SHARED MOBILITY

A SUSTAINABILITY & TECHNOLOGIES WORKSHOP

Retrospective from Caltrans Shared Mobility Workshop

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UC DAVIS CONFERENCE CENTER
SEPTEMBER 8, 2015

ACKNOWLEDGEMENTS

The authors of this synopsis would like to thank the Caltrans advisory group supporting this workshop including: Erik Alm, Alison Grimes, La Keda Huckabay, Lauren Iacobucci, Nicole Longoria, Jeffrey Morneau, Frederick Schermer, Rahul Srivastava, and Scott Williams (chair). We would also like to thank Helen Bassham for her valuable organizing efforts, and the rest of the TSRC team that provided event assistance including: Adam Cohen, Rachel Finson, Michael Fratoni, and Elliot Martin. Thanks also go to UC Davis for providing their conference space and AV staff. The contents of this paper reflect the views of the authors and do not necessarily indicate acceptance by the sponsors.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Shared mobility is the shared use of a vehicle, bicycle, or other low-speed mode that enables users to have short-term access to transportation modes on an "as-needed" basis. Shared mobility includes carsharing, personal vehicle sharing (or peer-to-peer (P2P) carsharing), bikesharing, scooter sharing, shuttle services, ridesharing, and on-demand ride services. It can also include commercial delivery vehicles providing flexible goods movement. Shared mobility has had a transformative impact on many global cities by enhancing transportation accessibility, while simultaneously reducing ownership of personal automobiles. A variety of shared mobility services have thrust shared mobility into the public spotlight, and cities and governmental agencies are seeking to better understand how these transportation services impact their region's travel to improve planning for the short-term and the long-term.

On September 8, 2015, UC Berkeley's Transportation Sustainability Research Center (TSRC), in partnership with the California Department of Transportation (Caltrans), hosted "Shared Mobility: A Sustainability and Technologies Workshop" at the UC Davis Conference Center. The workshop facilitated a dialogue among nearly 100 participants representing 28 organizations. There were 61 attendees from Caltrans, with 38 from Headquarters and 23 from various district offices. Caltrans employee attendees included planners, engineers, researchers, managers, and directors. In addition, nine participants were from the private sector and included individuals from shared mobility companies. There were 27 participants from other public agencies and universities.

Three key goals of the workshop were to:

- Increase shared mobility understanding,
- Explore impacts on planning and operations, and
- Investigate how shared mobility can enhance Caltrans' mission and goals.

Workshop participants were asked to keep these three main topics in mind throughout the conference. Since the workshop consisted largely of Caltrans employees, much of the focus was on introducing and defining shared mobility but also on exploring how these modes could impact Caltrans and the way the department plans and operates. A combination of plenary and breakout sessions covered many issues regarding shared mobility and public-private partnerships. While a range of topics were discussed during the summit, some of the prominent issues identified and examined included:

1) The need for reformed Caltrans planning practices that better streamline the incorporation of shared mobility services as a strategy to achieve policy goals;
2) The importance of data sharing from both the public agency and private industry sides;
3) The transformative role shared mobility could have in helping to meet Caltrans' future year goals;
4) The importance of coordination among public entities and shared mobility companies to address accessibility and operating efficiency issues; and
5) The need for action taken by public agencies in the form of pilot projects and revisited metrics and processes.

Workshop panelists and participants emphasized the role of public involvement in shared mobility projects, and they highlighted needed cooperation efforts that must continue to evolve. These efforts include both public agency operating changes, as well as increasing sharing of data and practices among private companies and the public sector. The workshop ended with increased awareness of shared mobility services and their travel impacts, and it opened an important discussion between Caltrans and shared mobility leaders.

This synopsis covers findings and discussions from the conference, and it summarizes the key topics explored throughout the day. The report starts off with recaps of the workshop introductions from Professor Susan Shaheen of UC Berkeley, Steve Cliff of Caltrans, and Socorro “Coco” Briseno of Caltrans. Next, the two expert panels are discussed in detail, touching upon key points made by each panel member and moderator. The breakout sessions are then covered, and the discussions regarding the impacts of shared mobility and on Caltrans planning and operations are reviewed. Finally, a conclusion summarizes the overall findings and key takeaways from the workshop.

