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Changing Workforce Development Needs for Regional Transportation Planning Agencies in California

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Changing Workforce Development Needs for Regional Transportation Planning Agencies in California

A Research Report from the National Center for Sustainable Transportation

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National Center for Sustainable Transportation

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A National Center for Sustainable Transportation Research Report

November 2018

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EXECUTIVE SUMMARY

The transportation industry faces future workforce challenges, including a lack of trained personnel in fields such as engineering, construction management, and intelligent transportation systems (ITS). The public sector will be particularly hard hit because it faces the threat of attrition at senior levels as skilled workers retire or move to the private sector.

The issue of transportation workforce development has received attention at the national level. Research has been conducted through the United States Department of Transportation (USDOT) National Cooperative Highway Research Program (NCHRP) on workforce needs of the public sector, although these focus exclusively on statewide agencies like DOTs. Little, if any, research has been done on the training and workforce needs at the regional level where Metropolitan Planning Agencies (MPOs), Councils of Government (COG), and transit agencies are engaged in both transportation planning and operations.

In California, the workforce capacity of MPOs in particular was challenged by the 2008 passage of Senate Bill (SB) 375. This legislation uses the transportation planning process to achieve reductions in greenhouse gas emissions. It requires MPOs, in partnership with the California Air Resources Board (CARB), to establish greenhouse gas emissions targets. MPOs are also required to include a Sustainable Communities Strategy (SCS) in the regional transportation plan that demonstrates how a given region will meet established targets.

This project aims at understanding how fundamental changes from SB 375 and other legislative mandates have impacted MPOs from a workforce standpoint. Using online surveys, job scans, and in-depth interviews with members of COGs and MPOs in California, we determined the importance of several factors on workforce capacity. These factors include recruitment, available funding for professional development, curriculum content in college and university programs, and the role of in-service training. Results indicate that, for regional transportation planning agencies, there is an increased need for functional modeling expertise to comply with SB 375 mandates and the need to accommodate a shift toward activity-based modeling. The interview participants acknowledged that SB 375 increased responsibilities and changed processes for MPOs, including the need to consider the possible impacts to the agency of litigation over the SCS or the Regional Transportation Plan (RTP). The interviews also indicated that, MPOs hire personnel with diverse skill sets—ranging from engineering to modeling and public outreach—to deliver on SB 375 goals. The report seeks to document the evolving role of MPOs resulting from the kind of mandates enacted by SB 375 and the concurrent demand for both traditional skills sets relating to regional planning processes and those that respond to demands for planners to:

- Optimize existing projects by making them "smarter" and further ensuring that these projects contribute to environmental sustainability.

- Link transportation planning to land use patterns with the intention of diminishing vehicle miles travelled (VMTs) and associated pollutants.

These are new inextricable planning synergies that require planning professionals to marry traditional transportation planning skills with climate change assessment and abatement skills. Throughout this report we will refer to this as "sustainable transportation planning skills." This expectation is tacitly set forth in SB 375 and is impacting employee hiring and retention and employee salary needs, as well as the need for additional training and skill building. Our study's findings will contribute to our knowledge of workforce development needs as well as the potential for policy responses at the federal, state, and local level.

Introduction: Research Issues and Objectives

The public transportation industry is undergoing significant changes in the composition and skills capacity of its workforce. This transition can broadly be described as transitioning into sustainable transportation planning. The shift results from a combination of factors, including the retirement of senior personnel, a need for incoming personnel to have new sustainable planning skills, and a lack of trained personnel in fields such as intelligent transportation systems (ITS). The public sector will experience significant workforce challenges as it faces the threat of attrition at senior levels and skilled workers move to the private sector (Warne 2004).

These trends are forcing public transportation agencies and private industry to consider the role that succession planning, job recruitment, and job retention play in their missions and training strategies. The nature of the workforce replacing soon-to-be-retired workers is also changing. Given significant demographic shifts in the United States over the last 50 years, contemporary workforce development initiatives increasingly promote transportation workforce reflective of this diversity (Bureau of Labor Statistics, 2015).

At the same time, organizations are being forced to rethink their purpose because of changing trends in technology and service delivery. These trends influence the type of skills needed by employees, particularly mid- and senior-level managers. "Soft" skills once considered complementary are now central to effectiveness. Personnel with multi-disciplinary skill sets such as computer programing, customer service, project management, people management, and compliance have emerged across domains to provide a big-picture approach. Most of the studies conducted to assess the impact of changing trends on the transportation workforce have focused on the national and state levels (Harder, 2006; Harder and Benke, 2005). Little, if any, research has been done on the training and workforce needs at the regional level, particularly in the case of the public sector where MPOs, COGs, and transit agencies may be engaged in both planning and operations.

This report addresses the research gap in regional and local transportation workforce needs. Our focus is on the impact of mandates emanating from California statewide environmental legislation. California's aggressive legislative program is often viewed as one that establishes nationwide standards in areas such as fuel standards, use of alternative fuels, and applications of new financing strategies such as cap and trade. Our interest is in how local and regional transportation agencies respond to the demand for work products—such as plans and models—that result from these programs. What adjustments and changes are made in terms of resource/staff allocation, recruitment, and hiring and training?

The report is outlined as follows:

- Review of literature on transportation workforce needs, including a summary of prior work by the authors on workforce needs of transportation agencies and transit operators.

- Survey of a decade's worth of environmental legislation from California to consider the possible impacts on the workforce needs of the agencies charged with implementing them.

- Review of the development of California Senate Bill (SB) 375 which, in establishing planning and reporting requirements for SCS, impacted the job functions of regional planners within MPOs.

- Summary of the research methodology used to obtain input from the California MPOs responsible for developing the SCSs on the workforce-related changes brought about by SB 375. This includes our efforts in matching the job functions identified by MPOs with the skill sets demanded by available job postings for transportation planners.

- Recommendations for MPOs (as well as for the educational institutions that graduate transportation planners) regarding the development, hiring, and retention of planners capable of meeting current workforce needs.

Literature Review

Research on Transportation Workforce Needs

Most transportation workforce research has focused on national or statewide perspectives (e.g. Spy Pond Partners et al 2009; Poister 2004; Warne 2003), including the need for a methodology to accurately count the nation's transportation workers (Sen and Rossetti 2007). This section reviews the literature on public sector workforce development, revealing the gaps at the local level.

Changing Roles and Changing Demographics

Multi-agency and public-private coordination are the new norm for the transportation workforce in the public sector. Driven in part by legislative imperatives that require cross-sectoral or intergovernmental collaboration as well as extensive community outreach, the nature of the traditional transportation planning job function has changed. Meanwhile, comprehensive evaluations of in-service training opportunities are needed but not always performed. Traditional educational and internship programs do not prepare young workers for workplace issues as diverse as technology transfer (Harder 2006), team building, capital project analysis, visioning, and community justice/civil rights (Warne 2005).

Changing workplace demographics play a significant role in workforce development pressures. According to the U.S. Department of Labor, the workforce growth rate has declined from a high of 2.6 percent in the 1980s to 1.2 percent between 2000 to 2015, and an expected growth rate of only 0.2 percent from 2015 to 2025 (Gee 2009). Furthermore, by 2020, between 16.5 percent and 20 percent of the population will be 65 or older (Warne 2005a; Harder 2006). More than 50 percent of the California state transportation agency workforce was eligible to retire by 2013. This is more than double the national workforce retirement rate (Committee on Future Surface Transportation Agency Human Resource Needs 2003). According to the U.S Departments of Education, Transportation, and Labor (2015), this trend continues, as more than 50 percent of transportation industry employees were older than 45 in 2014.

2014 Worker Distribution by Age:
Transportation Subsectors vs. All Industries

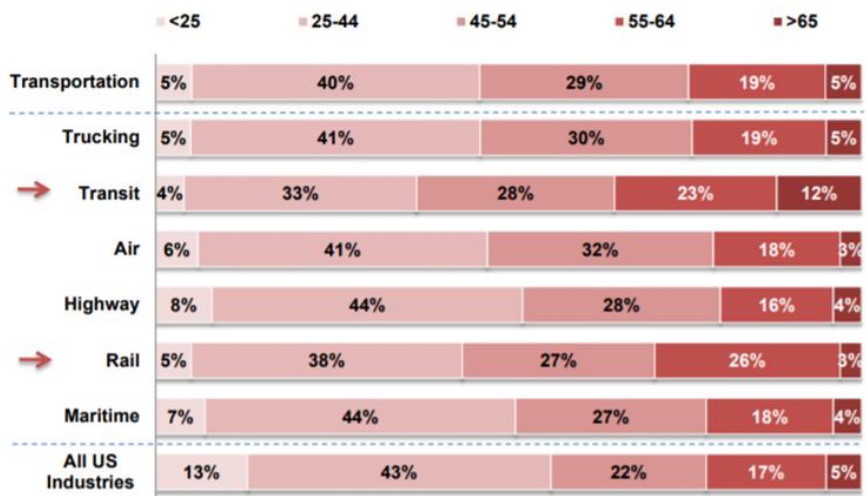|	<25	25-44	45-54	55-64	>65
Transportation	5%	40%	29%	19%	5%
Trucking	5%	41%	30%	19%	5%
→ Transit	4%	33%	28%	23%	12%
Air	6%	41%	32%	18%	3%
Highway	8%	44%	28%	16%	4%
→ Rail	5%	38%	27%	26%	3%
Maritime	7%	44%	27%	18%	4%
All US Industries	13%	43%	22%	17%	5%

Figure 1. Worker Distribution by Age in United States *(U.S. Departments of Education, Transportation and Labor, 2015)*

In addition to emerging labor shortages and a growing disparity between public and private salaries, wide-scale retirement will also create an industry expertise vacuum. Those who retire are often skilled, especially as they carry the most agency-specific knowledge (Rothwell and Poduch 2004). On the transit side, approximately 40 percent of skilled technical workers are at retirement age. According to the Transit Cooperative Research Program (2008), in some rail transit agencies, this number is closer to 70 percent. While transportation industry workforce expertise is lost due to attrition, the skills needed by employers have also changed over time. Transportation agencies are being forced to rethink their purpose because of trends in technology and service delivery. Functional skills once considered complementary (e.g. project management, communications, knowledge of context sensitive solutions) are now central to effectiveness (Warne 2005).

