



## SUSTAINABLE MOBILITY AND CITIES: MARRYING TECHNOLOGY AND POLICY

Policy Overview prepared by Elisa Barbour

### CAN WE “MARRY” TECHNOLOGY TO TRANSPORTATION SUSTAINABILITY?

The University of California Transportation Center hosted a conference in Berkeley on February 23-24, 2012, that brought together a diverse group of scholars, planners, and private sector thinkers to discuss emerging issues in technology, transportation systems management, and sustainability planning. This policy overview presents key topics, issues, and concerns discussed during the event.



Figure 1. Apps make smart parking and adaptive meter pricing practical.  
Photo credits: Bay City News Service; Androidfreeware.net; SFPark

UC Berkeley’s Robert Cervero welcomed conference participants by noting that advances in technology present opportunities and challenges for sustainable transportation. For example, wireless mobility applications which utilize Global Positioning System (GPS) information can facilitate sustainability techniques such as ridesharing and transportation pricing programs, while in turn, public policy sometimes helps ensure that new technologies such as cleaner fuels and vehicles can succeed in the marketplace. Participants were encouraged to consider such synergies but also possible points of tension between public and private goals and practices in regard to “marrying” new technologies to sustainability outcomes.

The first panel addressed the potential of new mobility applications (“apps”) for smartphones to provide consumers with real-time travel information. They have the potential to alter travel behavior significantly. Panelists described apps including Waze, Google Transit, and Roadify that alert transit and car users to schedules, congestion

delays, and alternate route and mode options, often through crowd sourcing. While some apps could make transit more attractive, others that direct drivers to congestion-free routes could induce more driving.

Transportation pricing techniques (including time-of-day pricing for road access and parking, as well as flat cordon pricing) were addressed in the second panel. They work by internalizing the external costs of driving (e.g. environmental effects) to produce revenue that can be used to offset the impacts and to pay for upkeep of roadways. New technologies can make it easier for these charges to be levied on consumers. One example is SFPark, which uses advanced technology to monitor parking demand and adjust meter rates. Another example, is mileage-based pricing, which has been piloted in Portland, OR.



Figure 2. Carsharing and bikesharing stations.  
Photo credits: Sean Fisher; Flickr



Panelists were quick to note that in spite of gains in efficiency of pricing technologies, the public remains highly resistant to increasing the cost of driving, although acceptance of roadway pricing is higher when the revenues collected are spent on enhancing alternative modes. With transportation emissions constituting one-third of U.S. greenhouse gas emissions (GHGs) that contribute to climate change, a pressing question for conference participants was whether technology can bring transportation's share of GHGs down to the levels needed to reverse climate change. They are widely considered insufficient on their own, unless technology can facilitate the use of alternatives to private vehicles.

Two conference panels considered these questions: how can technology enhance fuel and vehicle efficiency and help promote adoption of cleaner modes? Hybrids and plug-in electric vehicles can reduce GHGs significantly, but adoption is hampered by relatively high costs compared to conventional vehicles. Batteries are the main reason costs are high, and adoption rates will increase only when battery costs fall. State and national CAFÉ standards can level the playing field between conventional and cleaner vehicles to help make this happen. Programs such as carsharing and bikesharing can reduce car use and promote non-motorized modes, and they have been aided by new technology that improves consumer access and logistics. Another burgeoning use of mobility apps is for ridesharing—forms of carpooling ranging from pre-arranged to dynamic and intermittent.

## CROSS-CUTTING ISSUES AND CONCERNS

Conference participants discussed opportunities and concerns related to technology and policymaking, including:

- Opportunities for enhancing public-private collaboration in data sharing and coordination,
- Challenges posed by differing priorities of private firms versus public agencies,
- Need for an overarching systems view in managing data and establishing standards, and
- Challenges faced by public agencies in keeping up with and addressing technological change.

In terms of private-public co-benefits, mobility apps depend on high-quality, integrated public data for travel route maps and transit schedules, while in turn, public agencies can benefit from the vast new amounts of travel data being generated through these apps. App-derived data can help fill in gaps in public data on traffic patterns, congestion levels, and incidents more cheaply than traditional data-gathering techniques. The potential for co-benefits has led to some important private-public partnerships, such as the collaboration of Google with Portland's TriMet to launch Google Transit.

