



WHITE PAPER

Smart Mobility for a 21st Century America

Strategies for Maximizing Technology to Minimize Congestion,
Reduce Emissions and Increase Efficiency

A White Paper by Transportation for America,
ITS America, the Association for Commuter
Transportation and the University of
Michigan's SMART Initiative.

October 2010

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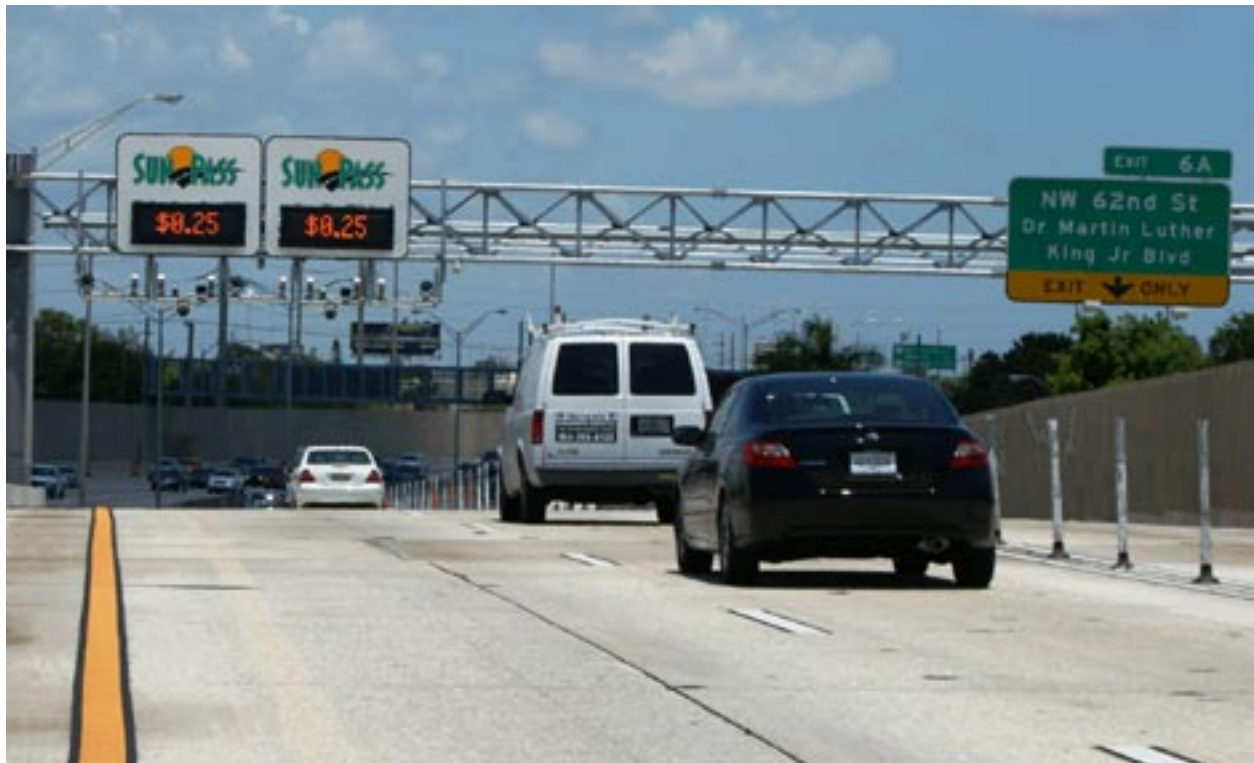
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Executive Summary

Improving transportation efficiency through operational innovation is critical as our population grows and ages, budgets tighten and consumer preferences shift. Now, as Congress prepares to review and reauthorize the nation’s transportation program, an array of innovations that were either overlooked or did not exist at the time of previous authorizations can be incentivized.

Case studies here and abroad show how savvy investments can help the U.S. save money while reclaiming world leadership in developing a transportation network for the 21st century. Smart technologies are available to improve travel efficiency, provide accurate real-time information, make pricing and payments more convenient, and customize travel to meet individual needs.

But these innovations require systematic deployment throughout the transportation system and across the country in order to be most effective. As Congress moves forward with a comprehensive transportation bill, this report shows how establishing national targets for reducing congestion and emissions through programmatic changes and funding incentives can accelerate the development and implementation of innovative, new information systems and technology solutions.



Express lanes using the SunPass technology in Florida. Photo courtesy of the Florida Department of Transportation.



A reporter from KING 5 TV reports from inside the Traffic Management Center at The Seattle Department of Transportation during the evening news coverage of the 2008 Seattle snowstorm. Credit: Flickr user viriyincy. <http://www.flickr.com/photos/viriyincy/3120052318/>

Introduction

Astounding advances in technology — from smart phones, to smart networks, to high-speed broadband — are transforming lives in ways unthinkable just a few years ago. Digital communication allows movement around the virtual world in an instant.

But current technology has yet to reach its potential to move us around the physical world. Rather than unleashing powerful capabilities to improve the transportation system as a whole, technology is applied today primarily to make individual vehicles more “high tech.”

This paper will explore strategies for using existing and emerging technologies to minimize congestion, reduce emissions, cut spending, create jobs and improve efficiency, all while expanding convenience, safety and mobility.

Just as the Internet, smart phones and social media changed the way we acquire news, listen to music or connect with friends and family, these same innovations have implications for how we move around. While high-tech gadgets can be a problem when they distract motorists from driving, they open up a whole new world for people using other modes. From the comfort of a bus or train, for example, one can surf the net, text friends or send e-mail to the office, all while

traveling from point A to point B. But what if we could manage traffic to help drivers avoid congestion before they get stuck in it? What if you always knew when the next bus was going to arrive, the closest parking space or which train car had a seat available for you?

We are at a point where advancements in physical and digital infrastructure can work hand in hand, positioning us to develop intelligent and forward-thinking solutions for our transportation systems as a whole.

Yet we have only just begun to unleash these technological capabilities on the U.S. economy. A great deal more is possible.

Innovation leaders such as Japan, Sweden, South Korea and increasingly China are leaping ahead of the United States with technologically advanced transportation networks that reduce emissions and cut travel times. However, the U.S. can catch up and reclaim our role as an innovation leader if we make the kind of national commitment we have made in the past to build cutting-edge infrastructure, from rural electrification to the Interstate Highway system.

As Congress prepares to review and reauthorize the nation's transportation program, this paper makes the case for emphasizing technology and innovation to solve our nation's most critical transportation problems.

The U.S. transportation system is the engine of our economic competitiveness, providing access to schools and jobs, delivering just-in-time products, maintaining security, encouraging healthy active lifestyles, allowing first responders to tackle emergencies, promoting tourism, facilitating business, and ensuring smoothly operating thoroughfares so people

can get where they need to go.

As our population grows and ages, budgets shrink, and consumer preferences shift, we need a new vision for a faster and smarter 21st century America to make better use of our resources. The innovations presented here show how to get the most for our investment as we adapt to new circumstances and opportunities.



Cars and trucks travel in the high occupancy toll lanes on Washington's State Route 167, where tolls vary with demand to keep traffic flowing. Photo by Wash. Department of Transportation. <http://www.flickr.com/photos/wsdot/4986569059/>

Innovative Technologies and Strategies

No single mode of travel can possibly meet the mobility needs of our increasingly complex world, in which the watchwords are “options,” “efficiency,” and “flexibility.” Across the globe, a transformational wave of ingenuity and technological innovation is taking hold.

While improvements to vehicles and cleaner fuels are the most talked-about technological innovations, an abundance of other smart technologies are available to improve travel efficiency, provide accurate real-time information, and customize travel to meet individual needs. These innovations are grouped into five categories.

INCREASED EFFICIENCY

1. Making transportation systems more efficient. Ensuring that the resources we’ve already invested in are fully utilized is the first step. Already, many regions use digital technologies to collect information about highway networks and manage the flow on and off of major road facilities. For example, by controlling “ramp meters” and synchronizing traffic lights, Minneapolis-St. Paul was able to increase freeway volume nine percent and increase peak period throughput 14 percent.

In Detroit, Michigan, advanced traveler information systems, highway advisory radio, ramp metering, and variable message signs increased average vehicle speeds by 5.4 mph, decreased trip times by 4.6 minutes, and reduced commuter delay by 22 percent. Technologies that pre-empt traffic signals

can also improve travel times for bus rapid transit and light rail. More broadly, IT systems are beginning to integrate transportation networks and services.