Furthermore, the rapidly changing nature of the work itself outpaces the ability of education and training programs to deliver consistently relevant curricular materials. And the traditional degree programs that feed the transportation workforce, including urban planning and engineering, face competition from other disciplines. Many college students no longer find engineering (Blue, et al 2005) or research as attractive as other professions. While the United States produces more researchers than any other country, those numbers are flattening out. Other nations like China are catching up. Koehler (2005) estimated that California alone needs an additional 650,000 graduates of college programs to keep pace with the world's top performers. Likewise, projected transportation job openings exceed corresponding educational program completion by 68 percent (U.S. Departments of Education, Transportation and Labor, 2015). While technology and Intelligent Transportation Systems (ITS) may help modernize the transportation industry and attract young employees (Agrawal 2008), they also increase the training investment required for both new and incumbent employees (Shiplett 2006), even as they eliminate some positions altogether (Harder and

Benke 2005). Hence, there is the gap between what is taught, what is desired, and the future skills required for a modern transportation workforce. Clearly, this gap has resulted in a deficiency of qualified employees who can plan for, design, operate, and direct transportation systems.

There are also labor market and branding challenges for the public sector. Higher salaries and promotional opportunities offered in the private sector and other fields are strong incentives for trained personnel to leave the public sector (Warne 2004). A Converges Corporation study determined that private-sector competition for skilled workforce members will intensify (Pratt, 2007) and that this trend results in public sector managers finding the size of their potential qualified labor deficient (Collins 2008). Transportation employees are no exception. Results from a survey of DOT transportation employees from three states indicated that 25 percent of respondents were considering leaving because of the potential for a higher salary or a better opportunity for promotion elsewhere (Warne 2003), despite the ability of the public sector to meet the more altruistic needs of the workforce because of its perceived focus on public service (Collins 2008; Naegelen and Mougeot 2011). Where salaries are not competitive, organizations try to offer opportunities for career advancement, on-the-job training, flexible work schedules (De Caluwé et al. 2014), and opportunities for personal fulfillment.

This could serve as a comparative advantage for the public sector. For the millennial population, quality and purpose of work is valued more than compensation offered. A Pricewaterhouse Cooper (PwC) research report from 2015 on transportation and logistics concluded that millennials desire to be associated with organizations which are value-driven, less bureaucratic, and change-oriented in their processes and systems (Pricewaterhouse Cooper, 2015). However, public-sector work spaces suffer from lack of brand identity. Employer brand is a key element in attracting and retaining young employees. Employers in the private sector are increasingly adopting digital platforms such as LinkedIn, Twitter, Facebook, and other forms of social media to garner and enhance brand image (Pricewaterhouse Cooper, 2015). This medium of hiring has become the new norm, and public-sector recruitment strategies, which must adhere to stricter process-driven guidelines, find it hard to compete in a dynamic labor market.

The challenge of meeting workforce development needs has received the attention of transportation officials at all levels of government, as well as private industry. The impact of key trends, like the retirement of the baby boomers, is expected to hit the public sector, especially transportation and state-level agencies, particularly hard. These trends are forcing organizations to consider the roles that succession planning, job recruitment, workspace branding, and job retention play in their organizational strategies.

Unique Challenges at the Local and Regional Level

While the public and private sector are both confronted with the need to respond to workforce development challenges and identify means of designing training programs that respond to both organization-specific and individual needs (i.e. just-in-time training), the workforce development landscape for the public sector is decidedly different. This is particularly true at the local level.

The workforce challenge at the local level is, in some ways, dependent upon the landscape at the state and national level because of some integrated policy making and financing processes. Some

federal and state programs work directly with local agencies or via state partners to address training needs (e.g. FHWA's Local Technical Assistance Program, the Metropolitan Capacity Building Program, and the Transportation Curriculum Coordination Council). While these opportunities for collaborative partnerships are numerous, they can become burdened by institutional impediments, especially when specific local incentive structures are not considered (Bunse and Fritz 2012). This is not unlike partnerships at other levels of government, but the situation is made more complex by the sheer number of possible jurisdictional entities involved at the local level. For example, in the case of border crossings, agencies at all levels share some common incentives, but different border agencies have varying objectives. Transportation agencies are focused on optimizing approach roads, while Homeland Security is almost solely dedicated to intercepting contraband people and goods. Additionally, control to change border practices rests with officials at higher levels of government. In this case, a one-size-fits-all approach to training does not work.

In addition to institutional and multi-level coordination, the diverse needs of the modern transportation workforce complicate training. Local and regional agencies are heavily involved in not only planning, forecasting, budgeting, and financing, but also operations, which traditional surveys of transportation departments do not address. MPOs, for example, participate in program implementation, such as Intelligent Transportation Systems, resulting from changes first enacted in federal legislation such as the Intermodal Surface Transportation Efficiency Act (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21). They also work with transportation providers to implement transportation improvement programs, including those with an environmental focus.

Transit faces challenges like planning organizations, but with one key difference. Local-service transit agencies are, in general, highly unionized. This tends to define the training and education environment, as unions determine these needs for their members. Made up largely of bus operators and mechanics, this segment of the workforce is also older than the rest of the transportation industry (Committee on Future Surface Transportation Agency Human Resource Needs 2003). Despite its makeup, transit is increasingly required to implement specific and complex planning, modeling, and compliance goals. Transit properties are being asked to adopt the characteristics of "high-performing" work organizations to address rapidly changing consumer demands for quality service and government accountability (Schwarz 2014).

More research is needed that considers changes in management approaches, service delivery, and technology, and their relationship to local transit. Surveys by transit associations (American Public Transportation Association 2007) demonstrate the need for more strategic planning and investment in training and education, but more information is needed on how specific agencies are approaching workforce development and how local political, regulatory, and financial contexts are influencing decision-making.

Even less work has been done at the MPO and COG level. At least one study has indicated that it is not clear how local agencies spend training dollars or how they collaborate and cooperate with others in addressing workforce needs (Committee on Future Surface Transportation Agency Human Resource Needs 2003). But more research on the factors that influence workforce capacity at the regional level is needed. This project investigates how California MPOs respond to government

mandates, particularly the new planning and accountability demands imposed by the CARB in the wake of the passage of Senate Bill 375.

A Decade of Legislative Mandates

Considered a progressive state, California has long been a champion of adopting climate-conscious policies (Zeke Hausfather, 2017). In 2006, Governor Arnold Schwarzenegger signed into law Assembly Bill 32, The California Global Warming Solutions Act, which outlined aggressive emission reduction targets for the state (Schmidt, 2007). Over the years, California has advocated for laws reducing global warming impacts. The State has strategized on ways to target sectors such as transportation and curate policies that aim at a low-carbon future.

In last decade (2007-2017) alone, California lawmakers have passed legislation seeking technology-driven, low-carbon solutions for the transportation sector. This nexus of transportation planning, combined with advanced technology, has posed a unique challenge in identifying a workforce capable of understanding, developing, and executing policies for the State. Bills passed in the last decade have focused on the innovative potential of developments in the transportation field without necessarily considering their effect on workforce demands and relevant training. Below are a few examples of these recent bills.

Assembly Bill 118: Alternative fuels and vehicle technologies: October 2007

"The State Energy Commission, in conjunction with other state agencies, is required to develop and adopt a state plan to increase the use of alternative fuels. This bill administers the Energy Commission to create the Alternative and Renewable Fuel and Vehicle Technology Program" (State of California, 2007).

AB118 provides nearly $200 million in annual funding for the adoption of new alternative fuel transportation technologies such as hybrid and zero-emission. Transit operators have benefitted from this bill by obtaining funding for operating low-emission buses. In terms of transportation technology, this bill allows for the voluntary retirement of passenger vehicles and light-duty and medium-duty trucks that are high polluters. In addition, AB 118 changed the workforce needs of state agencies such as the California Energy Commission and the California Department of Transportation (Caltrans) in requiring people to have intrinsic know-how of emerging technology and governance of policies towards such technologies. Although this bill is largely a funding initiative, AB 118 establishes ground rules for low-emission technology in transportation.

Senate Bill 375: Sustainable Communities & Climate Protection Act: September 2008

The greatest impact to MPOs on the issue of climate change was established through SB 375. This legislation required that each MPO, in partnership with CARB, establish a greenhouse gas emission target and develop a Sustainable Community Strategy (SCS).

The SCS must demonstrate how a region will meet targets as part of its regional transportation plan. This bill specifically challenges planning agencies to develop workforce capacity in travel demand modeling.

Senate Bill 1204: California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program: September 2014

"Projects that support greater commercial motor vehicle and equipment freight efficiency and greenhouse gas emissions reductions, including, but not limited to, advanced intelligent transportation systems, autonomous vehicles, and other freight information and operations technologies. The goal shall be to design a simple and predictable structure that provides incentives for truck, bus, and off-road vehicle and equipment technologies that provide significant greenhouse gas reduction and air quality benefits" (State of California, 2014).

Anthropogenic effects of millions of Californians include pollution caused by cars and trucks. SB 1204, at its core, targets the freight sector in ensuring low-carbon goods movement. The bill aims to incentivize the freight sector in making choices about trucks that form an integral part of freight movement. Greenhouse gases (GHG) released by the transportation sector in California contribute to 39% of the GHG inventory across the state (California Air Resources Board, 2018). SB 1204 targets the fuel source and encourages investments in modern technology that could potentially have a sustainable impact for freight movement. Money for this program is provided through the cap and trade revenues. Through SB 1204, technology drives policy solutions for long-term low-carbon impacts.