Private firms often have different priorities, resources, and timeframes than public transportation agencies. Mobility apps firms, for example, prioritize immediate benefits for individual consumers through easy-to-use interfaces, while public agencies are more concerned with managing entire transportation systems for the long run, although they often lack resources for data collection, analysis, and integration. These differing orientations signal the potential for mutually beneficial collaborations, but also certain tensions.

Panelist Jose Moscovich of the San Francisco County Transportation Authority noted that the public sector has been unable to keep pace with what he called a "tsunami" of innovation in transportation technology. Some participants pointed to an associated "disconnect" between private and public motivations and timeframes for using traveler information. Christopher Harrelson of Google Transit noted that although public agencies could benefit from app-derived data, mobility information firms are not in business to sell data. Others noted a discrepancy between the short-term focus of private firms on current market dynamics and the long-term planning focus of public agencies. The emphasis of public agencies on consistency and consolidation in data collection and dissemination was contrasted with the flexibility valued by firms producing a wide variety of differentiated products.

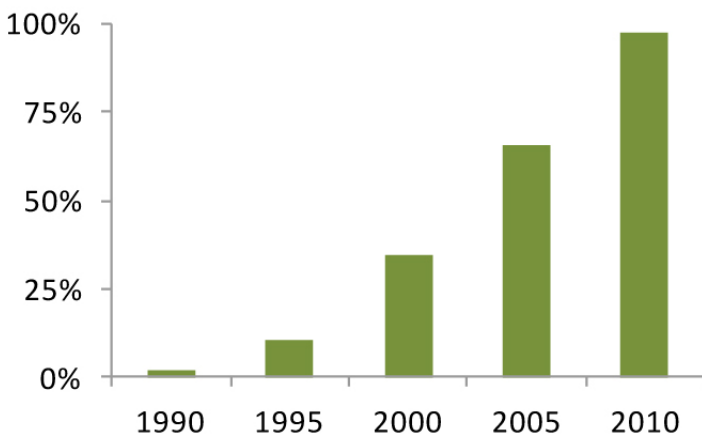


Figure 3. Percent of U.S. population with wireless subscriptions. Source: CTIA, the Wireless Association

The question of standardization in data collection and dissemination practices was discussed as one possible point of convergence between public and private sector interests. Some participants argued that public institutions can play an important role in promoting standardization to enhance scalability and interoperability of mobility apps across data platforms. For example, Raja Sengupta and Alexandre Bayen of UC Berkeley explained how UC Berkeley’s Partners for Advanced Technology (PATH) program helps facilitate standardization, even as it also helps incubate new technologies and promotes information-sharing. PATH works with universities, private firms, non-profits,

and state and local agencies to test new technologies and applications and metrics and standards that could be diffused to enhance scalability. Bayen, Scott Kolber from Roadify, and other participants underscored the need for new institutional and legal venues to promote further integration and coordination of this sort. Panelist Axel Reissnacker from Siemens reinforced this message by noting that private engineering firms oriented to large-scale transportation systems derive great benefit from clear standards established by the public sector.

Some participants raised questions about the purpose and need for public regulation in addressing the use of mobility apps. Adib Kanafani from UC Berkeley asked: What will happen to driving behavior if most travelers come to use apps that re-direct traffic on a real-time basis? In that context, public regulation could prove to be quite challenging. In the presence of under-priced externalities, such as car emissions contributing to climate change, maximizing individual trip efficiency may not always coincide with maximizing social welfare through improved network efficiency. Given different public and private priorities and practices in use of travel information, Moscovich questioned whether crowdsourcing can provide an effective basis for optimizing entire network systems. Concerns include how and whether crowdsourcing information can promote transit use if transit service levels are not improved, and how to address privacy and sampling coverage concerns inherent in using app data.

Some participants connected concerns about differing private and public goals to the importance of enacting pricing policies to ensure that travel markets are not distorted by under-priced externalities. If and when travel prices reflect full social costs, greater convergence is possible between individual and wider social benefits from trip efficiency strategies. Along these lines, Cervero asserted that proper pricing lays a basis for any and all effective policies. Similarly, Chris Ganson, from the Governor’s Office of Planning and Research, argued that pricing induces program and behavior changes by embedding full costs of travel in market and policy choices.