PANEL SUMMARIES

Ninety-seven (97) people attended the conference. There were 77 attendees, 13 speakers, and seven UC Berkeley Transportation Sustainability Research Center (TSRC) staff members. The workshop drew many individuals from the public sector, with 80 of the participants affiliated with a governmental agency. There were 61 participants from Caltrans, representing 38 from Headquarters and 23 across Districts 1, 2, 3, 4, 6, 7, 8, 10, and 12. Caltrans employee attendees included planners, engineers, researchers, managers, and directors. In addition, nine participants were from the private sector and included individuals from mobility and technology companies. This section provides a summary of each panel and opening speaker remarks, as well as a synopsis of the topics discussed.

Welcome and Program Overview

The workshop began with opening remarks from Susan Shaheen, Adjunct Professor and Co-Director of TSRC. Professor Shaheen introduced the background for the conference, along with workshop goals and the agenda for the day.

She started by exploring the role of shared mobility in our current and future transportation systems, pointing out that there have not been very many large foundational changes in surface transportation in the last 100 years, since the invention and widespread adoption of the automobile. But today, there are many new forms of technology leading to innovative business models that could disrupt some of the foundational groundwork of our current transportation ecosystem. Sharing, electric vehicles, automated vehicles, new business models, public-private partnerships, and a slew of other technological innovations and behavioral trends are driving this disruption. Although sharing itself is not a new practice, current technology is increasingly breaking down logistical and social barriers to entry and is driving the growth of the sharing economy. The sharing economy has been receiving a lot of media coverage lately, yet there is also a lot of confusion as to how these services are impacting the world around us. This confusion stems from the fast pace of these advancements, as well as the lack of information and understanding on their impacts. Professor Shaheen noted that it is these issues that motivated the workshop. Next, she presented the workshop objectives:

- Increasing understanding of shared mobility,
- Exploring impacts on planning and operations, and
- Investigating how shared mobility can enhance Caltrans' mission and goals.

After a brief program schedule overview, Professor Shaheen closed her remarks by reminding attendees to keep these issues and goals in mind during the panel and group discussions throughout the day.

Caltrans' Perspective on Innovation and Technological Change

The second opening remarks were made by two Caltrans leaders: Steven Cliff, the Assistant Director of Sustainability, and Socorro "Coco" Briseno, the Deputy Director for Planning and Modal Programs. They spoke about Caltrans' mission and goals for the future. Each speaker touched upon ways in which they believe shared mobility might be able to help achieve some of those goals. Dr. Cliff noted the importance of shared mobility in helping define Caltrans' livability metrics, as well as the role these systems could play in helping to meet statewide greenhouse gas (GHG) emission and vehicle miles traveled (VMT) reduction targets. He continued to speak of the need for Caltrans air quality standards to

be consistent with the California Air Resources Board (ARB) and AB 32 (California's Global Warming Solutions Act) metrics, emphasizing that cooperation with other agencies and stakeholders is a key part of this process. He also discussed the importance of encouraging car-light lifestyles through the statewide influence that Caltrans maintains. Giving an anecdotal example, he shared that his family had recently sold one of their cars and purchased a folding bicycle for tripmaking, after realizing that shared mobility services could provide him with mobility when he needed a vehicle. He concluded with a warning of a future with "robot cars" (automated vehicles (AVs)) that replace private vehicles. In contrast, he emphasized that a combination of AVs and shared mobility could facilitate a brighter transportation future, which could help achieve many of the state's GHG and VMT reduction goals.

Coco Briseno started her remarks by noting that we are in a time of change and are witnessing the growth of transportation as a service. She emphasized that Caltrans cannot sit back and watch as these services grow and instead needs to take a leadership role in overseeing this change. Drawing upon Caltrans' Mission Statement, vision, and five departmental goals, she encouraged those in attendance to think about how sharing economy services can contribute to reaching these broader goals. Ms. Briseno also noted the need for Caltrans to fit these innovative technologies and mobility options into their planning processes in a streamlined fashion. She concluded by reminding participants that no one knows what the future of transportation holds, but we may be seeing a glimpse of what it might look like over the course of the workshop.

Expert Panel 1: Shared Mobility

In the first panel session, experts representing four shared mobility companies spoke about their particular services and how they fit into the mobility ecosystem. They also voiced their opinions on where shared mobility is headed and the logistical and legislative issues faced by the industry. Timothy Papandreou, Director of the Office of Innovation at the San Francisco Municipal Transportation Agency, moderated the panel. He opened the session by reviewing some of the overarching transportation problems faced today relating to the built environment, underused capacity, and public sentiment. Mr. Papandreou then provided an overview of the range of shared mobility services, defining their operational models and how each fits into the overall transportation system. He highlighted that many of these shared modes exist on a spectrum that lies somewhere between public transit and driving alone, noting that some services may be more effective than others at reaching city-level and state VMT, GHG, and accessibility goals. He then opened the discussion to the four panelists, and each gave an introduction of their company's services and spoke about related transportation issues raised by Mr. Papandreou.