TRAVEL OPTIONS

2. Providing more travel options. Before the Internet, providing services to help people share cars or rides was cumbersome, if not impossible. Now, on-line databases can be used to match riders to van pools and car pools, and to support car-sharing and bicycle-sharing services that allow one person access to a variety of cars or bikes any time of the day or night.

These allow for on-demand reservation of the vehicle type needed, at just the moment they are needed. In the Denver metropolitan area, vanpools offer an alternative to driving for groups of commuters who live and work near each other, and who travel more than 15 miles to work. Vanpooling also allows an opportunity to save money by splitting a low monthly fare.

BETTER INFORMATION

3. Providing travelers with better, more accurate, and more connected information. The more information people have, the more efficiently they can plan their travel and choose and connect the modes and services and routes that best suit their circumstances. Computerized vehicle tracking and information delivery can let public transportation riders know in real time — via electronic signs, smart phones or other means — exactly when to expect their bus or train.

Users of the Advanced Traveler Information

Service in the Washington, DC region were able to reduce the frequency of early and late arrivals by 56 and 52 percent, respectively. Bicyclists too can use personal technology to find safe and efficient bike routes in unfamiliar places, and to connect up with a wider range of transportation options door-to-door.

PRICING & PAYMENTS

4. Making pricing and payments more convenient and efficient. When resources are scarce or in high demand, pricing is one of the best ways to allocate their use. This is true of parking, where smart meters can vary prices by demand to always keep a minimum of spaces vacant, and collect fees using a wide variety of payment media. Variable tolls can help to regulate the flow on freeway lanes. The New Jersey Turnpike Authority reports that their EZ Pass system reduces toll station traffic delay by 85 percent.

Electronic benefit cards can be a convenient way for low-income people to pay for a variety of subsidized goods, including public

transportation, with a single card or their phone.

TRIP REDUCTION

5. Reducing trips and traffic. Sometimes the most efficient trip is the one not taken. A growing number of Americans use technology to work from a variety of remote locations, allowing them to shift their commutes to times when there is less traffic or avoid traveling to an office altogether. Employers at the national retailer Best Buy famously increased company savings by letting employees set their own hours and decide when, where, and how to get their jobs done. An infinite variety of work arrangements are now available to many Americans, who may use more than one in any given week.

Eliminating trips is not only limited to work. You can now access banks, shopping, medicine, and education services online or over the phone, which can help us do things without going out the door. Smart technology helps users make wise choices about when, where, how and whether to travel.



The SmartTrip cards used by the Washington Area Metropolitan Transit Authority store value to be used for trips and can be recharged via deductions from employee paychecks through the SmartBenefits system. Photo by Flickr user Mr. T in DC: http://www.flickr.com/photos/mr_t_in_dc/2514037043/

A Vision for Next-Generation Infrastructure

Modern transportation is a “system of systems” — a network of modes, services, technologies, and designs that operate as a seamless intersection of options, that conveniently link walking on the sidewalk, with riding a train, driving a car, or using technology to avoid or consolidate trips.

In the 1950s, developers and programmers of huge mainframe computers that would fill a whole warehouse may have never imagined that a device like the iPod would one day connect with the Internet, or that a DVR could be programmed from a cellphone to record a football game. In much the same way, highway traffic engineers of the 1950s likely saw private cars, interstates, and highways as the solution to the nation’s congestion problem. They couldn’t have imagined the multi-modal, door-to-door transportation networks and options that are possible and taking shape today. As times have changed, so should the tools used to address the problem, equating the 21st century with a much wider menu of seamlessly connected and customized options – just like our IT portfolios.

Visionary leaders around the world are investing in systems like these that link multiple options of travel, offer real-time information on arrival and departure times, provide incentives to travel at different times of day, and allow for streamlined ways to pay for it all. For the person traveling, this makes sense. We all desire options for getting around whenever we choose, safely and efficiently.

What does “intelligent transportation” mean?

Intelligent transportation systems (ITS) are integrated information, telecommunications and computer-based technologies used to make infrastructure and vehicles safer, smarter, and interconnected.

While intelligent transportation systems (ITS) have begun to yield significant benefits, the full impact has yet to be realized because many technology solutions have been deployed in discrete segments rather than integrated throughout the whole system of transportation networks. For example, where high-occupancy toll (HOT) lanes or automated weigh stations are used today, congestion is reduced at points along specific corridors. However, the larger transportation grid remains largely unaffected. This is comparable to thinking about the first few years after computers were invented. After its debut, the computer was noted for its technological advances, but did not truly become a game-changer until their presence was ubiquitous in homes and the Internet allowed individual components, data sources, and networks to connect in a seamless, interoperable way.

Similarly, the United States needs to adopt an aggressive plan to incorporate technologically advanced solutions throughout the transportation system in order to leverage existing capabilities and create a seamless, interoperable network. It won’t be enough to install innovations in isolation.

More and Connected Choices, for More People

The technologies discussed here are not being developed and deployed for their own sake, but because they address the very real needs of growing and diverse population.

Here are a few examples:

Sarah is a single mom living in a small town about 100 miles from her job near a major metropolitan area. Every morning, she takes her children to the school bus pick-up location and waves good-bye before driving into town and parking at the train station. Today, she decides to walk down the street to pick up a coffee and checks her smart phone to see how full the next vanpool shuttle is and when it will leave. Knowing she has some extra time, Sarah picks up a paper and chats with the shop owner a few extra minutes before settling in for an early ride to work.

Deciding which family member to call for rides used to be a problem for John, an 70-year-old man living in Montana, but not anymore. Now when he books an appointment with his doctor online, he also receives a list of options for getting to the office — including vanpools, a medical shuttle and public buses. The morning of the appointment, John forwards the appointment time and location to his ride sharing provider and receives confirmation that he will be picked up downstairs. John is confident that he will arrive at the doctor's office on time because the ridesharing service takes into account traffic patterns and maps the best routes in real-time. John books the trip and starts getting ready. As an added bonus, this service was made particularly cost effective when he donated his vehicle to the service after realizing he was no longer able to drive.

Marisa is a young economist rushing to prepare for a meeting across town but confident that she will make the appointment on time, despite frequent congestion downtown. Just 12 minutes before the meeting, her smart phone alerts her that she should leave now to be on-time, based on current traffic conditions and signal timing. Marisa walks out of her office and waves her wallet past a sidewalk hub to unlock a shared bike already adjusted to her preferred size. After stuffing her briefcase in the large basket on the back, she bikes 15 blocks across town on bike lanes to her meeting, dropping the bike in another hub outside their office.

Why Now?

A transformational shift has been happening just under the radar for many years. The aging U.S. population, shrinking household size, coupled with the younger generation's demands for mobility options, as well as shifts in the global economy, require a new approach to transportation planning in the 21st century.

Increasingly, the freedom that many people once found in a car is now met by digital technology that allows for virtual connectivity. Transportation planning, design, and operations, all of which have been historically marked by competing interests, incompatible technologies, and disparate systems, traditionally lacks a regional vision.

Though this is changing, fully 85 percent of Americans still believe that transportation decision-making is based more on politics than on actual need.¹ Since the key to more efficient transportation is connecting rather than competing systems, these barriers have prevented the kinds of innovation and practical design that could provide a rich and seamlessly connected variety of mobility options. In addition, many cities lack the resources and capacity for significant new highway and transit transportation infrastructure, and virtually all state and local agencies lack the funding to keep up with even maintaining existing transportation infrastructure.

Changing demographics

It is no secret that the Baby Boom generation is nearing retirement age and will require smarter alternatives to get around. In 2007, there were 31 million licensed drivers aged 65 and older in the United States. People 65 and older are the fastest growing demographic in the United States, and, by 2030, a quarter of all licensed drivers will be in that age group. Boomers will begin turning 65 in 2011, and by 2030, one out of five drivers will be 65 or older — up from one in eight drivers today.

The risk of being injured or killed in a motor vehicle crash increases as you age; an average of 500 older adults are injured every day as occupants of motor vehicles. Though motorists older than 70 drive far less frequently than other age groups, they already account for an outsized proportion of fatalities, according to the National Highway Traffic Safety Administration. The death rate per mile traveled for drivers over 85 is four times that of the 30-59 age group. Only teens rival that fatality rate.