Governor Brown's Executive Order B-32-15: Sustainable Freight Action Plan: July 2016

The Sustainable Freight Action Plan sets three overarching goals for the freight sector:

Table 1. Priorities of the Sustainable Freight Action Plan 2016

System Efficiency	*"Improve freight system efficiency 25 percent by increasing the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces by 2030."*
Transition to Zero Emission Technologies	*"Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030."*
Increased Competitiveness and Economic Growth	*"Establish a target or targets for increased State competitiveness and future economic growth within the freight and goods movement industry based on a suite of common-sense economic competitiveness and growth metrics and models developed by a working group comprised of economists, experts, and industry. These targets and tools will support flexibility, efficiency, investment, and best business practices through State policies and programs that create a positive environment for growing freight volumes and jobs, while working with industry to mitigate potential negative economic impacts. The targets and tools will also help evaluate the strategies proposed under the Action Plan to ensure consideration of the impacts of actions on economic growth and competitiveness throughout the development and implementation process."*

The Sustainable Freight Action Plan demonstrates the state's intent to be a leader in low-carbon freight systems. The plan also sets clear roadmaps for each state agency in ensuring it satisfies the

above-mentioned targets. The order weaves together many of the dispersed freight efforts across various agencies and sets precedents for what the freight sector should look like by 2030. For statewide implementation agencies, this vision necessitates an accelerated plan for a freight system that will lead the country toward emission reduction (Governor's Office of Business and Economic Development, 2018).

Through the Sustainable Freight Action Plan, the next generation of governing leaders have set new benchmarks. Leaders have acknowledged the environmental impacts of anthropogenic activities and are developing stringent policies that will assist in mitigation. The Sustainable Freight Action Plan is a policy directive for the State of California to reinstate its commitment to technology-based sustainable solutions for the freight sector.

Senate Bill 1: The Road Repair and Accountability Act: April 2017

It is estimated that California needs $12 billion worth of annual repairs on its transportation infrastructure (Transportation Resource Center, 2018). A 12-cent gas tax increase through Senate Bill 1 provides California $5.24 billion each year to improve roads, bridges, freeways, and other transportation infrastructure. SB 1 funds are protected under a constitutional amendment (Assembly Constitutional Amendment 5) that safeguards new dollars for transportation use only.

The projects listed under SB 1 for improvement include areas of modern technology deployment through active traffic management systems. Implementation agencies such as Caltrans also consider workforce development in the transportation sector an important part in delivering the right strategy for sustainable freight movement. Overall, SB 1 is largely a funding directive with an emphasis on programs and projects prioritizing effective transportation infrastructure improvement. There is an environmental imperative as well; SB 1 encourages the adoption of modern technology for low emission.

TRAFFIC MANAGEMENT ELEMENTS

To move people, vehicles and goods quickly, reliably and safely, traffic managers look towards technology to better manage the demand and harmonize traffic flow.

One of Caltrans' strategies to address congestion includes active traffic management, utilizing technology that helps the existing freeway system work smarter and more efficiently to promote safe and consistent traffic flow.

Caltrans uses technology to better manage urban congestion and has invested in more than 50,000 traffic devices that relay travel information to Caltrans and/or help the Department monitor traffic.

▸ SB 1 provides funding to ensure we can bring 90 percent of these traffic management systems to good working order by 2027.

▸ SB 1 dollars will pay for repairs to congestion-reducing technology such as ramp meters, traffic loops and electronic highway message signs.

Caltrans Traffic Management Center
Click for larger image.

Figure 2. Traffic management improvements at Caltrans

A decade of California legislative mandates has focused on issues ranging from sustainable environment to transportation technology. At the federal level, the Obama-era regulation Fixing America's Surface Transportation Act (FAST Act) of 2015 has earmarked over $300 billion through 2020 dedicated to improving transportation infrastructure through efficient project delivery

by state MPOs (U.S. Department of Transportation, 2017). It is evident that regulations in the future will encompass greater responsibility on regional implementation bodies and necessitate skilled personnel. The summary table presented below indicates workforce impacts due to legislative changes in the last decade.

Table 2. Summary of legislative mandates and its impacts on workforce

Legislative Mandates	Workforce Impacts
Assembly Bill 118: Alternative fuels and vehicle technologies: October 2007	• Workforce knowledge of emerging alternative fuel vehicle technology. • Workforce ability to commercialize alternative fuel source.
Senate Bill 375: Sustainable Communities & Climate Protection Act: September 2008	• Workforce capable of performing long-range activity-based modeling. • Workforce capable of performing public outreach. • Workforce capacity in land use and air quality modeling. • Drafting Environmental Impact Reports (EIRs) with long range predictions.
Senate Bill 1204: California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program: September 2014	• Workforce knowledge of alternative fuel technology for heavy vehicles. • Project management skills for testing and quantifying pilot projects.
Governor Brown's Executive Order B-32-15: Sustainable Freight Action Plan: July 2016	• Workforce capacity to develop technology-led solutions for heavy vehicles. • Workforce with knowledge of innovative digital tools to achieve efficiencies. • Project management expertise capable of aligning state goals with departmental goals.
Senate Bill 1: The Road Repair and Accountability Act: April 2017	• Use of modern software applied to active traffic management. • Workforce re-training with respect to latest software techniques.

Most legislative mandates indirectly effect workforce in some form or another. The SB 375 Sustainable Communities & Climate Protection Act of 2008 in particular had a direct impact on the workforce needs of regional planning organizations, as addressed in the next section.

New Challenges in California: The Case of SB 375 and MPOs

As outlined above, the workforce development capacity of local and regional transportation agencies can be challenged by program and policy mandates emanating from other levels of government. In California, one example of this kind of catalyst is Senate Bill 375: Sustainable Communities and Climate Protection Act. This legislation incorporates regional California transportation planning

processes into the effort to achieve reductions in greenhouse gas emissions. SB 375 requires each MPO, in partnership with CARB, to establish greenhouse gas emission targets and to develop a Sustainable Community Strategy (SCS) that demonstrates how its region will meet targets as part of its regional transportation plan.

SB 375 builds upon an earlier piece of legislation, Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, which is a comprehensive program of regulatory and market mechanisms to reduce GHG emissions. Under AB 32, CARB was directed to develop GHG emissions reduction targets. Because of SB 375, CARB is also directed to work with each of California's MPOs to develop an SCS that responds to these reduction targets. Those plans are integrated into regional transportation planning (RTP) processes.

Under SB 375, the principal responsibility for preparing the SCS falls upon the MPO. The SCS must identify:

- Regional land use (important to note that while the MPO must identify the land uses, it DOES NOT control land use decisions), residential densities, and building intensities within a region;
- A transportation network sufficient to service the region's entire population over an 8-year projected period;
- The best practically available scientific information regarding resource areas and farmland in the region; and,
- Reductions in GHG emissions that the SCS projects, as well as any shortfall in reaching CARB's regional target.

If the SCS falls short of meeting targets, then the region must prepare an alternative planning strategy (APS). The RTP is designed to show how a region meets air quality standards and mobility needs. It is required to be updated every three years. While the RTP is undergoing federal review, CARB reviews the SCS or APS.

SB 375 poses challenges for MPOs from a workforce perspective over both the short term and long term. Over the short term, personnel are required to devote additional hours to determine how the SCS will be developed. This process requires that a great deal of staff time be dedicated to coordinating with multiple stakeholders, along with other MPO-level requirements such as the regional housing needs allocation process. Coordinated funding is also an issue because SB 375 requires regional funding allocations to be consistent with the SCS.

Over the long term, the overall goal of SB 375 requires that MPOs accomplish all of the objectives set within the mandate without actually having any enforcement powers. MPOs will need to consider the technical and numerical capacity of their current and future workforce to ensure that personnel have the right skills to meet the state mandates, particularly in regard to quantifying reductions in greenhouse gas emissions.

SB 375 provides a unique context in which to investigate the workforce development needs of state planning agencies. Through online surveys and in-depth interviews with members of MPOs, our study assesses how different organizations that engage in planning and/or operations address a wide range

of issues, including recruitment, funding, curriculum-related needs, the role of in-service training, and future workforce needs. The findings underscore that regional transportation workforces face more acute shortfalls (including skill sets and adequate budgets that align with the SB 375 mandates) than that expected for state and federal counterparts.

Table 3. SB 375-related Milestones

Year	Milestone
2006	Assembly Bill 32: Global Warming Solutions Act directs the California Air Resources Board (CARB) to begin developing discrete early actions to reduce greenhouse gases while also preparing to identify how best to reach the 2020 limit.
September 2008	Senate Bill (SB) 375, also known as Sustainable Communities and Climate Protection Act of 2008, is passed, requiring California's Air Resources Board (CARB) to develop regional reduction targets for greenhouse gas emissions (GHG), and prompts the creation of regional plans to reduce emissions from vehicle use throughout the state. SB 375 requires that Metropolitan Planning Organizations (MPOs) prepare a SCS as a new element of their RTPs, along with the traditional policy, action, and financial requirements.
January 2009	CARB requires creation of a Regional Targets Advisory Committee (RTAC).
October 2009	Secretary of State approves SB 391, which adds new requirements to the State's long-range transportation plan to meet California's climate change goals under Assembly Bill (AB) 32. It also requires that the California Transportation Plan (CTP) identify the "statewide integrated multimodal transportation system" needed to reduce greenhouse gas (GHG) emissions from current levels by 2020 and 80% below 1990 levels by 2050.
July 29, 2010	Fresno COG adopts their RTP.
November 2011	San Diego Association of Governments (SANDAG) sued over 2050 blueprint.
December 2012	SB 391 requires the Department of Transportation to submit an interim progress report which must include a list and overview of all sustainable communities' strategies and alternative planning strategies.

Research Methodology

Our research was conducted through a combination of online surveys, in-depth interviews, and analysis of real-time job postings and job scans. A survey targeting MPOs and COGs engaged in transportation planning was designed, tested, and implemented using Survey Monkey. The surveys asked how various organizations identify workforce development needs. There are also questions that ask how workforce development efforts are financed and evaluated. Survey Monkey allows for both a qualitative and quantitative assessment of survey results. In some cases, follow-up interviews were also conducted.