Emily Castor of Lyft explained her company's beginnings from their founding three years ago in San Francisco to currently serving millions of rides a week across most major U.S. cities. She noted their founder's beginnings with the long-distance ridesharing platform Zimride, and their core goals of reducing vehicle ownership and aggregating demand. Ms. Castor explained the service "Lyft Line," which aims to match passengers traveling along the same route in real time. She stated that over half of Lyft requests in San Francisco are now "Lyft Line" requests, with the majority of those requests having successful matches. She also emphasized Lyft's growing role in outlying urban areas, and their goals of connecting suburban workers to public transit. The role of mobile ticketing was also raised, and she

spoke about her experiences with public transit agencies working to move mobile ticketing forward. She mentioned L.A. Metro has been trying to work with them on this issue, and she speculated there may be a Kayak.com-like system one day where all transportation payments could be made through one platform seen by the end user.

Walter Rosenkranz of the one-way carsharing company, car2go, stressed the importance of first-and-last mile connectivity to public transit. He explored the ways in which car2go is helping with this issue of connectivity. He shared that most of their members are already public transit riders looking for extra mobility in situations where using a vehicle makes more sense. He discussed the cooperation they have had with cities and their firsthand experience with communities that get very "emotional" over reduced parking for privately owned vehicles. Mr. Rosenkranz described the growth of shared mobility services as one that requires trust of the entire system, which he believes will largely be facilitated through smartphones and technology. The point at which someone trusts the system enough to step outside with their smartphone and just "wing it" is when we will see widespread shared mobility use.

Paul Steinberg of Carma Carpooling explained his company's goal of filling empty seats in cars already traveling to a destination. He highlighted the cyclical nature of the morning and evening rush hours and how Carma and other services could help to reduce congestion by facilitating shared rides during these periods. Mr. Steinberg noted that if the carpooling mode share rose just five percent, state VMT would see a three-percentage point reduction. He also stressed the importance of cooperation with federal, state, and local governmental agencies to enhance sharing economy success. He noted examples where Carma has partnered with public agencies like the Contra Costa Transportation Authority to convert old bus stops to legal carpool parking pull-offs, and a partnership with the Central Texas Regional Mobility Authority that allows toll reimbursements for participating Carma users with an electronic toll tag. Mr. Steinberg also emphasized the importance for open application programming interfaces (APIs), which can more easily allow for streamlined integration of data among mobility providers and other application developers. He concluded that the biggest limitations to shared mobility moving forward are legal ones, not technical ones.

Kansas Waugh of Motivate, a bikesharing operations company, spoke about his experiences with their 16,000 bikes and 1.3 million users across 10 markets. In California, Motivate is the operator of Bay Area Bike Share (BABS), which is slated to expand from 700 bikes to 7,000 bikes in the next few years across San Francisco, the East Bay, and the South Bay. Collaboration among various stakeholders and the Metropolitan Transportation Commission (MTC) was essential in planning the expansion. Mr. Waugh also stated the importance of station density to make bikesharing systems ubiquitous. Regarding ease of payment, he mentioned the possibility of having app-based payment in the future without a key fob. He concluded with an emphasis on smarter, more livable cities that promote active forms of transportation. He pointed to the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide as a good way for public agencies to achieve some of these goals toward more livable streets.

Expert Panel 2: Future of Shared Mobility and Potential Impacts on Transportation Planning and Operations

The second expert panel of the day, The Future of Shared Mobility and Potential Impacts on Transportation Planning and Operations, was moderated by Amanda Eaken of the National Resources Defense Council (NRDC). She began her remarks by placing the conference in the context of the current transportation policy climate—Caltrans recently unveiled its new mission and ambitious goals, hoping to reduce VMT and GHG emissions by 15 percent each by 2020. After her opening statements, she gave the five panelists an opportunity to share their perspectives and then fielded questions.