Further, recent trends in home location among older adults indicate pent up demand for walkable communities and a more active lifestyle. A Robert Charles Lesser & Co (RCLCO) survey conducted in 2009 found that 75 percent of retiring baby boomers stated that they wished to live in mixed use, mixed age communities.²

Integrating transportation options with technology solutions should be a major priority for communities working to make getting out, staying active and traveling safe easier for people of all ages. As a bonus, this is also more cost-effective both for the user

1. Survey conducted on behalf of Building America's Future (BAF) by Public Opinion Strategies and Greenberg Quinlan Rosner Research June 30 – July 2, 2009 among 800 adults. This study has a margin of error of +3.46%.

2. McIlwain, John. Urban Land Institute. "Housing in America: The Next Decade." January 20, 2010.

and the operator of the system.

Digital Revolution

On the other end of the age spectrum, the younger generation also demands new and different ways to travel. In 1978, nearly 50 percent of 16-year-olds and 75 percent of 17-year-olds in the U.S. had their driver's licenses, but by 2008, only 31 percent of 16-year-olds and 49 percent of 17-year-olds had licenses, with the decline accelerating rapidly since 1998. Of course, many states have raised the minimum age for driver's licenses or tightened restrictions; still, the downward trend holds true for 18- and 19-year-olds as well and those in their 20s.³

While the share of automobile-miles-driven by people 21 to 30 fell in the U.S. to 13.7 percent in 2009 from 18.3 percent in 2001 and 20.8 percent in 1995,⁴ it is not just new drivers driving less. Members of this highly networked generation demand quick and convenient ways to travel, are less interested in maintaining a car than previous generations, and are more concerned with maintenance and fuel costs.⁵ They are also more environmentally conscious. A RCLCO survey in 2008 reported that 77 percent of this generation desires to live in an urban environment, and that they would rather walk than drive to services, places to meet, and workplaces.⁶ This demand to live near urban conveniences — whether in big cities,

growing suburbs or small towns — will also drive the need for a smarter, more efficient transportation system.

Finally, the knowledge economy, in which workers and businesses connect around the world, is changing the global marketplace. The ability to work from home, or “web commute”, is increasingly possible for many people. As of 2004, 20.7 million persons (or 15 percent of total non-agricultural employment) did some work from home each week as part of their job.⁷ A 2007 survey released by Citrix found that 41 percent of small business owners work from home or an offsite location on a regular basis, 62 percent of workers who cannot work off-site would like to, and 70 percent of workers ages 18 to 34 would like to work remotely.⁸

Natalie Perez-Duel, a 16-year-old junior at Albert Einstein High School in Kensington, Md., has yet to take driving classes and does not know when she will. She is already squeezing in AP and International Baccalaureate classes, dance, proms and a school play so “It’s one more thing to study for, and it’s just a hassle,” she says.

Washington Post: “More teens are choosing to wait to get driver’s licenses.” Jan. 24, 2010.

3. Advertising Age. Is Digital Revolution Driving Decline in U.S. Car Culture? by Jack Neff. Published: May 31, 2010. http://adage.com/digital/article?article_id=144155

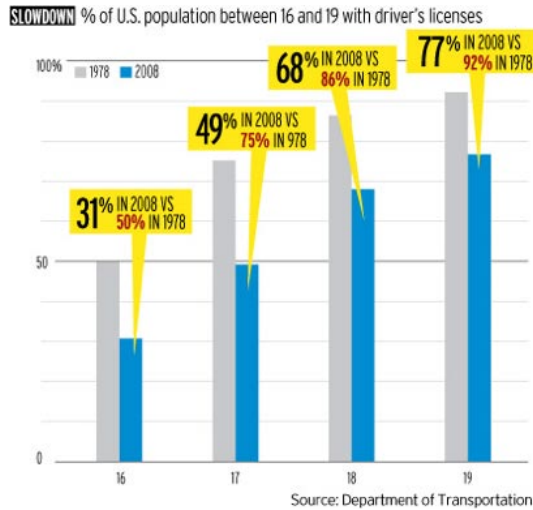
4. Federal Highway Administration's National Household Travel Survey. 2009.

5. J.D. Power and Associates. “J.D. Power and Associates Reports: Associations with NASCAR and Action Movies Fuel Online Conversation about Chevrolet and Dodge Among Generation Y.” 2009

6. Ibid.

7. Bureau of Labor Statistics. “Work at Home in 2004.”

8. Citrix Systems. “The Rise of the Web Commuter: Citrix Survey Reveals 23% of Americans Are ‘Working From Anywhere’ — 62% Wish They Could.” Nov 27, 2007.



Global Economic Demands and Benefits

The strategies presented in this report can help squeeze more efficiency from the existing system while saving taxpayers and consumers money. They can also help meet the growing travel needs of a changing nation and a global economy.

Other countries have generated significant economic benefits by prioritizing the integration of new technology solutions throughout their transportation systems. A recent report by the nonprofit, nonpartisan Information Technology and Innovation Foundation found significant results from the “whole systems” approach taken by Japan, South Korea, Singapore, and other leading Asian and European nations. While some technology solutions can be deployed locally and prove effective, such as timing traffic signals, the vast majority of ITS applications—and certainly those that offer the greatest potential to deliver the most ex-

tensive benefits—need to operate at a larger scale. By adopting information systems throughout the transportation network and matching them with the demands of individual users throughout a state or region at the same time, other countries have increased system inter-dependency, network effects, and system coordination over the more gradual adoption of technological innovations in the US.⁹

Japan achieved its 2010 goal of reducing CO₂ emissions by 31 million tons below 2001 levels, with 11 million tons of emissions savings coming from improved traffic flows on their highways and roads, and another 11 million tons eliminated by encouraging drivers to use their vehicles more efficiently through “eco-driving.”

South Korea estimates that there has been a \$1.3 billion benefit by implementing its Hi-Pass electronic toll collection system, a technological innovation that reduces travel time, expenses, environmental pollution, and operating costs — a benefit-to-cost ratio of over 10 to 1. South Korea has also gen-



London photo by Flickr user: eliotreeves
<http://www.flickr.com/photos/eliotreeves/3873747441/>

9. Stephen Ezell. Information Technology and Innovation Foundation. Explaining International IT Application Leadership: Intelligent Transportation Systems. January 2010.

erated more than \$100 million in benefits each year from both its Traffic Management System and by providing real-time traffic information to drivers and transit riders through in-vehicle navigational units, the Internet, mobile phones, and radio.

Technology solutions can provide cash-strapped states and local governments with critical transportation financing options and cost-effective long-term system solutions. Global cities like Singapore, Stockholm, Oslo and London have reduced traffic congestion and emissions through technology adoption and integration such as electronic toll collections, high-occupancy toll (HOT) lanes, dynamic payment systems like congestion pricing, smart cards, and a vehicle-miles-traveled user fee that can vary by pricing zone, time of day, congestion level, and even transportation mode. In the US, these solutions have been slow to catch on and a highly publicized initiative in New York City to charge drivers entering the city was not adopted by the New York State Legislature in 2008.¹⁰

Other countries are using ITS not just to reduce traffic crashes, congestion, operating costs and emissions, but are investing in ITS to expand export-led growth sectors that contribute directly to their economic competitiveness and job creation. Currently, more than half of the ITS jobs created in Great Britain are for small businesses. Researchers from Information Technology and Innovation Foundation and the London School of Economics found that investment in ITS directly benefits economic growth by



Real-time traffic information shown on Google Maps. Also available through various mobile apps using the Google data.

stimulating job creation across multiple sectors, including green jobs, high-tech, automotive, information technology, consumer electronics, and related industries.

These strategies and innovations are cost-effective and relatively quick to deploy. Agencies investing in synchronized and adaptive traffic signals have found that for every \$1 invested, close to \$40 returns to the public in time and fuel savings. Additionally, CO₂ emissions are reduced by up to 22 percent (even higher when combined with transit priority systems).