The survey targeted the members of CALCOG, the California Association of Councils of Government. CALCOG is a statewide association representing 35 regional planning agencies. Members include councils of government representing joint powers agreements of cities and counties as well as county transportation commissions. In each case we directed the survey to the Planning Manager of the unit responsible for the development of the SCS. The proper recipient was determined by a review of agency websites.

While most of CALCOG's members are single-county organizations, the organization also represents multi-county MPOs including the Southern California Association of Governments (SCAG), Association of Bay Area Governments (ABAG)/Metropolitan Transportation Commission (MTC) in the Bay Area, Sacramento Area Councils of Governments (SACOG), as well as the Association of Monterey Bay Area Governments (AMBAG) covering the Monterey/Santa Cruz area. In these multi-county regions there are also sub-regional organizations. In the Southern California region alone, there are 14 sub-regions engaged in regional planning. CALCOG members include the 18 agencies responsible for the development of RTPs and the Sustainable Communities Strategies mandated by SB 375 (See Table 4). These 18 agencies were the focus of the survey outreach and follow-up interviews.

Table 4. Agencies adopting Sustainable Communities Strategy

MPO	Adoption Year	Renewal Year	APS Needed?
Association of Monterey Bay Governments	2014	2017	No
Butte County Association of Governments	2012	2015	No
Council of Fresno County Governments	2014	2017	No
Kings County Association of Governments	2014	2017	No
Kern Council of Governments	2013	2016	No
Merced County Association of Governments	2014	2017	Yes
Madera County Transportation Commission	2014	2017	Yes
Metropolitan Transportation Commission	2013	2016	No
Santa Barbara County Association of Governments	2013	2016	No
Sacramento Area Council of Governments	2012	2015	No
Southern California Association of Governments	2015	2018	No
Shasta County Regional Transportation Planning Agency	2015	2018	No
San Joaquin Council of Governments	2014	2017	No
San Luis Obispo Council of Governments	2015	2018	No
Stanislaus Council of Governments	2012	2015	No
Tulare County Association of Governments	2014	2017	No
Tahoe Metropolitan Planning Organization	2012	2015	No
San Diego Association of Governments	2014	2017	Yes

The online surveys were sent to approximately 20 out-of-sample contacts for testing and input (5-10 in each group). The survey instrument was adjusted in response to the input of the pilot participants to ensure that length, flow, and content were appropriate and that the survey collected as much information as possible. Because some of the questions pertaining to SB 375 are unique to California, it was not possible to test all questions with out-of-sample contacts. Where it was necessary to pre-test with the same agencies likely to receive the survey, different contacts were identified for each phase.

All respondents were asked to provide company information for internal tracking purposes only and to allow for follow-up calls in the case of partial or unclear survey responses. The first page of the survey included consent language approved by the California State University, Long Beach (CSULB) Internal Review Board.

Follow up-interviews allowed for an exploration of individual responses. At the end of all surveys, all respondents were taken to a concluding page where they had the opportunity to state their willingness to participate in a follow-up interview. Six follow-up interviews were conducted, including interviews with two of the largest MPOs in the state. Interviews were conducted concurrently with the online survey.

The survey instrument can be found in Appendix A. We received 15 responses (14 complete and 1 partial) to the survey sent to the 35 CALCOG members.

Survey Analysis

The overall goal for the Sustainable Communities Strategy is to hit SB 375's greenhouse gas reduction goals by 2035, with the long-term benefit of implementing best practices for sustainable community development. Developing an effective SCS requires assessing current environmental conditions, forecasting future challenges, and then planning and modeling strategies to meet reduction goals while implementing best-case scenarios. Issues common to all MPOs regardless of size include:

- Blueprint planning processes that involve developing and selecting growth scenarios that will act as the foundation for decision-making on local and regional levels.
- Forecasting employment, population, and household density rates.
- Developing transportation and land use modeling.
- Public outreach plans.
- Social equity issues regarding environmental justice and promoting healthy life-styles for the public;
- Transportation demand management and transportation system management;
- Protecting farmland and natural resources, especially regarding climate change concerns (primarily rural regions); and,
- Rural-urban connections to maintain economic vitality for all appropriate regions.

Surveys of Regional Planning Agencies

To better assess the workforce impact of SB 375, we asked more generally how agencies measure and evaluate success. There appears to be a disconnect between how MPOs currently assess performance and what indicators could be used to better evaluate it. Agencies primarily measure success from the perspective of federal/state transportation compliance, along with satisfaction from stakeholders and the public (Figure 3). Most respondents agreed, however, that transportation system security, reliability, and travel-demand model accuracy might be better measures of success (Figure 4). Forty percent of the MPOs in our survey also reported that they do not conduct outcome evaluations of completed projects to assess the accuracy of forecasts because of a lack of funding, time, and a trained staff. Future research is needed to better understand how performance aligns with agency mission and the development of job descriptions for employees.

Personnel shortages may also underlie challenges to carrying out federal and/or state requirements for transportation. For example, respondents reported that 'limitation in travel demand modeling capacity,' 'competing priorities between transportation planning and other duties,' and 'lack of trained staff' were 'moderate' to 'very great' challenges. Funding issues may also affect in-house staffing since 'lack of ability to find funding sources for local match of federal transportation planning funds,' 'lack of flexibility of transportation planning funds,' and 'lack of certainty for federal transportation funding' are viewed as the greatest challenges (Table 5).

Table 5. Summary of survey responses to challenges in transportation planning

	Very Great Challenge	Great Challenge	Moderate Challenge	Some or Little Challenge	No Challenge	No Basis to Judge	Total Responses
Lack of Flexibility	2	7	1	2	1	1	**14**
Lack of Certainty for Federal Transportation Funding	5	6	2	0	0	1	**14**
Lack of Ability to Find Funding Sources for Local Match of Federal Transportation Planning Funds	2	6	4	1	0	1	**14**
Data Limitations	0	5	5	2	0	2	**14**
Fiscally Constraining the Long-Range and Short-Range Transportation Plans	3	4	6	0	0	1	**14**
Limitations in Travel Demand Modeling Capacity	1	4	3	4	0	2	**14**
Lack of Transportation Planning Funding	6	3	3	1	0	1	**14**
Competing Priorities Between Transportation Planning and Other Duties	1	3	6	2	1	1	**14**
Limited Authority to Implement Short-Range Projects and Plans	1	3	6	2	0	2	**14**
Coordination with Land Use Planning Agencies	0	3	7	3	0	1	**14**
Obtaining Public Input	0	2	3	7	1	1	**14**
Coordination with your State DOT	0	2	3	5	3	1	**14**
Lack of Trained Staff	0	2	5	2	4	1	**14**
Coordination with Regional Planning Entities	0	1	3	6	3	1	**14**

The greatest short-term strain of SB 375 on MPOs is on demand for modeling skills, and the modeling skills are becoming increasingly complex. Often outside consultants are engaged to supplement in-house skills. Twelve of the 14 respondents agreed that SB 375 will increase overall modeling demand. Survey responses indicate about half of MPOs used new consultants to perform modeling (Figure 6), while other MPOs relied on consultants already working with the planning agency prior to the SCS mandate. The role and intensity of third-party consultants needs further exploration, particularly as planning agencies assess their experience with the first SCS process over time.

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Respondents indicated some deficiency in land use, air quality conformity, and future travel demand knowledge while creating SCS. Most organizations use travel demand modeling from a 'moderate' to 'great extent' to estimate the impact of transportation land use (Table 5). These models require staffing to generate. While only three organizations added full-time equivalents to comply with SB 375, this could be explained by lack of funding. Furthermore, MPOs that were unable to develop a travel demand model internally cited 'lack of knowledge about travel demand models' and 'limited personnel' as contributing factors.

Most agencies respond to funding shortfalls by reducing operating expenses, either by reducing salaries, the sizes of their workforces, employee training, or the number of programs implemented (Figure 7). These approaches directly conflict with the need to increase both staff positions and their skill sets because of mandates like SB 375.

SB 375 demands knowledge in sustainable technology (e.g., fuel-efficiency tech), modeling, data collection and analytics, public relations and community building, transportation planning, and policy administration. Staffers at a SCS public outreach workshop attended by the research team also expressed interest in developing web-based sustainability tools to enhance future sustainability planning efforts. The web-based tool would leverage geographic information systems (GIS) technology to calculate emissions reductions. Other workshop participants reported that responding to SB 375 requires a new set of skills at the municipal level. These skills may include leadership development and succession planning. Given that SB 375 requires broader skillsets and more human capital, future research should address how much MPOs spend on workforce development to meet the demands of SB 375. These should include a comparison of third-party consulting and in-house training and development.

As a short-term response to funding challenges, including workforce development needs, regional planning agencies pursued external grant funding. Ten of the 14 respondents applied for and received a Strategic Growth Council (SGC) sustainable planning grant in 2010. The SGC brings together agencies and departments within Business, Consumer Services and Housing, Transportation, Natural Resources, Health and Human Services, Food and Agriculture, Environmental Protection, and the Governor's Office of Planning and Research to coordinate activities that support sustainable communities. The majority used the funds to improve modeling capabilities, specifically in software and training.

Organizations also cited communication as an essential component in the development of SCSs. They coordinate planning activities most with state departments of transportation and city and county entities (e.g. planning boards), while adjacent MPOs were coordinated with least overall. Environmental agencies, air quality organizations, and advocacy groups were coordinated with most regarding solicitation of input/feedback on an ad-hoc basis. Sharing travel demand modeling capacity was the least prioritized coordination planning activity, which may reflect the realities of outsourced services. Future research could address whether incentivized inter-organizational communication might alleviate personnel strain.

Future surveys should consider how agencies are incorporating SCS development into their long-range human resource needs. For this study, it's likely that respondents lacked fiscal data since they

were still determining workforce needs and how to address them. Further complicating the SCS process during the survey period was the controversy surrounding the lawsuit[1] filed by environmental groups against the San Diego Association of Governments (SANDAG) for the environmental impact report (EIR) associated with the SCS that was adopted as part of its Regional Transportation Plan in 2011.