Participants advocated various objectives for public agencies to consider in managing and using traveler information and new technology. These objectives included “getting out of the way” (in the case of policies that now inhibit travel efficiency or reduce innovation); learning more about private-sector business models and being more responsive to market dynamics; coordinating with private firms in developing metrics for information quality and processes for information exchange; framing information strategies within wider sustainability objectives for facilities investment and land use; addressing equity concerns related to access to digital technology; and promoting congestion pricing more assertively. Kanafani summed up the take-away message of the conference in noting that new technologies open up important opportunities for influencing and understanding travel behavior, but the public sector has not yet developed the necessary policy mechanisms to address the implications.

## POLICY RECOMMENDATIONS

Support pricing strategies that maximize individual travel benefits without undercutting network efficiency.

Ensure that information benefits transportation consumers and providers.

Support pilot projects in which public agencies use new technologies and data, such as:

- Integrating infrastructure management such as ramp metering with mobility app information;
- Coordinating demand-responsive bikesharing with access to transit; and
- Monitoring of regional travel behavior using GPS-enabled mobile phones.

---

## PARTICIPANTS

**Robert Arnold**, Federal Highway Administration

**Alexandre Bayen**, UC Berkeley

**Scott Belcher**, ITS America

**Dena Belzer**, Strategic Economics

**Damian Breen**, Bay Area Air Quality Management District

**Carlos Castellanos**, East Bay Asian Local Development Corporation

**Robert Cervero**, UC Berkeley

**Tilly Chang**, San Francisco County Transportation Authority

**Dan Chatman**, UC Berkeley

**Christopher Cherry**, University of Tennessee, Knoxville

**Nancy Chinlund**, California Department of Transportation

**Melanie Crotty**, Metropolitan Transportation Commission

**Elizabeth Deakin**, UC Berkeley

**Tom Durbin**, UC Riverside

**Di-Ann Eisnor**, Waze

**Ethan Elkind**, Center for Law, Energy, and the Environment

**Phil Erickson**, Community Design + Architecture

**Karen Trapenberg Frick**, UC Berkeley

**Chris Ganson**, Governor's Office of Planning and Research

**Logan Grizzel**, Toyota

**Chris Harrelson**, Google

**Adib Kanafani**, UC Berkeley

**Scott Kolber**, Roadify

**Ken Laberteaux**, Toyota

**Timothy Lipman**, UC Berkeley

**Jose Luis Moscovich**, San Francisco County Transportation Authority

**Sean O'Sullivan**, Avego

**Steven Raney**, Ultra Global PRT

**Bill Reinert**, Toyota

**Axel Reissnecker**, Siemens Industry, Inc

**Jean Roggenkamp**, Bay Area Air Quality Management District

**Samitha Samaranayke**, UC Berkeley

**Bill Satariano**, UC Berkeley

**Raja Sengupta**, UC Berkeley

**Susan Shaheen**, UC Berkeley

**Daniel Simon**, Asia Society of Northern California

**Alex Skabardonis**, UC Berkeley

**Pravin Varaiya**, UC Berkeley

**Martin Wachs**, UCLA and RAND

**Steven Weissman**, UC Berkeley

**James Whitty**, Oregon DOT

**Allison Yoh**, UCLA

**Jessica Zenk**, Silicon Valley Leadership Group

---

This is a Policy Overview from the third conference in the Sustainable Cities series held in 2011-2012 at UC Berkeley, organized by Berkeley Law, the College of Environmental Design, the Institute of Urban and Regional Development, the University of California Transportation Center and the Berkeley Program on Housing and Urban Policy. The Ted and Doris Lee Fund sponsored the series.



**BERKELEY PROGRAM ON HOUSING AND URBAN POLICY**



UC  
**BERKELEY**  
ENVIRONMENTAL  
DESIGN

**BerkeleyLaw**  
UNIVERSITY OF CALIFORNIA



Sustainable Cities Conference Series, UC Berkeley, 2011-2012  
Policy Overview PO 02-2012