Jim Allison, representing both Capitol Corridor and BART, was the first panelist to speak. He emphasized that while his power is limited because the Capitol Corridor does not own the parking lots surrounding its stations, first and last mile connectivity issues are still critical to his organization. For example, he stated that the Capitol Corridor is working with cities to support bikesharing as a means to better use the space around stations and to promote shared mobility. He argued in favor of using bike infrastructure to support short and frequent trips, as public transit currently has at least a 15-minute headway. He equated the Capitol Corridor system to removing a half-lane of road that did not need to be built. These types of benefits arise when policymakers focus on moving people and not vehicles.

Rick Hutchinson, formerly the CEO of City CarShare and now a carsharing expert, began by explaining that people have been engaged in shared mobility since ancient times. Coming from a nonprofit background, he said that shared mobility was driven by the "three Es of sustainability"—economics, environment, and equity. He went on to stress the point on equity and how it is defined by geographic access as well as financial inclusion. He also stated that any equitable system should take into account social, racial, disability, technological, and economic equity factors. Mr. Hutchinson explained that since current public transit services are either oversubscribed or undersubscribed, an ecosystem of different mobility modes is needed to either share the burden or feed in passengers. He did caution, however, against blindly accepting any shared mode, as some are not as "green" as others. While he expressed concern that there was no mention of bikesharing in the federal transportation bill, he shared that transit-oriented carsharing was mentioned in MAP-21. While he argued in favor of private sponsorship of government-provided mobility services (e.g., bikesharing), he cautioned against the risks associated with over-reliance on the private sector.

Joseph Kopser of RideScout pitched a case for aggregation of information on shared mobility options, as well as better targeting of government budgets through these systems. He explained that his company, which aggregates mobility options and costs for the end user, focuses on the individual's mobility rather than on the automobile's mobility. He stressed that all the requisite information is available, but the challenge remains in connecting these data in an accessible way for users. He posed the scenario where rather than adding a new bus line, a government will be looking to get people smartphones with a data plan that can connect them to the existing complex ecosystem. He also suggested that governments could target their subsidies more efficiently through these mobility aggregation apps. Mr. Kopser went on to propose a "density tax" rather than a gas or VMT tax, as this would set a price based on the density of the mode used (e.g., a carpool would have a higher density weight than a single occupant vehicle) rather than the mode itself. In this way, a lower-density mode would have a higher tax. On the

topic of transportation accessibility, Mr. Kopser suggested that the audience read the book *Our Kids: The American Dream in Crisis*, by Robert Putnam. He argued that society needs to invest money to provide transportation systems for low-income and low-access communities.

Sarah Hunter represented Google[x]'s AV program. She described the vehicle her team is working on as semi-autonomous, in that it drives itself on the freeway, but the driver takes control on surface streets. She said the vision is to develop a vehicle that does not have a steering wheel and the driver would be entirely free of control. She supported this vision with the figure that 94 percent of accidents are caused by human error, thereby making a case for increased safety due to AVs. She also made a case for accessibility, as AVs could serve older and disabled people who are no longer willing or able to drive. She did note, however, that technology does not solve the issue of lack of high speed transit or rail in the U.S., and she argued for greater investment in these areas. During the Q & A session, Ms. Hunter was asked about induced traffic as a result of the mobility gained by people who could not drive before. She responded by saying that she envisions AVs being shared more by its users than present-day shared vehicles. She predicted that AVs would also be idle for less time during the day, if they could drive themselves without a driver on board (i.e., could go to pick up children or other items) and in its own way become a taxi-like vehicle. She also gave a five-year timeline after the development of a fully self-driving car before it could be brought to the market on a mass scale.

Finally, Sam Shelton spoke on behalf of the Sacramento Council of Governments (SACOG). He explained that SACOG has been developing voluntary sustainability plans that include shared mobility for the cities in its purview, and he is working to entice cities to adopt these plans. He cited regional bikesharing as an example of where shared mobility can be used as a tool to meet sustainability goals, and SACOG is investigating a unified payment system for different mobility modes, similar to the Bay Area's Clipper Card. He also said that his agency was working on developing a comprehensive travel survey. Mr. Shelton advocated for greater collaboration while noting that agencies, like SACOG, bring together various stakeholders. He stressed the need for true public-private partnerships in achieving sustainability objectives.

BREAKOUT DISCUSSION SUMMARIES

After a break for lunch, workshop participants divided into four groups in separate meeting rooms to discuss shared mobility impacts and planning issues in a smaller group setting. Three discussions were led by members of the TSRC research team: Susan Shaheen, Rachel Finson, and Apaar Bansal. The fourth group was led by Mike Cappelluti of Highland Consulting Group. The breakouts were divided into two topic areas: shared mobility travel impacts and the impacts of shared mobility on Caltrans planning and operations. A summary of both of these breakout sessions are presented below.