Further, a recent GAO report found the benefit-to-cost ratio of deploying a nationwide real-time traffic information system across the United States would be 25 to 1, with the \$1.2 billion projected costs outweighed by \$30.2 billion in safety, mobility and environmental benefits.¹¹ Overall, the benefit-to-cost ratio of ITS-enabled opera-

10. <http://www.transalt.org/campaigns/congestion>

11. Surface Transportation: Efforts to Address Highway Congestion through Real-Time Traffic Information Systems Are Expanding but Face Implementation Challenges. GAO-10-121R November 30, 2009.



Ridesharing and vanpool services can help coordinate the idea of carpooling on a much larger scale, using technology to match up riders with rides. Photo by Flickr user buzzerblog <http://www.flickr.com/photos/thebuzzer/3963744697/>

tional improvements is estimated to be 9 to 1, a significant return on investment over the more conventional solution of adding new highway capacity, which has a benefit-to-cost ratio estimated at 2.7 to 1.

The last decade has seen a significant increase in the customer service levels of transportation share, or “fractional use” programs, including fixed-route and on-demand shuttles, ride matching, and bike and car sharing programs. Even today in most cities, successful transit service providers rely upon predetermined routes, locations, dates, and times — without the flexibility to respond to on-demand travel needs. Now, in addition to offering access to more information, the connectedness of the Internet and new technology allow transit and rideshare providers to offer more convenient, reliable trips, and the ability to “match up” riders based on very specific commute patterns and needs.

For the developer or operator of the network, sometimes it is simply a matter of

making travelers aware of connections that are already there, or putting signs up and distributing maps showing where connections already exist.

For travelers, using innovative technologies appeals to a mobile citizenry who use “next generation” technologies. These technologies provide more opportunities for connectivity through social networking and telecommunications-based platforms.

For example, in cities such as Boston and Washington, DC, social networking tools support shared car use through programs like GoLoco, and “slugging,” an informal carpool system where drivers pick up passengers at a common location like a transit station. Social networking sites create a large number of small, virtual databases full of ride requests. They do not require a super-computer, pre-existing schedule, or complex matching procedures. These tools validate observations from existing rideshare services that people prefer to ride with known and

familiar acquaintances. When rides are coordinated through existing social networks of family members, friends, co-workers and neighbors, studies show that people are more likely to participate.

The proliferation of advanced smart phones and handheld devices now allows for the arrangement of rideshare trips, car pick-ups and drop-offs on short notice, and eliminates the need to sit in front of a traditional computer. While smart phone services may never replace traditional fixed service scheduling, several transit providers now offer on-demand services in the US. Avego Shared Transport (www.avego.com) and Carticipate (www.carticipate.com) offer real-time ride-sharing applications on the Apple iPhone.¹²

Innovations in planning and design

New approaches to community design can improve transportation efficiency, reduce trips by bringing neighborhood amenities closer together, improve safety, and encourage more physically active communities. Integrating data on known travel patterns into transportation planning can help prioritize projects and streamline decision-making. For instance, linking a networked grid of community amenities such as hospitals and schools, with mode options like bus station locations, rail lines, and bike trails, can reduce traffic, increase accessibility, and encourage travel efficiencies. Connecting places and services such as doctors' offices located next to hospitals can reduce trips region-wide and improve the efficiency of an entire transportation system.

Recommendations for Federal Transportation Policy

Improving the operational performance of our transportation systems should be an easy decision for most transportation agencies. However, the federal programs that fund many projects at the state and local level are not designed to incentivize innovative planning and design or to achieve the kind of scale needed to get the biggest benefits.

As a result, we miss the boat on the technologies that could help to maximize system performance and achieve these kinds of day-to-day results, even when they are more cost-effective, faster to implement, better at achieving results, and more successful at creating jobs across multiple industry sectors.

As Congress prepares to authorize the next iteration of the federal transportation program, legislators should be responding to the needs and capabilities of the 21st century by following these principles:

12. Amey, Andrew. Innovations in Ridesharing Service Offerings. TDM Review. Winter 2010.

Recommendations for Federal Transportation Policy

1. Establish national transportation targets for reducing congestion and emissions while increasing economic growth and accessibility.
2. Provide incentives for states and regions to adopt information technology solutions and integrate them throughout the transportation network.
3. Ensure federal funding and programs support a broad range of connected transportation options and services and help create livable, walkable communities.
4. Establish a demonstration grant program for metropolitan and rural regions to provide model deployment sites for large-scale advanced ITS and related next-generation infrastructure solutions.
5. Create a framework to help state departments of transportation, metropolitan planning organizations, transit agencies, the private sector and local governments cooperate to develop and deploy the most advanced unified technology.
6. Accelerate the development and implementation of innovative, new information systems and technology solutions.
7. Provide dedicated funding for states and regions to improve system operations. This funding would encourage technology adoption and integration plans, like electronic toll collections, high-occupancy toll (HOT) lanes, telework programs, and other intelligent transportation systems.

The good news is that much of the needed technology exists today — it is now a matter of investing wisely to ensure smarter transportation solutions. One thing is clear: the U.S. transportation system is the force that sustains economic growth and ensures our quality of life.

The current transportation system has served its purpose well, but is in dire need of updating to accommodate the needs of the new century. A rapidly expanding urban population, a quickly aging population, an instantaneous just-in-time global economy, and the pervasive presence of technology — all are driving the need for change.

The U.S. is at a critical juncture.

We need to maximize technology to reduce congestion, minimize emissions, and increase efficiency. We need to build a next-generation transportation system to solve these challenges.

Smart mobility for a 21st century America: now is the time.



The Washington, D.C. metro area launched a bike sharing system in September 2010 with 1000 bikes in 100 stations around the city. Flickr photo by James D. Schwartz <http://www.flickr.com/photos/36871124@N04/5039081350/>



Photo by Dan Olson, Minnesota Public Radio

SMART MOBILITY CASE STUDIES

INCREASED EFFICIENCY

TRAVEL OPTIONS

BETTER INFORMATION

PRICING & PAYMENTS

TRIP REDUCTION

Smart Mobility Case Studies

Smart transportation solutions are already modernizing outdated networks and fueling innovation throughout the country, through both the public and private sector. The following case studies demonstrate the community benefits smart mobility solutions are giving regions, cities, and businesses.

The case studies are classified into five broad areas, which can be identified with the colored banners at the top of each page.

1. Making transportation systems more efficient.
2. Providing more travel options.
3. Providing travelers with better, more accurate, and more connected information.
4. Making pricing and payments more convenient and efficient.
5. Reducing trips and traffic.

Integrated Trip Planning and Fare Payment: Yellowstone LINX Cooperative

INCREASED EFFICIENCY

BETTER INFORMATION

PRICING & PAYMENTS

The LINX program has integrated transportation providers in 27 counties for an easy-to-use and more seamless network for riders.

LINX is a member cooperative that connects transportation providers across 27 rural counties in Idaho, Wyoming and Montana. LINX uses innovative technologies to market services efficiently via one integrated system. The Yellowstone Business Partnership, or YBP, led the charge for LINX, which was incorporated in January 2010.

Within the Greater Yellowstone region, there had been significant gaps in service and coordination between transportation providers and a general lack of knowledge about available service. Improving the marketing of existing services through a new website is central to the LINX project. This central ticketing and trip planning website allows riders to book and confirm online trips anywhere in the region, as well as print tickets at home.

YBP is also testing a system called “LINX-Comm” that would allow vehicles to communicate directly with the central server about location, availability and scheduling. The LINXComm system includes online ticketing



and remote printing, onboard ticket validation, GPS location information for vehicles and Wi-Fi service for riders of participating Linx providers.

The pilot phase for LINX, which began in January, is now testing and developing the following mobility management components:

- Trip planning and ticketing system with multiple customer touchpoints
- Improved marketing of existing and emerging services
- Coordination of route schedules and transfer points
- A centralized location for information on all modes of mobility

Facilitating convenient and affordable transportation in the Greater Yellowstone area will bolster economic viability, as well as reduce traffic congestion and carbon emissions, while helping preserve what is special about the community’s ecosystem. With more than 3 million visitors each year, the region needs to offer viable alternatives to driving a private vehicle. The LINX program has made great strides toward filling that need.