Results from the MPO workforce survey primarily paint a picture of organizations suffering under funding constraints that limit personnel development and growth. SCS development demands personnel with technical skill sets in land use and travel demand modeling that organizations lack internally, and which require workforce training, new hires, outside contracting, and/or additional grant funding. Some of the key survey questions and responses are highlighted below.

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[1] The San Diego Superior Court and the Fourth District California Court of Appeal, Division 1, both upheld the lawsuit on the grounds that it failed to adequately address ways to reduce environmentally toxic emissions till 2050. In July 2017, the California Supreme Court ruled in favor of SANDAG indicating that the MPO did not abuse its discretion in its presentation of the EIR.

Survey question: To what extent, if at all, does your organization use the following indicators to evaluate its effectiveness?

Evaluating MPO effectiveness

satisfaction among pubilc

satisfaction among stakeholders

compliance with transportation planning rules

extent of coordiantion and stakeholder involvement

level of highway congestion

air quality

measure of public participation

No. project plans implemented

condition of transportation network

system accessibility

mobility for disadvantaged populations

system reliability

system safety

system security

travel demand model accuracy

0   2   4   6   8   10   12

■ Very Great Extent   ■ Great Extent

Figure 3. MPO effectiveness evaluation

Survey question**:** Regardless of your individual answers to the previous question, from your perspective, how useful, if at all, *could* the following indicators be for evaluating the effectiveness of MPOs?

Usefulness of MPO Evalutations
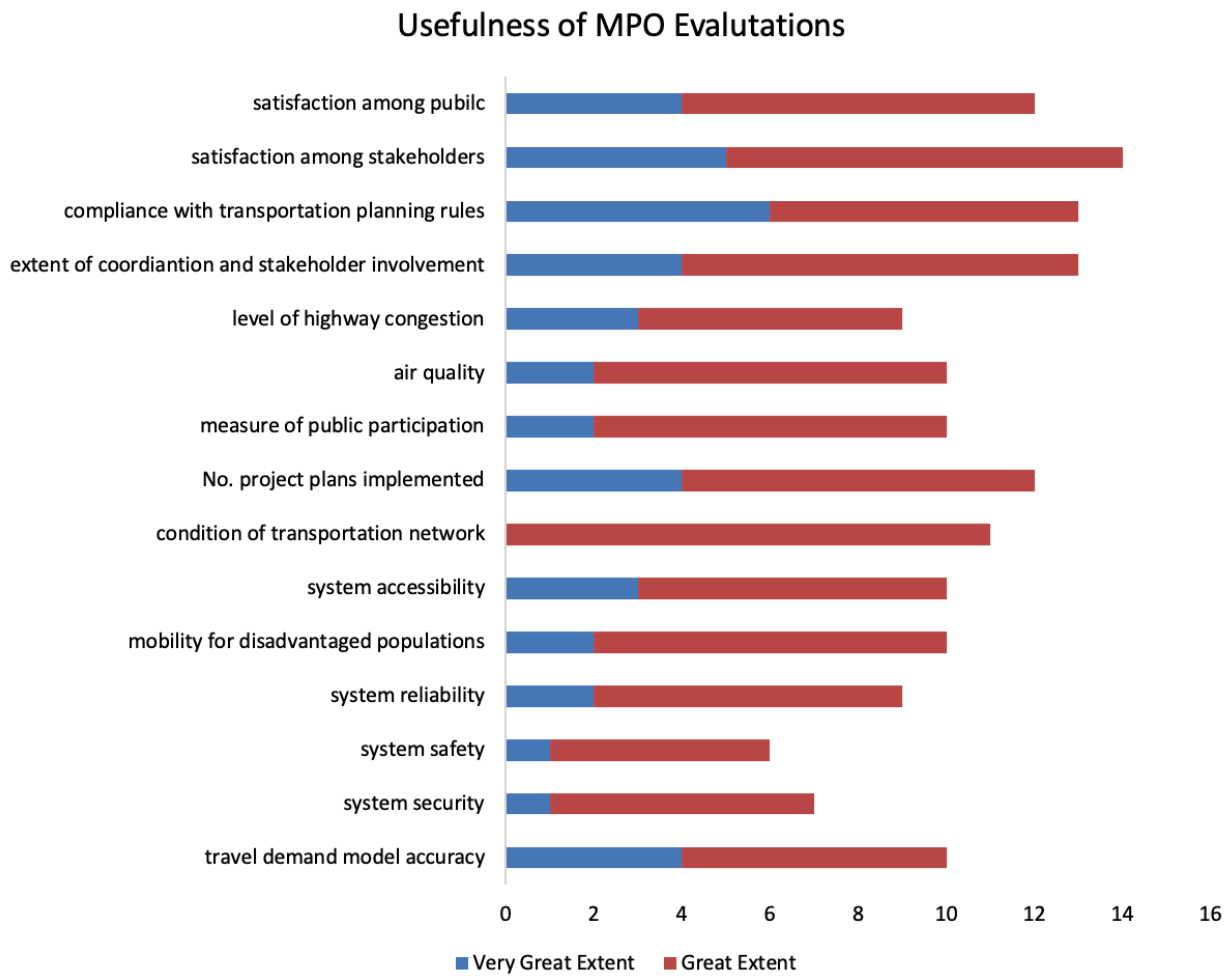
Figure 4. Usefulness of MPO evaluations

Survey question: To what extent, if at all, does your organization use travel demand modeling to carry out the following planning activities?

MPO Travel-Demand Models Used for:
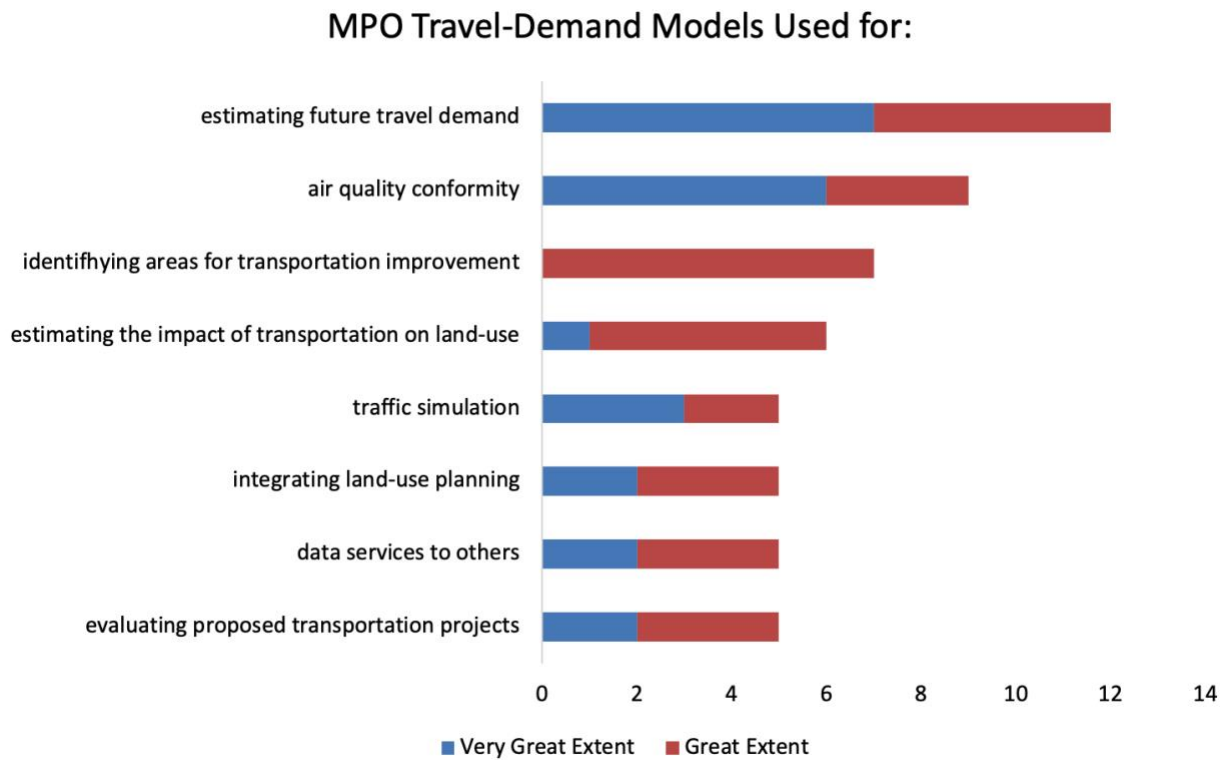
Figure 5. MPOs use for travel demand models

Survey question**:** Which agency performs most, if not all, of the travel modeling for your organization's long-range plan?