Topic 1: Impact of Shared Mobility on How People Travel and Select Modes

The first breakout topic started by asking what exposure, if any, each group participant personally had in the past with shared mobility services. A number of services were mentioned including: ridesourcing/Transportation Network Companies (TNCs), carsharing, bikesharing, microtransit, shuttles, carpooling, vanpooling, and various others. The majority of shared mobility modes discussed earlier in

the day were used by at least one person at the summit. The amount of use and specific modes varied widely, with participants from the San Francisco and Los Angeles areas having slightly more experience than others with certain modes, although many attendees had experience with at least one shared mobility service.

Groups then discussed what they believed to be the most interesting and useful aspects of shared mobility. Emphasis was placed on the fast growth of many of these services in only a couple of years—from research concepts to startups and companies becoming more commonplace. Aspects discussed included:

- On-demand service quality,
- Changing public perception,
- Individual imperative,
- Efficient use of resources, and
- Infrastructure implications.

The on-demand aspects of shared mobility services were discussed. The fact that rides can now be hailed on-demand with low waiting times is an interesting development that changes the historical operating model of many transportation modes. Group members mentioned a shift in public perception being brought about by shared mobility. There is a newfound individual imperative that a traveler can do something about pollution, congestion, and community livability. Many of these companies foster this mindset and help facilitate actionable travel changes to reflect these values. This perception is even shifting at the regional planning level, as agencies are increasingly concerned with moving people, instead of the previous practice of moving vehicles. Infrastructure and funding changes brought about by shared mobility were explored, since it is clear that expanding infrastructure is not a viable long-term option. Participants discussed that opportunities to more efficiently allocate transportation funds with increased adoption of shared mobility is a useful impact of these services.

The groups also brought attention to potential negative impacts of shared mobility. These impacts include:

- Tension in existing industries (e.g., taxis);
- Delayed reaction of legislative oversight;
- Accessibility/equity issues; and
- Mode shift away from public transit.

Tension in the automobile and taxi industries was noted as a concern. Since many of these innovative services are entering markets with established companies and business practices, the concern is that the disruption will have a ripple effect across industries and regulating bodies. The effects are already being seen with companies, such as Lyft and Uber, and regulating bodies like the California Public Utilities Commission (CPUC). Another concern raised by participants was that governmental agencies are slow to react and properly regulate some of these new technologies. The private sector has a history of moving faster than the public sector, but the gap in speed is widening as technology companies are innovating at increasing rates. This dichotomy was discussed as something that public agencies need to recognize,

as they are creating new rules around shared mobility services. In addition, accessibility/equity issues were examined, and group members shared concerns about equal access to mobility services. Disabled users and users without a smartphone were mentioned as two population groups whose access to some of these services is noticeably diminished, and this should be highlighted as an area for improvement. Modal shift away from more sustainable modes, like public transit, and a possible increase in VMT were cited as potential future problems due to shared mobility. Some participants noted that certain modes could eventually become so attractive that riders may be drawn off of existing public transit services, decreasing public transit ridership and possibly increasing VMT, depending on the modal shift. Overall, the behavioral change barrier was mentioned as one of the biggest impediments to the growth of shared mobility. As was discussed during the panel sessions, group members echoed the notion that shared mobility services would not see large modal share proportions until it is something that is "instinctual," like getting into your car and turning the key. Although there are concerns over the current status and future development of shared mobility, many participants noted the importance of public and private sector cooperation to ensure that any potential negative impacts are mitigated to the fullest extent possible.

