, and GHGs in metro areas, while respecting the value of mobility to the economy and diverse business and household segments?

### **Group 4 Topic: Performance Measures and Policy, *Keck 110***

Robert Noland

What type of performance measures are needed to inform policy design to reduce energy consumption? What policies are most appropriate to pursue at the local or regional level?

2:30 p.m.–3:00 p.m., *Served Outside of Keck 100 with tabletop seating in Keck 101, 105, 109, and 110*  
**Break**

3:00 p.m.–4:30 p.m., *Keck 100*

### **Closing Session: Research and Data Priorities—Moving Forward to Support Sustainable Energy Transportation Systems**

Daniel Sperling, University of California, Davis, *presiding*

This session frames the research and data needs for developing sustainable energy transportation systems in the years ahead. There will be discussion of the key findings and issues identified in the conference plenary and breakout sessions. We will consider progress and challenges in pursuing sustainable transportation energy and identify the most critical research areas and topics.

#### **Key Findings of the Conference**

Michael D. Meyer, Parsons Brinckerhoff

#### **State DOT Perspective**

Paula J. C. Hammond, Washington State Department of Transportation

#### **U.S. DOT Perspective**

Kevin Womack, RITA

#### **Concluding Remarks**

Daniel Sperling, University of California, Davis