Contact:

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 Mobility Project Manager
 Yellowstone Business Partnership
 ph: 208.528.0269 cell: 208.881.3523
 josgood@yellowstonebusiness.org

For More Information:

Yellowstone Business Partnership
<http://www.yellowstonebusiness.org/transportation/>
<http://www.yellowstonebusiness.org/data-files/Pocatello%204-15.pptx>

SmartBus Project: Chattanooga, Tenn.



Chattanooga’s SmartBus project has produced significant savings and made buying tickets and finding buses easier than ever.

The Chattanooga Area Regional Transportation Authority’s SmartBus Project uses technology to make public transportation more user-friendly and reliable. The project involves an array of innovations that are being gradually rolled out over the course of several years.

Chattanooga, a city of about 170,000 people with about 500,000 in the metropolitan area, is served by 16 fixed route bus lines, curb-to-curb transit for people with disabili-



ties, a free electric shuttle in the downtown area and an incline railway up historic Look-out Mountain. The regional transportation authority also owns and operates several parking garages and manages most on-street parking in downtown.

Since 2004, this moderate-sized transit agency has made the transition from an organization that made limited use of technology to one in which technology is an integral part of its operations.

“Having the data we need to support business decisions means we can effect necessary changes more quickly, making us more agile and efficient in an increasingly challenging budget environment,” Tom Dugan, executive director of the transit authority, told Mass Transit Magazine.

Some of the improvements currently underway or in the pipeline include;

- Data warehousing and reporting software to better handle data on the operations of the transit system
- New operations management software to support fixed-route scheduling and demand response scheduling and dispatch
- Ticket vending machines for the Incline Railway
- Connections to CARTA vehicles via cell phone networks and wireless public

- Internet access on CARTA buses
- A next stop automated announcement system that provides riders with a real-time estimate for the next bus arrival, as well as a website with real-time tracking.
- Better revenue management systems
- Automatic Passenger Counters
- Bus security systems, such as a covert alarm and on-board video surveillance

Implementation of the scheduling software has minimized operating costs while ensuring compliance with labor laws and transit agency policies. The agency has also saved at least 60 hours per week in operator labor as result of the new technologies.

Contact:
 CARTA Executive Offices
 423-629-1411

For More Information:
 A Case Study on Applying the Systems Engineering Approach: Best Practices and Lessons Learned from the Chattanooga SmartBus Project. November 2009
http://ntl.bts.gov/lib/32000/32900/32928/exec_sum.htm

Specialized Customer Information: Pittsburgh, Pa.

INCREASED EFFICIENCY

BETTER INFORMATION

The ACCESS program integrates non-profit and for-profit transit providers to maximize service for older residents and the disabled.

Harnessing technology makes it easier for some of our most vulnerable neighbors – older adults and persons with disabilities – to use public transportation. Pittsburgh’s ACCESS project demonstrates how low-cost technology improves service, alleviates the concerns of waiting customers and saves money.

ACCESS is a door-to-door, advance reservation, shared ride transportation service serving primarily older adults and the disabled in Pittsburgh and the surrounding area. On-demand transportation services are provided from 6:00 a.m. to midnight, seven days a week, with additional hours on selected routes. There are no restrictions on the purpose or number of trips, but riders are required to share the vehicle with others.

The ACCESS network integrates several non-profit, for-profit and public transportation providers from 10 locations.

“People ride for a bunch of different reasons, which is good,” Gerry Miller, operations manager for Town and Country Transit, told the Pittsburgh Tribune-Review. “To have people with disabilities be able to live inde-

pendently because of the service is a great thing.”

The agency has installed a low-cost, real-time information system to support drivers’ schedules and improve on-time arrivals. The system allows ACCESS to more easily make trip-by-trip eligibility determinations and provide detailed information to customers seeking fixed-routes. ACCESS also generates automated telephone calls that announce arrival times for waiting customers.

ACCESS conducted a series of surveys to track customer satisfaction with the new system. In 2009, the average weekday ridership for ACCESS was 5,832.

Contact:
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For More Information:
 Easter Seals Project Action
http://projectaction.easterseals.com/site/PageServer?pagename=ESPA_Newsletter_mainbody_art1_taproj8

Pittsburgh Tribune-Review
http://www.pittsburghlive.com/x/pittsburghtrib/news/pittsburgh/s_693250.html



Dynamic Parking Pricing: San Francisco, Calif.

BETTER INFORMATION

PRICING & PAYMENTS

SFpark has reduced idle driving time and cut congestion by making it easier to track and locate parking in San Francisco.

In 2009, 30 percent of driving San Francisco consisted of drivers circling around the block looking for parking. Now, city officials are pursuing an intelligent parking-pricing model called “SFpark” to cut down on the wasted time and fuel that too often results from this elusive parking search. A two-year pilot phase began this past summer.

Under SFpark, parking spaces throughout the city will contain sensors that give real

time digital information about whether the space is occupied and for how long. The sensors will be wired into a database that coordinates parking across San Francisco. Information is compiled at a block-by-block level and available via the web, smart phone applications, text messages and roadway signs.

In order to keep an optimum amount of parking available throughout the city, the hourly parking rates will be raised or lowered in response to demand. The changes in price will occur no more than once a month and be published in advance. The goal is to set a pricing level that will keep from 10 to 30 percent of spaces in a given area vacant.

“The idea is to give people more choice, more convenience and to reduce congestion,” Mayor Gavin Newsom told the San Francisco Chronicle, earlier this year.

The San Francisco Municipal Transportation



Agency received a \$19.8 million grant from the U.S. Department of Transportation’s Urban Partnership Program, which amounts to 80 percent of the SFpark project costs. The remaining 20 percent of the program comes from the agency’s budget.

Contact: SFMTA
 1 South Van Ness San Francisco, CA 94103
 415-701-4500
 For More Information:
<http://www.sfmta.com/cms/psfpark/sf-parkover.htm>

San Francisco Chronicle
<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/04/14/MNTO104818.DTL&feed=rss.news>

Traffic Signal Optimization: Portland, Oregon

INCREASED EFFICIENCY

TRIP REDUCTION

Portland officials improved the timing and coordination of traffic signals in 17 key intersections, resulting in lower auto emissions and less traffic.

In 2002, the Climate Trust, a Portland-based non-profit, contracted with the City of Portland to buy offsets from a project aimed at improving traffic signals.

The traffic signal optimization project ensures maximum green light times for the heaviest traffic flows and allows signal cycle time to adjust based on changing demands



Portland traffic flowing smoothly at night. Flickr photo by ahockley. <http://www.flickr.com/photos/ahockley/563467429/>

during peak times, such as rush hour. Seventeen major arterials were identified for improved signal timing using studies on optimizing traffic flow and reducing gridlock.

“It’s like having the Internet for our transportation system,” said Peter Koonce, Division Manager of Signals and Street Lighting for the City of Portland.

After the signal timing has been completed, the Climate Trust pays Portland based upon the amount of carbon dioxide emissions that will be avoided.

In the program’s first six years, more than 157,000 metric tons of carbon dioxide emissions were prevented, the equivalent of the emissions generated from burning 17.7 million gallons of gasoline. As a result of this success, city officials extended the partnership contract through 2012 with a goal of reducing an additional 21,000 metric tons of carbon dioxide.

The project was awarded a ‘Smart Solutions Spotlight’ from ITS America in February 2010.

Contact:

City of Portland Bureau of Transportation
 Dan Anderson, Public Information Officer
 (503) 823-3723

The Climate Trust
 Amy Phillips, Marketing and Communications Manager
 (503) 238-1915 ext. 211

For More Information:
 ITS America
<http://www.itsa.org/itsa/files/pdf/02-11-10%20Portland%20Smart%20Solution%20Spotlight%20Award.pdf>

Daily Journal of Commerce, Oregon
<http://djcoregon.com/news/2010/02/16/oregon-intelligent-transportation-systems-projects-seek-more-funding-trpn/>

Benefits of Retiming Traffic Signals: An ITE Informational Report. ITE, 2005.

Managed Lanes with Peak-Period Transit Discounts: Minneapolis, Minn.

INCREASED EFFICIENCY

TRAVEL OPTIONS

BETTER INFORMATION

PRICING & PAYMENTS

TRIP REDUCTION

In Minneapolis, priority lanes and differential pricing have cleared a key interstate during peak hours and allowed more commuters to utilize public transit.