Discussion then turned to specific shared modes and which of them would have the largest impacts on how individuals travel in the present and future. Attendees noted that bikesharing could have a more immediate positive impact on public perception and shared mobility use. Since it is a mode that is easily noticed on the street it invokes the curiosity of members in the community. It is also fairly cheap compared to other shared modes and has a lower barrier to entry (all you need to know is how to ride a bicycle). In this sense, attendees saw it as a "gateway mode" to other shared mobility services. Carsharing was mentioned by some groups as having similar properties to bikesharing, as another possible gateway. Carsharing is also easily spotted on the street. It can have a notable impact on behavior and even household vehicle holdings. If individuals realize they can replace a family vehicle with a carsharing membership, the reduction in VMT could have a significant positive impact. Looking to the future, group members explored the transformative impacts that AVs might have on the transportation landscape. Discussions centered around disruption of existing industries, land use and travel pattern changes, and social and environmental impacts. The potential for demand aggregation was explored as was the possibility to have different shared AV services to address a broad array of demand. Emphasis was placed on the need for AVs to work in combination with shared mobility, since induced demand for AVs that are not shared could potentially lead to large VMT increases and negative land use results. AVs for freight also were mentioned as having the potential to disrupt the trucking industry and to provide positive benefits from reduced emissions and improved efficiency. Possibilities for combining freight and passengers in AVs were mentioned as another possibility to increase travel occupancy and efficiency, as well as to decrease VMT and GHG emissions.

Topic 2: Impact of Shared Mobility on Caltrans Planning and Operations

After the first discussions on the impacts of shared mobility, the groups focused on how shared mobility might impact Caltrans planning and operations, as well as how these services could aid the Department in reaching its local and statewide goals. Workshop participants highlighted the following ways that shared mobility might impact Caltrans planning and operations:

- More public-private partnerships,
- Increased cooperation among Caltrans departments,
- Updated planning protocols,
- Increased information sharing,
- New funding opportunities,
- Facility design changes, and
- Expanded service areas.

The importance of public sector involvement in legislative and planning processes regarding shared mobility companies was emphasized by many of the groups. The public sector will need to be involved in certain decisions regarding how, where, and for whom these services operate. Without involvement of public agencies like Caltrans and others, the transportation solutions that develop might not be the most equitable for all parties involved. On a related theme, some attendees explored the possibility of partnerships with Caltrans and shared mobility companies. This might include a project that incorporates dedicated space for certain carsharing operators, for example. Although there could be many partnership benefits, concern was raised as to how the system for establishing these partnerships would work. Competitive bidding issues might arise due to the current low number of operators in certain markets. Further, the speed of innovation may move so fast that by the time the procurement process is completed, the approved technology could be obsolete. Due to these concerns, further work should be done to explore the possibilities of mutually beneficial shared mobility partnerships.

Discussion also focused on the impact that shared mobility services might have on planning, engineering, project delivery, and operations teams, along with increased cooperation among departments that would be needed to handle these projects. Since shared mobility services often blur the lines between traditional transportation modes, coordination among various departments will be key in all project stages that incorporate shared modes. Some Caltrans planning practices may have to evolve as well, and workshop participants shared that much of their planning goes out as far as 20 or more years into the future. Since developments in shared mobility happen at a much more rapid pace, Caltrans will need to adapt and create more versatile planning protocols. Some employees suggested a kind of “living document” that is updated more regularly than current long-range planning reports. Updating metrics in the planning process was also mentioned as a potential solution. For example, delay-hours could be changed to some sort of “service reliability metric” in planning certain projects.

Data use and sharing issues were also explored as something that would impact Caltrans planning and operations. The increased accuracy and amount of data that shared mobility modes generate could be incredibly useful to Caltrans planners. These data might be able to aid in travel demand planning by generating origin-destination pairs in real time. Data might also be useful in determining bike ridership along certain corridors, and this understanding could aid in planning bicycle infrastructure growth. There were many other data applications discussed, but the need for having open and shared data was elicited across many Caltrans group members. The data sharing issue goes both ways, however, and some private industry representatives voiced desires for more open public data for their services to build upon, like real-time public transit information.

Other impacts included potentially reduced maintenance costs for Caltrans facilities, since shared mobility might bring increased occupancy and therefore reduced need for roadway capacity. In addition, facility design changes were mentioned, and examples like narrower lanes for AVs and dedicated spaces for carsharing and bikesharing were discussed. Focus also turned to the opportunity for shared mobility to fill in gaps in the current transportation landscape, and Caltrans employees spoke to ways in which shared mobility services could be catered to the user, providing mobility services in areas where the current system does not. Groups mentioned differences between urban and rural mobility needs and the feasibility of shared mobility services in a rural context. In some rural areas, freight has greater mobility than people, so finding a way to potentially link freight with personal mobility needs could be beneficial.

In terms of shared mobility affecting day-to-day responsibilities, Caltrans employees noted that they could make projects more complex by adding additional stakeholders. Many employees marked this as a positive challenge, since it would lead to unique projects and strategies that would make for safer, more livable solutions. Caltrans employees also mentioned the impact shared mobility may have on deciding when to intervene and when to get out of the way. Some shared modes might mean less complexity in some cases, if some of the original issues are met by shared mobility solutions.

