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News from ITS

Upcoming Event:
 "High-Speed Rail: Challenges and Opportunities for California," an evening symposium on California's high-speed rail plan, takes place Tuesday, October 6, at UC Berkeley's Alumni House, from 5 to 7 p.m.

[Berkeley Transportation Alumnus Named to Prominent US DOT Research Post](#) *Robert Bertini, who received his PhD in transportation engineering in 1999, has been named deputy administrator of the Research and Innovative Technology Administration (RITA).*

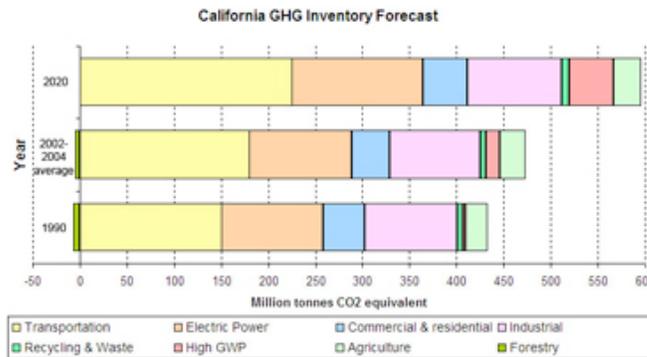
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Fall 2009: Stories This Issue

[A Message from ITS Director Samer Madanat](#)

I write these lines at the start of an academic year that promises to be very interesting for the field of transportation research and for the Institute of Transportation Studies at UC Berkeley. While the global economic recession dominates the headlines, the problems of global warming and the need to reduce humanity's carbon footprint have not been forgotten. Given the major contribution of the transportation sector to greenhouse gas emissions, especially in the U.S., opportunities for research in the field of transportation energy and sustainability abound. [More...](#)



Yellow bars mark transportation-related greenhouse gases.

[Carbon-busting strategies for California:](#)

The Transportation Sustainability Research Center recently delivered two reports to the state's Air Resources Board and the California Department of Transportation that may profoundly alter California's landscape. [More....](#)

Fresh New Faces

Thirty new transportation/planning students have begun their graduate work

at Berkeley and will be involved in transportation research projects throughout the Institute's nine research centers. They join 41 continuing students working toward master or doctoral degrees. The entering students come from China, Colombia, France, Hong Kong, India, Lebanon, Martinique, Puerto Rico, Spain, and Switzerland. Of the 16 American students, seven are from California. Meet them [here](#).

[New ITS Faculty](#)



The newest faculty member to join the ITS extended family is Paul Waddell, Professor of City and Regional Planning, and a creator of the popular [UrbanSim](#) modeling system for integrating land use and transportation modeling and planning. [More...](#)

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Fall 2009 Message from the Director

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Our research in this area was jump-started a few years ago with the establishment of the Berkeley Center for [Future Urban Transport](#) (a Volvo Research Foundation Center of Excellence) and the [Transportation Sustainability Research Center](#) (TSRC).

This year, our research in this area received a strong boost as a result of the establishment of a UC Multicampus Research Program (MRP), a joint research program with our sister institutes at UC Davis and UC Irvine, and with collaborators at UCLA, UC Riverside and UC Santa Barbara. Our MRP, entitled "Sustainable Transport: Technology, Mobility, Infrastructure" will be supported by an initial [five-year award](#) of \$6.25M from the UC Office of the President. It was selected under the University's Multicampus Research Programs and Initiatives (MRPI) through a competitive peer-review process. Funding will support cutting-edge research targeted at key state initiatives unfolding over the next few years, and the training of the next generation of transportation professionals and researchers.

Other positive developments to report include the addition of two leading experts to the transportation community at UC Berkeley. [Paul Waddell](#), known internationally for his pioneering work in modeling land use and its connection to transport demand, joins the City and Regional Planning department this fall. Paul is already involved in the mobility track of our MRP, working with Joan Walker and Caroline Rodier. And [Simon Washington](#), one of the leading authorities in the field of traffic safety analysis, joined us this summer as director of our Traffic Safety Center (TSC). Simon succeeds David Ragland, the founding director of TSC, who has led the center for the past nine years.

These exciting developments, and a large entering class of graduate students in [Transportation Engineering and Planning](#), give us much to look forward to this year!

—Samer Madanat



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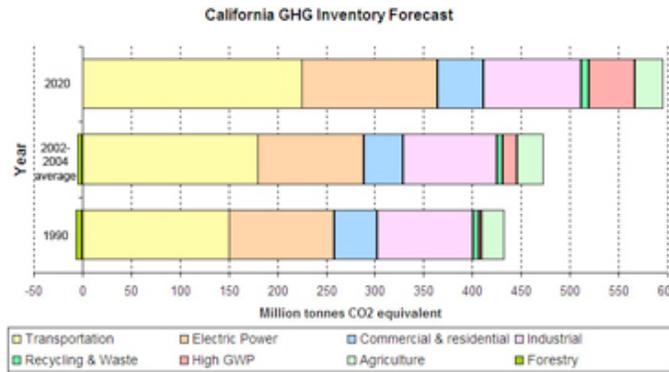
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Carbon-busting strategies for California: Transportation Sustainability Research Center helps state meet stringent emissions reduction goals



The [Transportation Sustainability Research Center](#), one of the Institute's youngest research centers, recently delivered two reports to the state's Air Resources Board (ARB) and the California Department of Transportation that may profoundly alter California's landscape in coming decades.

