

The Sustainable Transportation Center (STC) supports a wide variety of research, education, and outreach activities directed toward the goal of building a sustainable transportation system. The STC is a part of the federal University Transportation Centers program with funding from the U.S. DOT and Caltrans.

HOW GREEN IS OUR VALLEY? STC Report Tracks City Growth Policies



Example of ground floor retail with living space above
Photo Credit: Dave Shpak

Across California's fast-growing Central Valley local governments face competing pressures to develop open space to accommodate population growth while enhancing economic, environmental, and social sustainability. The need is even more urgent as cities and towns respond to SB 375, the nation's first law to control greenhouse gas emissions by curbing sprawl.

In a new UC Davis Sustainable Transportation Center study, "Achieving Sustainability in California's Central Valley," researchers developed a sustainability index based on 50 different measures such as land use and zoning rules, and transportation. The researchers then used that index to study the policies of 100 Central Valley cities and towns. They also conducted case studies of seven cities and offered suggestions for making the region grow green.

Lead author Mark Lubell, an associate professor of environmental science and policy, defines sustainable growth as growth that minimizes environmental impact while meeting goals for economic viability and quality of life, for both present and future generations.

"Our study identified some very serious obstacles to achieving the goal, but also identifies some variables and recommendations that might help, says Lubell." The report's recommendations include the following:

- Stop relying on big-box stores and sprawl for city revenues – even if it means revisiting Proposition 13. Dependence on retail sales tax and new development fee income discourages policies that restrict growth or encourage infill development. Many cities view growth as the only way to balance budgets because Proposition 13 limits property tax increases.
- Act now. State policies should put a high priority on those cities that are now growing fast and may be making irrevocable decisions about their future.
- Focus city general plan updates on sustainability from the start. The vision should encompass environmental, economic, and social issues.
- Establish a city sustainability program with a dedicated budget and staff.
- Keep learning. Help city staff benefit from others' experiences through conferences, training, and online peer networks. Spread knowledge through community meetings. Engage the public and make use of academic experts.

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GREENER HIGHWAYS: Pavement Center Research Saves Time, Money, Materials



Pengcheng Fu at work on SR33 in Colusa County, the first Caltrans project using FDR-foamed asphalt

“Reduce, reuse and recycle” apply increasingly to the highway construction and repair approaches used by the California Department of Transportation and local governments, supported by the research and development assistance that the UC Pavement Research Center (UCPRC) provides. The UCPRC, a joint project with UC Berkeley now based at UC Davis, is headed by John Harvey, a professor of civil and environmental engineering at UC Davis.

Conventional rehabilitation of badly damaged highways involves tearing up the old road and trucking the pieces away to a landfill or recycling plant, then using a lot of virgin materials, which take an enormous amount of energy to process, for the new road. In addition to environmental concerns, the estimated cost of rehabilitating the state’s highways this way is about \$1 million per lane-mile.

Now, a pavement recycling technology enhanced by UCPRC research is gaining favor. It combines a process called in-place, full-depth reclamation with foamed asphalt as a stabilizing agent. “FDR-foamed asphalt” as it’s called, is promising because it breaks up the old pavement in place, then reuses it by mixing it with foamed asphalt. In addition to being a greener and less costly way to rehab roads, the whole process takes less time, thus minimizing construction-caused traffic headaches.

UC Davis Ph.D. candidate Pengcheng Fu has worked for the last five years with UCPRC director Harvey and research scientist David Jones on sustainable pavement rehabilitation technologies. Fu’s dissertation research, sponsored by Caltrans and funded in part by a grant from the Sustainable Transportation Center, is a key component of a recently completed comprehensive UCPRC project for Caltrans on FDR-foamed asphalt.

Fu’s research identifies important characteristics affecting strength, stiffness, curing, and mixing of foamed asphalt materials. FDR-foamed asphalt has been in use for a few decades, Fu explains, but pavement engineers in the past designed and analyzed it using methods adopted for other pavement materials. Misunderstanding its unique characteristics had led to some incidences of premature failure, he says.

“In our study we did a comprehensive investigation and gave proper consideration to many of the unique features of this material,” Fu explains. These fundamental findings have enabled Caltrans to implement this resource-, energy-, and money-saving road rehabilitation approach with greater confidence and a higher success rate.

Fu credits the support he received from the Sustainable Transportation Center with enabling him to explore some unconventional techniques to study this material. In addition to supporting his research, the STC has provided a seed grant to develop a Web site to enhance researchers’ understanding of this technology, inform pavement engineering practice, and promote discussion of further advances in the technology. The site is expected to be completed in December.

The Center’s work for Caltrans received front page coverage recently in local newspapers including [The Sacramento Bee](#).

STC AWARDS: Faculty Research and Student Dissertations

Each year, the STC offers grants for student dissertations and faculty research projects that advance research and education in sustainable transportation. The following awards were announced for the 2009-2010 academic year.

Dissertation Awards

Peter Tittman, Geography

“Evaluating Life-Cycle Greenhouse Gas Benefits of Biofuel from Forest-Based Biomass”

Yan Xing, Transportation Technology and Policy

“Contributions of the Physical and Social Environment to Bicycling: A Structural Equation Modeling Study”

Faculty Research Grants

Alison Berry

“Improving Soil Infiltration of Runoff and Pollutants along Road Edges by Soil and Vegetation Management Strategies”

Yueyue Fan

“Multistage Network Design for Sustainable Transportation System Planning”

Susan Handy

“An Exploration into the Nature and Formation of Bicycling Preference and Comfort”

Susan Ustin

“Predicting Wildlife Movement Associated with Road and Highway Systems”

Michael Zhang

“The Optimal Coarse Toll for Heterogeneous Commuters in the Morning Commute”

Pat Mokhtarian

“How Do Commuters React to a Temporary Freeway Closure? An Evaluation of the Fix I-5 Project in Sacramento, California”

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