Caltrans Action Items

The second breakout session closed with action items for Caltrans regarding what they could start implementing in the near future to maximize the benefits of shared mobility for their planning and operations work. Group members suggested various ideas, some citing specific planning documents or potential pilot projects. Action items included:

- Public outreach,
- Interagency friendly shared mobility competitions,
- A shared mobility committee, and
- Planning/Project Delivery meetings and expanded coordination.

A topic echoed throughout the workshop is that many individuals who try shared mobility services generally like them; however, it is challenging to get people to try these services. This is often the highest barrier to entry in the adoption process. Workshop participants suggested that Caltrans and other agencies hold public outreach programs, where public employees guide community members through downloading apps, using them, and navigating the array of mobility services available that fit their personal travel needs. Incentivization and gamification were also discussed as good ways to keep individuals motivated to use shared mobility and alternative modes. Some groups even suggested a Caltrans board member meeting race, where Caltrans leaders try to race to the next board meeting equipped with a smartphone and shared mobility services in place of a personal vehicle.

Another action item discussed was the possibility of creating a shared mobility committee, similar to the California Road Charge Technical Advisory Committee (TAC). This committee would be comprised of members from Caltrans and other advisors from around the state, and this group would help provide advice on shared mobility projects throughout the state. The committee could also provide

recommendations on potential future pilot programs that incorporate shared mobility services. Pilot projects were also explored by attendees including a:

- Complete streets design pilot incorporating dedicated parking for carsharing,
- Office bike pools (some Caltrans offices already do this), and
- Exploring fund allocation to facilitate shared mobility.

Caltrans employees also focused attention on opening more discussion among members of different divisions in the project delivery process. They noted a need for increased coordination among the planning, engineering, and project delivery teams. Caltrans planners noted that Intelligent Transportation Systems (ITS) components of projects often get eliminated at the final project delivery stage due to monetary and time restrictions. These components are often removed due to project delivery incentives for quicker and cheaper delivery, which accomplishes some objectives but sometimes fails to incorporate newer technological elements into projects. Due to this, the planners suggested more coordination among divisions and an examination of the current planning document framework. Some of these specific documents and processes discussed included:

- *Project Initiation Document (PID):* These documents outline the project purpose and needs, and they present the project scope and alternatives studied. Planners discussed ways to make ITS (which could include shared mobility) more of an important component in these documents.
- *Transportation Concept Report (TCR):* This is a planning document that describes the Department's conceptual improvement options for a given transportation route or corridor. This document guides PIDs. Although PIDs cover ITS and bicycle facility design, often these components do not make it into the TCR. Caltrans planners noted that updates for the TCR are due in 2017, and they emphasized the need for these components in the TCR to have a stronger tie to the PID and final project delivery.
- *Integrated Corridor Management (ICM):* These are federal and state programs that encourage demonstrable transportation network improvements. Caltrans employees mentioned these programs could be a great way to integrate shared mobility to help meet sustainability goals at the state and local levels.
- *Highway Design Manual (HDM):* This is the engineering specifications manual that guides roadway and facility design standards. Although progress is being made, group members emphasized the importance of integrating more complete street and bicycle facility design guidelines. Participants also noted that the HDM could allow for more flexibility at the local level, delegating more design decisions to individual districts.
- *Value Analysis (VA):* Studies that incorporate a function-oriented, systematic team approach to analyze and improve the value in a project, product, or process. They also consist of a week-long meeting and are required for projects over $50 million or for bridge projects over $40 million. Caltrans workshop participants suggested adding a shared mobility or socio-economic analysis component to the VA.

These are just a few examples of specific documents and processes mentioned during the second breakout session that may be able to incorporate shared mobility. The list could likely be expanded, but

time constraints limited the depth to which these specific action items could be discussed at the workshop.

CONCLUSION

The role of shared mobility in transportation systems is spreading. The economic, environmental, and social forces driving demand for innovative transportation modes is gaining momentum and bringing issues regarding these services into the public spotlight.

This expanding role is not only drawing attention from local municipalities, but it is also garnering notice from state and federal agencies. This workshop marked the beginning of a dialogue among Caltrans employees from across the state, their local partners, and shared mobility thought leaders. Attendees were exposed to a spectrum of shared mobility services and related topics from a wide range of perspectives. The workshop also provided Caltrans employees with a forum to discuss these innovative services with fellow employees across different districts and divisions, their local partners, and the industry.