The Twin Cities Metropolitan Area is using innovative solutions to relieve congestion on major highways in the region, with a particular focus on Interstate 35. The effort, part of a Minnesota Urban Partnership Agreement (UPA), utilizes a suite of intelligent transportation approaches, sometimes known as the 4Ts: Tolling, Transit, Telecommuting/Travel Demand Management and Technology.

The Minnesota UPA involves ITS technologies like real-time traffic and transit information, transit signal priority, and guidance mechanisms for shoulder-running buses. These technologies will significantly reduce travel time for riders.

“Trip time will be about half an hour. We’ll offer six trips in the morning and six trips

home in the afternoon,” Bob Gibbons, a spokesman for Metro Transit, told Minnesota Public Radio.

First, the city is converting existing bus-only shoulder lanes and High Occupancy Vehicle (HOV) lanes along portions of the Interstate into wider lanes with prices that vary based on occupancy. Cars with only one occupant will have to pay a toll to access the lanes during peak hours, with prices set to ensure free-flowing travel. City officials say this will enable bus speeds to increase to 50 mph from the current bus-only shoulder lane speeds of 35 mph or less.

Second, a portion of the toll revenues from the new lanes will fund significant fare discounts for transit riders taking trips us-

ing the new facilities during peak periods. In and around the I-35W corridor, transit services will increase and a bus rapid transit network will be created, utilizing at least 27 newly purchased transit vehicles. There are also plans for six new park-and-ride lots with more than 1,400 additional spaces.

Third, new dynamic message signs and some existing signs will inform travelers about the availability of the lanes for non-bus use, toll rates for when the lanes are available, travel speeds on priced lanes versus on general-purpose lanes and transit alternatives.

The final element of the Minnesota UPA is telecommuting. This locally funded effort will focus on expanding upon the successful Results-Only Work Environment pro-



The MnPASS or congestion pricing lane on the left will be available at no cost to buses, car pools and to single driver vehicles willing to pay as little as 25 cents or up to \$8 a trip depending on traffic levels. Traffic managers adjust the price in order to keep the lane flowing at 50 miles per hour. Photo by Dan Olson, Minnesota Public Radio

gram, in which employers agree to provide employees the flexibility to telecommute or shift their hours to avoid congested commutes. Approximately 75 percent of Best Buy's 4,500 corporate office employees participate in ROWE. Officials are targeting large employers, including the 20 Fortune 500 companies in the region, for participation, with the goal of reducing 500 daily peak-period trips throughout the corridor.

For More Information:

US DOT Urban Partnerships Program
<http://www.upa.dot.gov/agreements/minneapolis.htm>

Minnesota Department of Transportation
<http://www.dot.state.mn.us/upa/telecommute.html>

Minnesota Public Radio
<http://minnesota.publicradio.org/display/web/2009/09/25/35w-makeover-projects/>

Bike Sharing Program: Pottstown, Pa.

TRAVEL OPTIONS

TRIP REDUCTION

A first-in-the-region bikesharing program has increased transportation options and improved public health in this town 40 miles outside Philadelphia.

Pottstown is a town of just over 20,000 people located about 40 miles northwest of Philadelphia. The community has struggled to find a new identity and revitalize its economy since the decline of the iron and steel industries. They have found some success leveraging the area's convenient access to the Schuylkill River Trail, a multi-use trail that connects Philadelphia to nearby communities.

The Bike Pottstown bike sharing program was launched in June of 2008 with 30 beach cruiser bikes all painted yellow and accompanied by a lock and a basket. Managed by Preservation Pottstown, a local non-profit organization within the borough, the program operates six days a week out of Tri-County Bicycles, a local independently owned bike shop. Anyone with a valid ID can rent the bikes and ride anywhere in the Pottstown until the end of the day. The bikes are free of charge and by December 2009 had been shared over 2,000 times.

"Bike Pottstown is a community bike-share program," said Tom Carroll, president of Preservation Pottstown. "By having it operate out of this location, and eventually out of



Pottstown bike sharing bikes. Photo courtesy of Bike Pottstown.

others as well, it brings the program to more people in the community, and, hopefully, will bring more community support to the program.”

The only free bike sharing program in the greater Philadelphia region, Bike Pottstown has been featured in numerous newspapers, magazines and television news segments. The media attention has been a win-win for the community, bringing needed tourism and renewing local enthusiasm for bicycling as a source of exercise and transportation. Bike Pottstown is removing cars from the road, promoting physical fitness and providing residents with more options for commuting to work, although most use the program recreationally.

Bike Pottstown was able to get off the ground because of a \$30,000 grant from the Pottstown Area Health and Wellness Foundation. The funding paid for the infrastructure study, bicycles and the first year of operating costs. Subsequent annual operat-

ing costs are paid for through promotional items, sponsorships and donations.

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For More Information:

The Mercury <http://www.pottsmerc.com/articles/2010/06/23/life/doc4c222f5d-7dd58523788526.txt>

Bike Pottstown Facebook Page

<http://www.facebook.com/pages/Pottstown-PA/Bike-Pottstown/119209880592>

Bus Rapid Transit Priority: Salt Lake City, Utah

INCREASED EFFICIENCY

PRICING & PAYMENTS

Rapid growth and a growing tourism industry prompted Salt Lake City officials to bring increased efficiency and connectivity to the area’s bus system.

A rapidly growing tourism industry, increasing diversity and economic growth in downtown prompted Salt Lake City officials to improve mobility options throughout the region. The Salt Lake City metropolitan area has a population of just over one million people, with roughly 200,000 living in the city proper.

Salt Lake City made infrastructure improvements to connect regional bus routes to existing transportation networks, like the regional light rail system. Designed to mimic the efficiency of light rail, the bus rapid transit system leveraged the city’s transportation network to provide convenient and reliable travel options. The MAX Bus Rapid Transit System began in 2008 by incorporating bus-only lanes and traffic signal priority for buses along the entirety of the system’s 10.8-mile bus route.

Buses have the right-of-way at intersections and traffic signal detection helps turn lights green as buses arrive. Along the most congested portions of the route, buses run in both directions in a dedicated center lane, allowing them to bypass cars. These innovative technologies keep trip travel time to a minimum and hold fuel costs in check, while

maintaining a high standard for safety. The system utilizes payment centers located off the bus, including user-friendly credit card machines, to allow passengers to quickly board the bus through one of three available doors.

The Utah Transit Authority plans to connect all the cities within the region to the light rail network with up to 80 miles of corridor routes within 20 years; 4,200 riders currently pass through the line’s 29 stops every day.

“This has the potential to become a piece of a future transportation spine,” Provo Mayor Lewis Billings said.

The MAX bus rapid transit line has seen a one-third increase in ridership and a 15 percent reduction in average travel time since 2008. The MAX line achieved a 97 percent on-time reliability rating on its very first day of operation, and now saves riders an average of 20 minutes per trip compared to an equivalent conventional bus driving the same route.

The project was awarded a “Smart Solutions Spotlight” from ITS America in June 2010.

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For more information:

<http://www.deseretnews.com/article/705323008/Utah-County-moving-forward-with-bus-rapid-transit.html>

New Mobility Hub Network: Chennai, India

INCREASED EFFICIENCY

TRIP REDUCTION

Automobile use in Chennai, India is growing by 13 percent a year and a new transportation hub has helped to integrate the city's diverse transit network for both residents and visitors.

The number of vehicles in greater Chennai increased from 90,000 in 1990 to almost 10 million in 2008, an average annual growth rate of 13 percent, in this rapidly urbanizing city of about 6 million people along India's southeast coast

This rapid growth prompted the Comprehensive Study for Transport System for Greater Kochi Area. City Connect, a partnership of the Confederation of Indian Industry, and Janaagraha, a respected Indian NGO, shepherded the study.

The major recommendation involved integrating an existing bus stand and the Kaloor Private Bus Terminal into a hub accessible using a variety of travel options. For instance, passengers would be able to exit the bus terminal at the hub and then use inter-city buses, auto, taxi or metro train to enter the city. The site also offers ideal bus parking spots for long and short distance buses.

While accommodating 900 cars and 120 auto-rickshaws in its parking lots, the area around the transportation hub also has the potential to host a world-class mega shopping mall, food courts, cultural center and

health club and other amenities.