[Achieving California's Land Use and Transportation Greenhouse Gas Emission Targets Under AB32: An Exploration of Potential](#)

[Policy Processes and Mechanisms](#), presents strategies for cutting the state's transportation greenhouse gas emissions to 1990 levels by 2020, and to *below* 1990 levels by 2050.

[A Review of the International Modeling Literature: Transit, Land Use, and Auto Pricing Strategies to Reduce Vehicle Miles Traveled and Greenhouse Gas Emissions](#), provides answers for transportation planners, communities, and regions on how much reduction various strategies might actually produce.

Transportation accounts for the largest piece of California's emissions pie—about 38 percent. Passenger vehicles alone account for 30 percent. If no action is taken, ARB experts believe total transportation sector emissions will increase by about 25 percent by 2020.

The state's targets, established when AB 32, the Global Warming Solutions Act of 2006, was signed into law, will be tough to meet in the face of expected population growth during the same period. Currently, California's population is 38 million. That number is projected to grow to 46 million by 2030, according to the governor's office. More people with more cars means more miles driven.

Even with cleaner fuels and more stringent fuel standards for vehicles, millions of additional vehicles will make it all the more difficult to reach the GHG emission reduction goals set by the state. And in a state whose culture and landscape has been shaped and built by the automobile—from its vast freeway system to its drive-in restaurants and bedroom communities sometimes located an hour-and-a-half drive away or more from the workplace—the changes required by AB 32 are monumental.

The state of California is on a tight deadline to reduce greenhouse gas emission levels to 1990 levels by 2020. What methods will yield the best results? Two reports by researchers at the Transportation Sustainability Resource Center provide illuminating data.

In early 2008, ARB and Caltrans turned to TSRC co-director Susan Shaheen, senior researcher Caroline Rodier, and other researchers at UC Davis, to conduct a study on the land use and transportation connection relative to AB 32; this led to the two reports. Specifically, they asked them to help identify the most effective ways emissions can be reduced within the transportation sector to meet the goals mandated by 2020 and 2050 (covered under Executive Order S-3-05).

ARB is responsible for developing the California Greenhouse Gas Emission Inventory, which accounts for all greenhouse gas emissions within the state and supports the AB 32 Climate Change Program. In 2007, ARB established a 2020 GHG target of 427 million metric tons of CO2 equivalent (MMTCO2e), requiring a reduction of 169 MMTCO2e—about 30 percent—from the state's projected 2020 of 596 MMTCO2e in a business-as-usual scenario.

"Our research sponsors, ARB and Caltrans, both realized the transportation targets would be challenging to meet, and it was important for stakeholders to talk about these changes in the context of the AB 32 Scoping Plan," explained Shaheen.

"It was also important that people from different groups and different parts of the state listen to each other. This led to five statewide workshops around the

What might seem reasonable reductions to Californians living in the Bay Area, may seem unreasonable—even impossible—to those living

state as part of our research."

What might seem reasonable reductions to Californians living in the Bay Area, may seem unreasonable—even impossible—to those living in regions that are looking at considerable growth, like the Central Valley. Solutions that seem sensible to an environmentalist may be unfeasible for a builder or developer.

in regions that are looking at considerable growth, like the Central Valley.

"There are clear regional differences, and some regions are more enthusiastic than others. In the Central Valley, they're looking at growing. How do you do that without emissions? The AB 32 and E.O. S-3-05 goals can present a notable challenge to those regions," she added.

Challenges for Researchers

With a tight timeline, and working closely with ARB and Caltrans, the researchers began a three-pronged approach to the challenge.

Rodier began the task of determining order-of-magnitude estimates for policies that are likely to reduce emissions in the near term by examining and extrapolating data from national and international studies.

Employee parking pricing, for example could provide a one percent reduction in vehicle-miles-traveled (VMT) over 10 years, while pay-as-you-drive insurance policies could provide reductions in the four to five percent range. Moderate cordon pricing schemes might cut VMT by two to three percent over the long term; increased investment in transit and higher ridership may shrink VMT another one-tenth to one percent during the next 10 years, and more in future decades. Changes in land use with supportive transit alone might reduce VMT by up to six percent over the next decade.

AB-32 also places a new set of demands on the methods typically used to forecast regional passenger vehicle travel. "When these tools were originally developed, regions were asking different questions of their models back in the 1960s," she explained. "They were looking at freeway widening and other large infrastructure projects, not cutting emissions from transit-oriented development."