The day opened with Caltrans leaders sharing their thoughts on how shared mobility fits into the Department's overall goals. It was followed by two expert panels discussing industry trends/developments and partnership possibilities, and it ended with small group discussions on thoughts and ideas for integrating these services into Caltrans practices. This facilitated the sharing of ideas and the beginning of new initiatives.

The workshop highlighted key issues in shared mobility and Caltrans planning and operations, including:

1) The need for reformed Caltrans planning practices that better streamline the incorporation of shared mobility services as a strategy to achieve policy goals;
2) The importance of data sharing from both the public agency and private industry sides;
3) The transformative role shared mobility could have in helping to meet Caltrans' future year goals;
4) The importance of coordination among public entities and shared mobility companies to address accessibility and operating efficiency issues; and
5) The need for action taken by public agencies in the form of pilot projects and revisited metrics and processes.

Much of the dialogue during the breakout sessions centered around what Caltrans' role should be in the shared mobility realm. While many employees admitted these types of projects had not hit their desks yet, most saw how it could change the way people access transportation. They also saw value in discussing these topics and thinking about the best ways to incorporate them into their work processes.

Shared mobility is growing with services like carsharing, bikesharing, ridesourcing/TNCs, ridesharing, shuttle services, microtransit, and network courier services, as well as future possibilities like connected infrastructure and automated vehicles. Shared mobility services will continue to be a part of the mobility equation as technology and design continue to evolve, and they will likely have an expanding role in

California. Given this, collaboration among various public and private stakeholders can help to ensure a future with transportation options that are more equitable, cost-effective, efficient, and environmentally sustainable.

2015 SHARED MOBILITY: A SUSTAINABILITY AND TECHNOLOGIES WORKSHOP AGENDA

Intended Outcomes:

-Increase understanding of the diverse nature of emerging shared mobility options
-Explore impact of shared mobility on Caltrans transportation planning and operations, as well as partnerships with local agencies
-Explore how shared mobility can enhance Caltrans mission and goals

9:00 **Sign-in**

9:15-9:30 **Welcome and Program Overview**
Susan Shaheen, TSRC, UC Berkeley

9:30-9:45 **Caltrans' Perspective on Innovation and Technological Change**
Steve Cliff, Assistant Director Sustainability, Caltrans
Coco Briseno, Caltrans HQ

9:45-10:45 **Shared Mobility Expert Panel**

- What is shared mobility?
- History and evolving types of shared mobility
- Smartphone apps
- Q & A

Moderator
Tim Papandreou, San Francisco Metropolitan Transportation Authority

Panelists
Emily Castor, Lyft
Walter Rosencrantz, car2go
Paul Steinberg, Carma Carpooling
Kansas Waugh, Motivate

10:45-11:00 **Break**

11:00-12:00 **Future of Shared Mobility and Potential Impacts on Transportation Planning and Operations - Expert Panel**

- Evolving definition of public transit, fewer cars on the roads, fewer cars parking, blurred lines between public and private transportation
- Automated vehicles and mobile payment in relation to shared mobility
- Accessibility implications

Moderator
Amanda Eaken, NRDC, Moderator

Panelists
Jim Allison, Capitol Corridor
Rick Hutchinson, Carsharing expert

Joseph Kopser, RideScout
Sarah Hunter, Google X
Sam Shelton, Sacramento Area Council of Governments

12:00-1:00 **Lunch**

1:00-2:00 **Breakout Discussion Topic 1: Impact of Shared Mobility on How People Travel and Select Modes**

- Small group moderated discussion (20-25 persons/group)
- Participant experience and perspective
- Challenges and Benefits
- Travel Impacts of shared mobility in near and longer term

2:00-3:00 **Breakout Discussion Topic 2: Impact of Shared Mobility on Caltrans Planning and Operations**

- Small group moderated discussion (20-25 persons/group)
- Impact of shared mobility on Caltrans planning and operations
- Impact of shared mobility on participants day-to-day responsibilities
- How can Caltrans maximize the benefits of shared mobility in relation to planning and operations?

3:00-3:15 **Break**

3:15-4:00 **Breakout Summary and Findings**
Susan Shaheen, TSRC, UC Berkeley

- Reconvene group together
- Breakout session 1 summary presentation
- Breakout session 2 summary presentation
- Possible next steps

4:00 **Adjourn**