“Providing alternatives to such passengers, in the form of other customer friendly, yet ecologically friendly modes of transportation, will have profound impact on the quality of life, in terms of traffic and transportation, in Chennai,” wrote Susan Zielinski, who has consulted for the project.

Chennai is also linking the mass transit system online through bus routes listed on Chennai's website. Passengers can enter their origin and destination into the system and receive a customized trip plan.

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Ph: 734.647.5198

For More Information:
SMART – University of Michigan http://www.um-smart.org/project_research/New_Mobility_Hubs_Chennai.pdf

Express Buzz: <http://expressbuzz.com/news/mobility-hub-to-decongest-city/75397.html>



Chennai road Flickr photo by eyesore9. <http://www.flickr.com/photos/eyesore9/4380660002/>

Dynamic Ridesharing: Cork, Ireland

TRAVEL OPTIONS

BETTER INFORMATION

Carpooling has been around for a while now, but Cork, Ireland’s Dynamic Ridesharing program brings drivers and passengers together in real time, extending the public transportation network using private automobiles.

Many communities have attempted dynamic ridesharing projects over the past 15 years, with limited success. The Avego Project at University College Cork in Ireland has gotten real results by creating a marketplace for drivers to offer their empty seats to riders in real time, without the need to arrange drop-off or pick-up locations beforehand. Pricing

seats based on mileage creates an incentive for drivers to carpool and increases options for passengers.

The Avego Project began in July 2009 as a pilot project at the University to address a lack of parking spaces and affordable commute options for the university’s 19,000 staff and students. The goal was to create a seamless transportation network in which private cars would effectively broaden the public transit system.

Drivers in the pilot program use GPS-enabled iPhones running Avego’s Shared Transport iPhone application, while riders may request rides via the iPhone application or online. The system automatically calculates the cost to the rider and manages the transaction via an electronic wallet at the end of the journey. A driver running the iPhone app is matched in real time with anyone searching for a ride along the same



Photo courtesy of the *New York Times*

route.

“You put the iPhone on the dashboard, and it records the entire trip and sends the route to our network,” Sean O’Sullivan, managing director for Avego Limited, told the New York Times.

Based on the user feedback from Phase I and an examination of shortcomings of earlier dynamic ridesharing projects, Avego has identified 5 critical success factors for dynamic ridesharing to become a viable option for connecting communities.

- **Adequate numbers of participants** – Dynamic ridesharing requires a critical mass of travelers targeted within a specific corridor or in a defined catchment area (such as a college campus).
- **An appropriate incentive program** – Self-sustaining dynamic ridesharing requires a pricing mechanism that allows drivers to recoup commute costs. The pilot determined that pricing seats at 20 cents per kilometer is a powerful incentive for drivers, while riders receive an affordable transportation option that is less expensive than owning a car.
- **Minimal complexity** – Even the most non-technical travelers must be able to understand and conveniently use the system. Verification of ridesharing and distribution of incentives should be automated, minimizing the need for administrative oversight.
- **Demonstrated security and privacy** – Travelers must be able to filter ride-matches (e.g., by gender, community, smoking, etc), authenticate travelers before they enter the vehicle, rate

and report other travelers and protect the privacy of their personal and commuting information.

- **Stakeholder engagement** – Continuous and effective communication with project stakeholders enables key information to guide pilot implementation, overcome challenges and promote community advocacy for the project.

Preliminary results of Phase I revealed that 20 participating drivers had been matched with a total of 3,922 simulated riders on their commute to and from UCC. Of these simulated riders, 1,545 were picked-up by drivers and driven to their destination along the driver’s route. More than 500 people have now registered their interest in participating in Phase II of the pilot, providing detailed summaries of their commuting behavior.

Contact:

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For More Information:

Avego Blog
<http://blog.avego.com/blog/category/sharedtransport/>

The New York Times

http://www.nytimes.com/2008/12/21/business/21novelties.html?_r=1

Social Carsharing: Getaround Inc.

TRAVEL OPTIONS

BETTER INFORMATION

San Francisco-based Getaround Inc. utilizes a smartphone application to help match customers with under-utilized cars, increasing options for non-car owners without adding more vehicles to the road.

Getaround Inc. is a California-based company that enables sharing of the 280 million personal vehicles in the U.S. that sit unused 93 percent of the time. By enlisting the underutilized cars in countless driveways and parking spaces, Getaround enables a

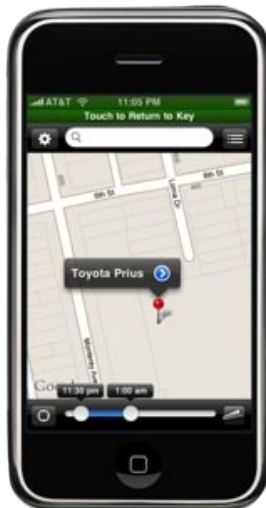


fleet of millions of shared and rentable cars, without adding more vehicles to the road. Getaround's Corporate Headquarters is based in San Francisco, with a research and development office in nearby Moffett Field, California. The company launched this fall.

Getaround uses in-vehicle hardware and native smartphone applications to ensure a seamless carsharing experience. These applications allow renters to quickly locate available cars within walking distance, browse car profiles and make reservations.

The company's iPhone application garnered industry recognition by winning the "Best Money Making Application" award from iPhoneDevCamp, hosted by Yahoo. Popular

1.
Find a car



2.
Browse



3.
Request car



4.
Drive



Science, CNET and the New York Times have also covered Getaround’s progress.

“Since the transportation industry hasn’t really changed much in the past 50 years,” said Jessica Scorpio, Business Development Director for Getaround, “we thought it was pretty ripe for some innovation.”

Getaround’s system works with existing communities, enabling friends, family, co-workers and neighbors who already share cars to do so in a safe and efficient manner. A switch to carsharing has the potential to reduce vehicle miles traveled by 44 percent and greenhouse gas emissions by 40, as well as induce increased walking and biking.

“Other car rental companies have huge overhead expenses related to purchasing vehicles and have issues related to fixed locations,” Scorpio said. “But we can very quickly have inventory on every street corner without having to shell out a fortune.”

Carsharing has grown exponentially in the U.S. since 1998, more than doubling every

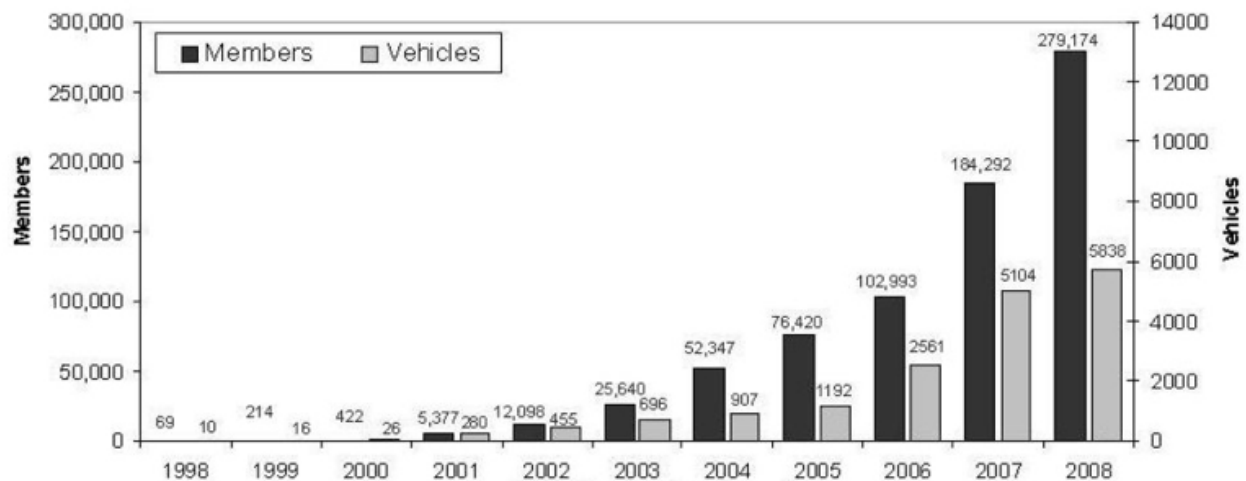
year from 1998 to 2005. Social carsharing is the next logical extension to this rapidly growing market and is predicted to increase from 400,000 members today to 4.4 million members in 2016.