Who performs most travel modeling?
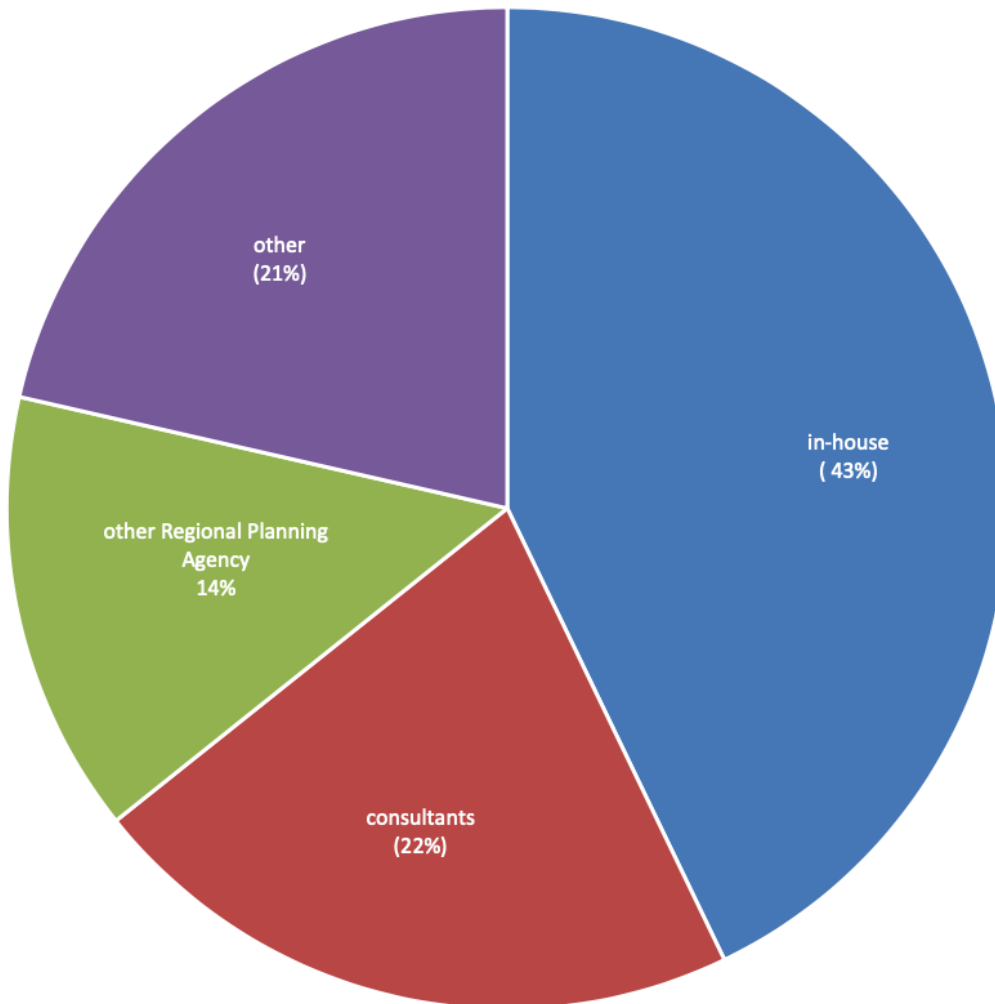
Figure 6. Agencies performing travel demand modeling

Survey question: How has your organization addressed any funding shortfalls within the past 5 years?
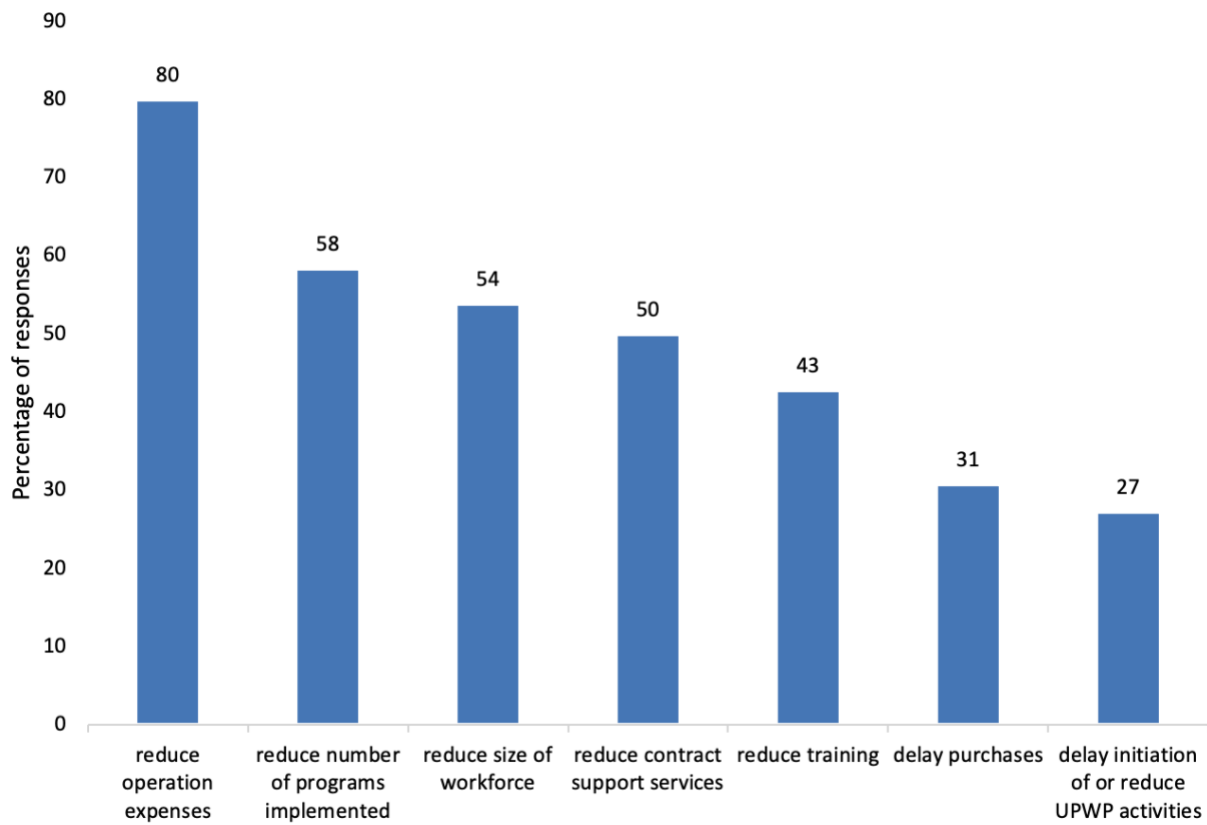
Figure 7. Responses for funding shortfalls

Insights from In-Depth Interviews

In an attempt to obtain follow-up data and ask more probing questions, a series of in-depth-interviews were organized with MPO leadership in California. The interviews were held via conference call between the research team and MPO principal planners. A total of seventeen MPO principal planners were contacted, and the researchers received responses from ten planners. The participants taking part in the in-depth-interviews were from the agencies listed below:

Table 6. List of MPO participants for the in-depth interviews

Number	Organization
1	Kings County Association of Governments
2	Merced County Association of Governments
3	Madera County Transportation Commission
4	Santa Barbara County Association of Governments
5	Sacramento Area Council of Governments
6	San Joaquin Council of Governments
7	San Luis Obispo Council of Governments
8	Tahoe Metropolitan Planning Organization
9	San Diego Association of Governments
10	Southern California Association of Governments

During the interviews, the research team posed series of questions regarding the nature of workforce changes within an MPO structure, both because of and independent of SB 375. The questions targeted changing workplace competencies, process changes, skill sets for new hires, and socio-economic challenges at the MPOs. Questions included:

- How have AB 32 (California Global Warming Solutions Act of 2006) and SB 375 (Sustainable Communities & Climate Protection Act of 2008) changed the nature of work at MPOs?
- Has environmental legislation like SB 375 increased the need for hiring consultants?
- Has SB 375 led to increased demand for personnel with modeling expertise?
- Has there been any impact on the workforce because of legal challenges to the SCS adoption process?
- Has SB 375 led to re-training/upskilling employees at MPOs?
- What skills (technical and soft skills) are necessary for a young planner?
- Do you see students graduating from college as employment-ready with the skills MPOs need?
- How do MPOs manage retention and skills gaps? Are there formal training programs to upskill employees at your respective MPO?
- How do MPOs deal with broader socio-economic issues like an aging workforce?

While the in-depth-interviews explored a range of issues relating to the changing nature of employment at MPOs, some common themes emerged.[2]

SB 375 fundamental impact on MPOs

At the outset, most interviewees indicated that MPO size was a critical factor in how SB 375 impacted their work structure. Smaller MPOs felt challenges associated with their cities/regions may not be the same as those targeted by the SCS strategy development process.

As indicated in Table 7, a majority of the MPOs interviewed are medium to large in size. The majority indicated that SB 375 intensified the RTP development process, stressing resources in terms of both people and money. For example, three of the MPOs recognized that SB 375 had significantly increased staff workload for modeling, public outreach, and land use planning. The larger MPOs reported that SB 375 increased the need for travel demand modelers. MPOs thus had to use a combination of in-house experts and external consultants to accomplish this task.

Table 7. Composition of MPOs

MPO Name	Members	Other partners	Number of employees	Size of COG
Kings County Association of Governments (KCAG)	• City of Avenal • City of Corcoran • City of Hanford • City of Lemoore • County of Kings	• San Joaquin Valley Regional Policy Council • California Association of Council of Governments	7 Full time employees	Small[3]
Merced County Association of Governments (MCAG)	• City of Atwater • City of Dos Palos • City of Gustine • City of Livingston • City of Los Banos • City of Merced • Merced County	• Caltrans • Federal Highway Administration • Federal Transit Administration • DIBS • CalCog • Self-help coalition • San Joaquin Joint Powers Authority • California High-Speed Rail • Amtrak • California Air Resources Board • San Joaquin Valley Regional Policy Council	• 7 Management Staff • 3 Transportation Planning Staff • 11 Administrative Staff • 8 Transit Staff • 9 Regional Waste Management Staff	Medium
Madera County Transportation Commission (MCTC)	• Madera County • City of Chowchilla • City of Madera	• San Joaquin Valley Regional Policy Council • Caltrans • California Air Resources Board • California High-Speed Rail Authority • CalCog • USDOT	• 8 Full time employees	Small

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[2] Appendix B has a detailed table of themes used for the in-depth interviews. All the MPO responses are included within the table. We have masked the respondents in Appendix B.

[3] We have defined small, medium, and large MPOs based on the number of cities an MPO manages and the number of employees an MPO has to manage those cities.