While efforts are underway to develop more advanced forecasting methods, the state needed a real-time analysis of the available evidence to understand what might be possible from a range of strategies available to reduce green house gas emissions.

Rodier's research was used by ARB to identify a possible reduction of emissions for regional transportation-related greenhouse gas targets from two to five million metric tons of CO₂ equivalent. This number represents an estimate of what may be achieved from local land use changes in California. ARB's work on AB 32 has given the state a head start on SB 375, an anti-sprawl bill signed into law in late 2008.

"Caroline's work has shown that if you look at Smart Growth as an enabling tool and support it with other strategies, then the magnitude of the savings in terms of emissions is going to increase," explained Shaheen.

Connecting the Dots

The researchers also undertook lengthy interviews with transportation experts, as well as workshops for a varied group that included builders and developers, elected officials, representatives of regional and local governments, and environmentalists from different locations around the state. Both the interviews and workshops provided opportunities for the researchers to hear from those most closely involved with transportation and land issues what emission-busting strategies they believed could be best utilized to meet AB 32's short- and long-term emission reduction goals.

Workshops were held in the Bay Area, Sacramento, San Diego, Los Angeles, and the San Joaquin Valley over a two-month period. In each session, the researchers asked participants to choose, in descending order of effectiveness, from five categories of reduction strategies:

- land use, such as mixed-use, transit-oriented development, construction of pedestrian and bicycle facilities;
- mobility management, such as carsharing, ridesharing, telecommuting;
- pricing strategies, such as fees, taxes, rebates based on transport mode used;
- intelligent transportation systems, such as encouraging transit ridership, bus rapid transit, adaptive signal coordination; or
- behavioral change, such as public education and marketing campaigns similar to "Spare the Air" that encourage low carbon choices.

"We handed out sticky dots and asked participants in the workshops to place them on the strategies that they felt would basically provide the biggest bang for the buck in terms of limiting VMT over different time horizons—between 10 to 40 years," explained Shaheen.

Ending Sprawl

The most significant outcome from 15 interview sessions and the five workshops was the consensus that the dominant 20th-Century pattern of single-use, automobile-dependent development—better known as sprawl—must end. There is no other way to reduce VMT—which will increase dramatically with population growth in coming decades—except by creating denser communities, implementing mixed use development, and having an orientation toward non-automobile use and public transit.

"Everyone agreed that over the long term, limiting VMT should be a high priority for meeting the requirements

of AB 32," said Shaheen.

Improvements in vehicle technology and the low-carbon fuel standard can only get the state partially to its mandated goals. The reductions they contribute will not be enough to achieve 1990 levels by 2020 if current trends in vehicle miles traveled continue.

"If people are living in a denser land-use patterns, then public transport can be much easier to access. You don't have so much difficulty with that first and last mile linkage to public transit."

Shaheen called the state's efforts ground-breaking, even historic. "California is tackling land-use planning and its relationship to greenhouse gas emissions," she said. "If we're serious about reducing emissions, we've got to get our arms around land use and transportation, as well."

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New ITS Faculty: Paul Waddell, creator of UrbanSim



A&M University.

The newest faculty member to join the ITS extended family is Paul Waddell, Professor of City and Regional Planning, and a creator of the popular [UrbanSim](#) modeling system for integrating land use and transportation modeling and planning.

Before joining the faculty at UC Berkeley, Waddell was professor in the Daniel J. Evans School of Public Affairs and the Department of Urban Design and Planning at the University of Washington in Seattle. He received his PhD in political economy from the University of Texas at Dallas, and a master's in human ecology from the University of Texas School of Public Health at Houston. He completed his Bachelor of Science degree at Texas

Much of Waddell's research focuses on the analysis and modeling of urban development, as well as the effects of major transportation investments and land policies on these processes. He was instrumental in developing UrbanSim, a software-based simulation program, which enables planners and policymakers within cities, counties, or other regions to predict the effects planning decisions will have in the future.

The powerful modeling system uses detailed data derived from a wide variety of sources, including property tax rolls, economic surveys, satellite images—even bird counts—to provide the detailed information planners need in order to forecast the effects of their land use decisions.

"Paul Waddell's expertise in transport modeling and his interest in urban economics make him a major asset to the Department of City and Regional Planning and the broad community of scholars across the university who are interested in urban and regional development," said Elizabeth Deakin, Professor of City and Regional Planning. "Paul also will help us build up our interdisciplinary Global Metropolitan Studies program, where growth and change in emerging economies are central to our concerns."

Since its original release in 1998, UrbanSim has been adopted for operational planning use in U.S. metropolitan areas such as Seattle, San Francisco, Salt Lake City, Phoenix, Detroit, and Houston, as well as by planning agencies in Europe, Asia, and Africa.

UrbanSim enables planners, policymakers and others to see on a computer screen in an animated, realistic way what cities and their neighborhoods will look like 25 years in the future if certain choices are made regarding infrastructure, land use, land preservation, street design, and numerous other factors