Getaround is honing in on cities, campuses and suburban areas initially. Due to the low overhead model employed, the system is highly scalable and will quickly expand outside of the limited areas covered by traditional carsharing models.

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www.getaround.com

Entrepreneur Magazine
<http://www.entrepreneur.com/article/217242>



Source: Shaheen, Cohen, and Chung: “North American Carsharing: A Ten Year Retrospective.” 2008

Telecommute Program: Washington State

TRIP REDUCTION

Washington State has created incentives for employees of large companies to pursue alternatives to driving, often through telecommuting.

The Washington State Legislature passed a law in 1991 aimed at encouraging employer-based programs that promote alternatives to driving alone, with the hopes that this step would relieve roadways and clear the air. By 2009, the Commute Trip Reduction Law had resulted in new programs at more than 1,000 worksites statewide, with commuters joining a carpool or vanpool, riding the bus, bicycling, walking or working from home.

Updates to the law in 2006 expanded responsibility for the program to local governments, directing jurisdictions to establish new goals and policies for reducing drive-alone trips and vehicle miles traveled. The roles of participants in the program are as follows:

- Major employers implement their programs based on locally adopted goals for reducing vehicle trips and VMT as established by the city or county in which they do their business. Groups of employers, such as transportation management associations or chambers of commerce, may also partner to provide services and support to commuters.
- Local governments provide technical assistance and services to employers to help them achieve the goals and may

also run their own service.

- Transit agencies operate services such as bus and vanpools and coordinate services and support with local governments.
- Regional transportation planning organizations provide planning support and coordination across jurisdictions.
- Washington Department of Transportation administers funding, guides the program with policies and procedures and coordinates measurement and evaluation of the program.
- The Governor-appointed Commute Trip Reduction Board sets the overall policy direction and funding levels for the program and reports to the legislature every two years on the effectiveness of the program.

As part of the new program focus in 2007, Growth and Transportation Efficiency Centers were located within some of the densest and most congested employment centers in the state, but also in smaller worksites, schools and neighborhoods and established worksites. Between, 2007 to 2009, these dense employment centers have demonstrated the greatest performance — about nine times more successful than all other Commute Trip Reduction sites — driving the overall progress of the program towards its statewide goals.

Many employers have praised the program.

“Technology enables flexible work arrangements, and EDS is a technology company. It is natural for us to provide our employees with work options,” said Guyanna Young, Communications Director at Electronic Data Systems. “Alternative work arrangements are the norm rather than the exception at

EDS.”

And Bill Ross, President of Ross and Associates Environmental Consulting, LTD, said: “Telework and flextime put more fuel in the engine of our business by allowing people to take care of personal issues.”

In 2009, the program succeeded at removing nearly 28,000 vehicles from Washington roadways every weekday morning. The Commute Trip Reduction program reduced 12,900 hours of delay in the region in 2009, saving \$99 million for the region in congestion costs due to lost time and wasted fuel. Each traveler in morning peak traffic in the Central Puget Sound saved \$59 in 2009 due to the increased system efficiency provided through the program.

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For More Information:
Washington State Department of Transportation
<http://www.wsdot.wa.gov/TDM/CTR>

Commuter Challenger
http://www.commuterchallenge.org/cc/casestudies/cs_alliancedata.html

Urban growth areas and designated GTECs in the CTR program



Transportation Management Plans: Oakland, Calif.

TRIP REDUCTION

Under Oakland’s GreenTRIP program, developers are accountable for how their projects will impact the community’s transportation needs.

Increased congestion and greenhouse gas emission from transportation compelled Oakland city officials to act. In 2008, the City Council passed a law requiring new building development to take the transportation and infrastructure implications of the project into account. Today, all new residential developments of more than 50 units and/or 50,000 square feet of non-residential space are required to submit a transportation demand management plan detailing strategies to increase bicycle, transit, pedestrian and car-share use. A similar policy in San Francisco inspired the law.

“GreenTRIP” is an innovative certification program used for new residential and mixed-use developments. Depending on the type of development, developers must meet between one and three traffic reduction strategies, including: separating the cost of parking from the cost of the unit; providing discount transit passes; or providing free car-share membership. The program is currently in its second pilot phase.

Transportation is responsible for 50 percent of greenhouse gases in the San Francisco Bay Area — due in part to long distances between work, housing and recreation — so linking housing and transportation makes a

lot of sense.

Kate White, executive director of the San Francisco-based Urban Land Institute, hailed GreenTRIP as “the next frontier of greenbuilding,” while Pamela Toliatt, mayor of nearby Petaluma, praised GreenTRIP as “a tool to prove to our residents that a developer is committed to reducing traffic and greenhouse gases.”

GreenTRIP receives funding from the Bay Area Air Quality Management District’s Climate Protection Grant Program, the Rockefeller Foundation and the Silicon Valley Community Foundation. An advisory committee guides the development of the program along with TransForm, a Bay Area transportation and land use planning coalition.

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For More Information:

TransForm
<http://transformca.org/GreenTRIP>



Employer Commuter Benefits Program: Santa Clara, Calif.

TRIP REDUCTION

Sun Microsystems is based in California’s Silicon Valley, but under its Employer Commuter Benefits Program, employees can work from one of several campuses or from home, and company-operated shuttles are available to transport them.

Transit benefits have continued to be a key plank of the Silicon Valley based Sun Microsystems, even as the company was acquired by Oracle. Sun’s SMART Commute Program,

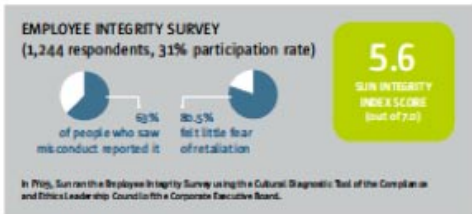
or Sun Microsystems Alternative Resources for Transportation, provides employees with up-to-date commuter information, participation incentives and shuttles connecting public transportation to Sun campuses.

More than 2,900 employees have participated in U.S. commuter incentive programs at campuses in Massachusetts, Colorado, California and Oregon. In the San Francisco Bay Area, the company operates the Sunway Shuttle program, which links public transit stations and company campuses. Launched in 2005, the service provides thousands of rides to Sun employees each year on average. With six vehicles operating seven different shuttle routes each workday, the service is one of the largest employer-operated transit shuttle programs in the entire Bay



At Sun, we believe our long-term business success depends on a healthy planet and thriving communities. Sun’s journey toward sustainability relies on the courage and integrity of our employees and partners and is guided by our core beliefs in openness, sharing, and radical transparency. With our 2009 Corporate Social Responsibility report, we strive to provide more data than ever before, while readying ourselves for the next phase in Sun’s evolution as a technology and innovation leader.

Sun microsystems 2009 CORPORATE SOCIAL RESPONSIBILITY REPORT



PUBLIC POLICY ENGAGEMENT AND COMPLIANCE

Sun endeavors to comply with all U.S. and international environmental laws and regulations, including RoHS, REACH, WEEE and others, to the extent they pertain to Sun products. Sun will similarly strive to meet any such new laws or regulations that are enacted in the future. Sun tracks environmental regulation globally and is well positioned to react in a timely manner to any changes that impact Sun products in order to facilitate compliance.

Area. In the first eight months of 2005, the number of employees riding shuttles rose 15 percent, from 7,700 employees to 8,700. Real-time information about the service is updated online and employees can elect to receive text messages about changes to services or delays.

Nearly 15,000 Sun Microsystems employees participate in Sun's iWork program, which enables employees to work from home, drop-in centers, or at campuses throughout the country. Employees at Sun's major campuses around the country also receive transit subsidies and/or prepaid transit passes to encourage and facilitate the use of public transit.

"The nightmares of commuting here lent itself to a positive environment for alternative transportation efforts," said Jordan Boyd, manager for workplace services at Oracle.

Sun's comprehensive Commute Benefit program has reduced the commute trips of Sun employees, while reducing costs and pollution. Sun actually has targeted goals that need to be met regarding usage of the transit benefit, targeting a five percent per employee increase for 2008 and 2009, a goal that was exceeded.

In FY09, the company took the first step toward estimating greenhouse gas emissions from operations, calculating the emissions resulting from the direct and indirect supply chain of Sun's products.

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<http://www.sun.com/aboutsun/ehs/ehs-commute.html>
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