MPO Name	Members	Other partners	Number of employees	Size of COG
Santa Barbara County Association of Governments (SBCAG)	•City of Buellton •City of Carpinteria •City of Goleta •City of Guadalupe •City of Lompoc •City if Santa Barbara •City of Santa Maria •City of Solvang •Santa Barbara County	•Caltrans	•20 Full time employees	Medium
Sacramento Area Council of Governments (SACOG)	•El Dorado County •Placer County •Sacramento County •Sutter County •Yolo County •Yuba County •22 cities	SACOG has committees that co-ordinate stakeholders: •Government and Public Affairs Committee •Land Use and Natural Resources Committee •Transportation Committee •Strategic Planning Committee •Advisory Committee	•53 Full time employees ranging from planners to the Chief Executive	Large
San Joaquin Council of Governments (SJCOG)	•County of San Joaquin City of Stockton •City of Lodi •City of Manteca •City of Tracy •City of Ripon •City of Escalon •City of Lathrop	•California Vanpool Authority •Amtrak •Caltrans •California Highway Patrol •San Joaquin Valley Regional Policy Council	•3 Directors •16 Planners/ Project Management staff •6 Administrative staff •4 Finance staff •1 Public information staff •1 IT staff	Medium/Large
San Luis Obispo Council of Governments (SOLCOG)	•City of Arroyo Grande City of Atascadero •City of Grover Beach •City of Morro Bay •City of Paso Robles •City of Pismo Beach •City of San Luis Obispo •County of San Luis Obispo	•San Luis Obispo Regional Transit Authority •Caltrans •Air Pollution Control District (SLO APCD) •San Luis Obispo Local Agency Formation Commission (LAFCO) •Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor Agency •Coast Rail Coordinating Council (CRCC) •San Luis Obispo Bike Club •Bike SLO County	•2 Executive Officers •2 Division Chiefs •6 Planners •1 Public information officer •6 Administrative staff •3 Rideshare program associates •1 Legal counsel	Medium

MPO Name	Members	Other partners	Number of employees	Size of COG
Tahoe Regional Planning Agency	•Lake Tahoe Community		•2 Executive Directors •1 Chief Operating Officer •2 Legal counsels •4 Public outreach staff •10 Transportation Planning staff •11 Current Planning staff •3 Code compliance officers •8 Environmental Improvement program staff •12 Research and Analysis staff •7 Finance and Admin staff •2 Human resources staff	Medium/Large
San Diego Association of Governments (SANDAG)	•City of Carlsbad •City of Chula Vista •City of Coronado •City of Del Mar •City of El Cajon •City of Encinitas •City of Escondido •City of Imperial Beach •City of La Mesa •City of Lemon Grove •City of Oceanside •City of Poway •City of San Diego •City of San Marcos •City of Santee •City of Solana Beach •National City •Vista City •Unincorporated Areas	•Imperial County •U.S. Department of Defense •Caltrans •San Diego Unified Port District •Metropolitan Transit System •North County Transit District •San Diego County Water Authority Southern California Tribal Chairmen's Association and •Mexico	•370 Full time employees in 2018	Large
Southern California Association of Governments (SCAG)	•6 counties •191 cities	•15 subregion councils •Caltrans •Federal Highway Administration •Federal Transit Administration •California Air Resources Board •CalCog •US DOT •Amtrak	•150 Full time employees	Large

Of the ten MPOs interviewed, eight said they use external consultants for at least some part of the SCS development process. Consultants were used to perform additional modeling tasks such as GHG emissions modeling and air quality modeling. Two MPOs indicated that they use consultants for intensive modeling tasks and validating in-house models on a case-by-case basis. In addition, for at least one MPO, consultants were also used as risk mitigation strategy as a means of outsourcing risk management and avoiding litigation.

Litigation was a considerable topic of discussion in the interviews. MPOs have been sued for their EIRs or land use plans. For example, the San Diego Association of Governments (SANDAG) and

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Merced County Association of Governments (MCAG) were sued on the basis of their EIRs, and SANDAG went to court to settle the matter. For MPOs, the cost of avoiding litigation has resulted in the hiring of in-house legal counsel or using lawyers while designing the EIR process. Litigation has created a shift in the internal dynamics at MPOs by prioritizing legal issues while developing regional plans.

Through the in-depth interviews, most of the MPOs concurred that public outreach and stakeholder engagement had increased post SB 375. The need to communicate and engage in productive conversations about impacts of SCS was critical. In one case, an interviewee indicated that the first round of the RTP development process evidenced increased public outreach as an eventual outcome of the SCS strategy. Respondents indicated that outreach was a critical component of the SCS and that stakeholder engagement was an important skill set for younger planners to possess in general.

Changes to workforce skills at MPOs

The advent of SB 375 triggered the need for specialist skills in modeling, land use planning, GHG emissions forecasting, and air quality modeling. As indicated in the previous section, consultants were brought in to perform complex modeling tasks. All the MPOs interviewed acknowledged that modeling was a critical skill set for planners to successfully execute SB 375 mandates.

In addition to modeling skills, several MPOs preferred planners with interdisciplinary skills who could perform a variety of different tasks. For example, in smaller COGs, planners with Geographic Information Systems (GIS) specialties were used resourcefully to deliver on air quality modeling or GHG emissions modeling. In another example, one large MPO hired a video game developer to deliver data visualization tools, thereby accelerating project delivery. The same MPO also suggested that personnel with skills like land use planning, budgeting, and project management bring new perspectives to problems and that this multi-disciplinary approach must be taken while drafting legislation as well.

Through the in-depth interview process, it became evident that planners must perform additional outreach. Hence, a critical soft skill to possess was effective communication. There was a general consensus that personnel and leadership capable of making productive conversations with stakeholders were vital to the success of the SCS development process. In addition to traditional communication skills, certain MPOs preferred personnel with digital communication skills as well (i.e, Twitter, LinkedIn, Facebook, and other social media platforms). Other soft skills such as writing, project management, team work, leadership, and public speaking were identified as skills for success.

In terms of hiring techniques, the MPO representatives interviewed concurred that fundamentals of the hiring process have not changed, but skill sets to fit the job description have. When asked about what MPOs look for in recent college graduates, responses indicated that candidates needed to have strong background in planning and GIS. Although quantitative skills in statistics, mathematics, and engineering were preferred, other considerable assets included computer programing, data analysis, and business development. A majority of the MPOs felt that recent college graduates lacked planning expertise and preferred that graduates have internship or training experience specifically within an MPO structure.

MPOs have also indicated that with job descriptions becoming more demanding and specific, it is important to hire people who are the right fit for the organization. More often, younger employees train with MPOs for two to three years only to resign and move on. MPOs feel this attitude of quick movement has resulted in a reluctance to hire fresh college graduates. MPOs seek dedicated and committed young professionals who will fit and grow within the public sector.

Other workforce challenges

MPOs face challenges in having the budget required to hire the right talent. In addition, socio-economic issues such as retirement of baby-boomers, high cost of living, rural/semi-rural location of MPOs, and unsatisfactory monetary compensation steer young planners away from a service in the public planning sector. In other cases, the high cost of living, especially housing, was a major reason for young planners opting out of taking a job in a region.

For rural MPOs, location was a deterrent for the millennial generation seeking employment. In addition, these counties also experienced a high rate of retirement, which they said led to a loss of institutional knowledge. Larger MPOs said they were more prepared for retirements and succession planning was done systematically.

To further validate our findings from the surveys and in-depth interviews, the team performed a series of job scans from MPO websites and researched workforce skill trends using *Burning Glass* technology.

Burning Glass analysis and Job posting scan

The research team at CSULB used *Burning Glass* to independently study skill sets for transportation planners. Burning Glass Technology analytics software is a real-time job analytics database that captures data-driven information based on labor market statistics. It allows for searches that capture not only job titles, but also critical skills needed for those positions, as well as required degrees or certificates. The research team analyzed a historical database of the last twelve months (i.e., the last 365 working days) for the occupation "Transportation Planner" using O*Net code 19-3099.01 in Burning Glass.
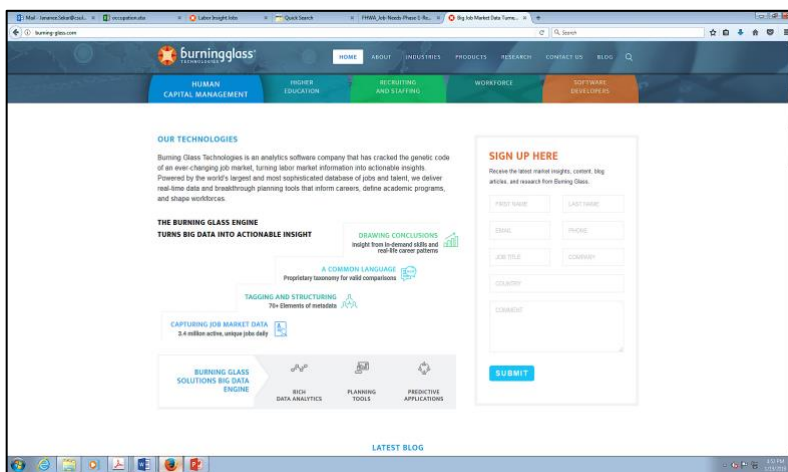
Figure 8. Burning Glass methodology

The analysis of the job title "Transportation Planner" identified real-time demand for technical and complementary skill sets. The search revealed transportation planning and transit planning as the top two desired skills, followed by functional skills like project management, budgeting, and scheduling.
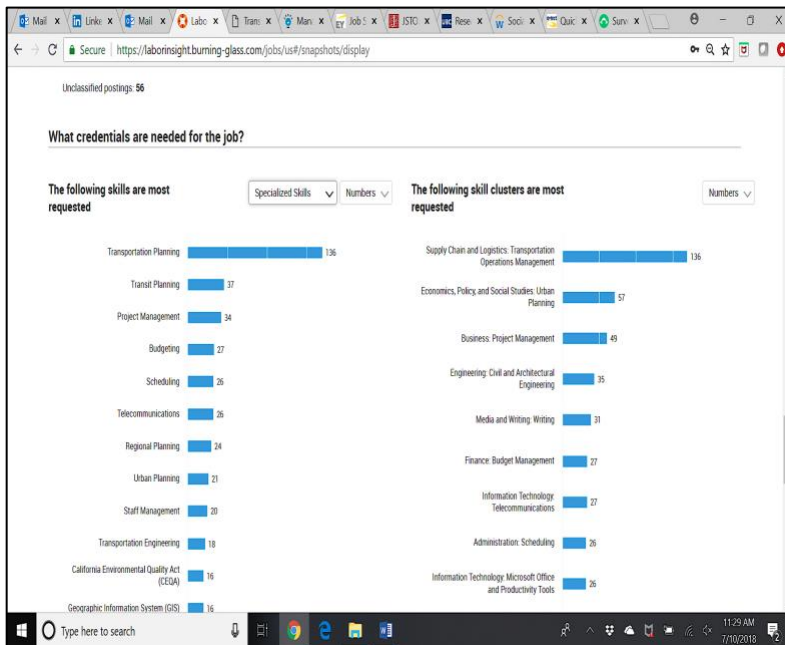
Figure 9. Top 10 specialized skills in demand for Transportation Planners in California

The portrayal of functional skills does echo the sentiments expressed by MPO representatives through the in-depth interviews. In a previous study exclusively aimed at researching the knowledge, technology skill, and abilities of one MPO (SCAG) in Southern California, the authors analyzed 32 job listings over a two-month period in 2017. The research (Table 8) does identify technical skills in urban planning, coupled with functional skills in problem solving and understanding regulation, as critical to job roles within SCAG.

Table 8. Knowledge, Skills, and Abilities analysis of SCAG *(Southwest Transportation Workforce Center, December 2017)*

Top five competencies requested at SCAG		Percentage of requirement
	Regulation/Legislation	72%
	Principles of Urb./Reg./Trans. Planning	69%
	Prepare Reports/Presentations	69%
	Collect, Compile, Analyze Data	66%
	Complex Problem Solving	59%
All competencies/requirements at SCAG		**Percentage of requirement**
Knowledge	Analysis/Research/Reports	56%
	Statistical Theory/Methods	41%
	Principles of Urb./Reg/Trans. Planning	**69%**
	PR Techniques	13%
	Air Quality Planning	16%
	Org/Mgt Practices	28%
	Transportation Modeling	31%
	Project Management Practices	56%
	Regulation/Legislation	**72%**
	Economic Forecasting	13%
	Env./Sust. Practices	13%
	Budgeting	34%
	Principles of Travel Demand Mgmt.	9%
Technology	GIS	25%
	SAS	9%
	Standard Office Application	9%
	Other Software Requirements	13%
Skills/Abilities	**Prepare Reports/Presentations**	**69%**
	Public Interaction/Outreach	41%
	Collect/Compile/Analyze data	66%
	Plan/Coordinate Projects	31%
	Teamwork	25%
	Work Independently	44%
	Discussion and Persuasion	28%
	Written and Oral Communication	25%
	Leadership	34%
	Management	31%
	Complex Problem Solving	**59%**
Salary	Salary (Average Lower Limit)	$ 99,018.40
	Salary (Average Upper Limit)	$ 137,865.37

The team also analyzed several job postings from MPO websites to assess if the workplace needs expressed in the in-depth interviews were accurately reflected within these job postings. In this report, we have attempted to scan entry level/associate transportation planning jobs posted by nine MPOs across California in an effort corroborate findings from the in-depth interviews. The summary below covers job postings from these MPOs that were active in the summer of 2018.

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Table 9. Sample job descriptions for associate/regional transportation planner at AMBAG, KCAG, and MTC

AMBAG	KCAG	MTC
Knowledge of: • **Data and analysis for long range transportation planning and land use;** • **Regional travel demand models; and** • **Study of economic development, housing, environmental, and sustainability issues.** **Skills:** • **Application of the Regional Travel Demand Model (RTDM) for SCS development;** • **Assistance in Regional Housing Needs Assessment, employment forecasts, and goods movement transportation plans; and** • **Administration of contracts with contractors, engineers, planners, and consultants in support of assigned program activities.** **Qualification:** • **M.S. degree in Civil Engineering.** • **Two years of work experience as a Planner in the field of transportation planning.**	**Knowledge of:** • Proper English grammar, spelling and punctuation; • Basic computer software operation; and • Equipment and operation. **Skills:** • Plan, organize, and implement transportation planning programs and projects; • Perform complex and sensitive transportation planning analyses and studies; • Prepare effective written reports, planning documents, press releases, legal notices, newsletters, and correspondence; • Exhibit judgment and analytical skills; and • Communicate effectively both orally and in writing. **Qualification:** • Graduation from an accredited four-year college or university with a degree in urban or regional planning, geography, public administration, engineering, or a closely related field. • Up to two years of work experience.	**Knowledge of:** • Multi-modal transportation planning; • Analysis and policy development; • Environmental analysis; • Transportation engineering, financial analysis, and programming; and • Legislative analysis and transit coordination and evaluation. **Skills**: • Monitor and keep informed of current trends in the field of multi-modal transportation planning; • Prepare reports, make presentations and meet with staff, Commission, partner agencies, elected officials, and the public; and • Develop assigned program or project budgets; monitor the approved budgets. **Qualification:** • A Bachelor's degree in a field related transportation planning: city and regional planning, transportation engineering or modeling, financial management, economics, business, or public administration. • Two years of increasingly responsible experience.

Table 10. Sample job descriptions for associate/regional transportation planner at SACOG, SANDAG, and SCAG

SACOG	SANDAG	SCAG
Knowledge of: • **Principles and techniques of conducting analytical studies;** • **Making sound recommendations and preparing and presenting effective technical reports; and** • **Applicable federal, state, and local laws, regulatory codes, ordinances, and procedures relevant to assigned area of responsibility.** **Skills:** • **Implement assigned programs, projects, and activities in an independent and cooperative manner;** • **Research, analyze, interpret, summarize, and present technical information and data in an effective manner;** • **Interpret, apply, explain, and ensure compliance with federal, state, and local policies, procedures, laws, and regulations; and** • **Use independent judgment within general policy, procedural, and legal guidelines.** **Qualification:** • **Bachelor's degree with major course work in planning, public or business administration, or a related field.**	**Knowledge of:** • Principles, practices, and current trends related to Transportation Demand Modeling including congestion management, systems management, intelligent transportation systems, multi-modal transportation, shared mobility, and innovative mobility services; and • Federal, state, and local laws, regulations, and requirements pertaining to regional transportation planning. **Skills:** • Build awareness of programs, services, and resources through strategic business partnerships; • Develop pilot projects and demonstrations from concept through implementation, prepare assessments and corresponding monitoring and evaluation report; and • Coordinate project teams and multidisciplinary working groups. **Qualification:** • Bachelor's degree with major course work in planning, public or business administration, or a related field. • Four years (Associate level) to five years (Senior level) of increasingly responsible, professional experience in transportation, mobility management.	**Knowledge of:** • Federal and state planning regulations relevant to transportation planning including MAP-21 and SB 375; • Principles and practices in Transportation Demand Management; and • Theories, principles, and practices of urban planning. **Skills**: • Methods and techniques of effective technical report preparation and presentation; • Advanced statistical concepts, research and methodology; • Project management principles and concepts; and • Computer software like GIS and data analysis techniques. **Qualification:** • Bachelor's degree with major course work in transportation planning, urban planning, public policy, and civil engineering. • Two years of professional urban or regional planning with experience in economic forecasting.

Table 11. Sample job descriptions for associate/regional transportation planner at SJCOG, MCTC, and MCAG

SJCOG	MCTC	MCAG
Knowledge of: • **Regional Transportation Planning, Transit Planning, and Air Quality Planning;** • **Partners at local, state-and-federal transportation agencies to help drive the planning process on transportation projects; and** • **The areas of state-and-federal transportation planning principles and the procedures.** **Skills:** • **Experience working with the public – particularly in terms of collaborating with state and federal transportation agencies;** • **Strong communication skills (both verbal and written); and** • **Background within Regional Transportation Planning, Air Quality projects, and Sustainably Community Strategy projects.** **Qualifications:** • **Bachelor's degree in urban planning, engineering, public policy, or public administration.** • **Two years of work experience within a related field is required.**	**Knowledge of:** • Developing planning proposals, and composing policy analyses; • Conducting field research and develop staff reports and presentations; and • Working in Urban/Regional Planning or Land Use Planning domain. **Skills:** • Good writer with strong communication skills; • Habit of working independently; and • Comfort carrying out the supervision of major planning-related activities. **Qualifications:** • Bachelor's degree in Land Use Planning, Urban/Regional Planning, or Public Administration. • At least two years of work experience is a must.	**Knowledge of:** • Professional transportation planning and • Local regulations, laws, policies, and implementation requirements on transportation and regional plans. **Skills:** • Develop grant applications; • Reports and presentations to staff and public; • Public policy analyses; • Data analyzes for respective reports and projects; and • Good communication skills (both written and verbal) for interactive dialogues with local agencies. **Qualifications:** • Bachelor's degree within a related field is required. • Any combination of relevant education and work experience.

The postings suggest that a majority of the MPOs requested personnel with specific technical skills in transportation/urban planning with particular experience in modeling, forecasting, and travel demand models. In addition, functional skills like communication, understanding regulations, public outreach, budgeting, and project management were also included. [4]

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[4] Job Descriptions (JD) were researched from MPO websites. The JD's listed here include the knowledge and skills listed but are not limited to the items listed.

Conclusions and Recommendations

Conclusion

This report addresses how the changing nature of transportation planning, particularly with regard to legislative mandates, translates into new transportation workforce demands on MPOs in terms of new training, new software and hardware knowledge, and additional demands on staff and consultants. Based on both the plans adopted and the interviews conducted, it is clear that SB 375 places a range of new financial and staffing demands on MPOs. This assertion was affirmed at a Southern California Associations of Government (SCAG) public outreach workshop held during the study period where stakeholders discussed the need to incorporate transportation, planning, housing, and public health issues into SCSs.

The work supports other efforts in workforce development at the federal and state level and reflects a growing interest in the capacity of the future transportation workforce. TEA-21, enacted in 1998, for the first time allowed the states to use up to 0.5% of surface transportation funds for employee training. Provisions in SAFETEA-LU, enacted in 2005, provided for 100% funding for workforce activities, extending eligibility for workforce development to other federal programs including interstate maintenance, bridges, and congestion management/air quality. The legislation also expanded types of eligible activities beyond training and education for employees to pipeline programs that help students prepare for transportation careers. Federal legislation also authorized funding for the Transportation Education Development Pilot Program (TEDPP), which aims to develop, test, and revise new curricula and education programs to train individuals at all levels of the transportation workforce.

This research identifies some of the workforce needs of California's regional transportation planning agencies. Findings help us understand how workforce development trends at the regional level differ from those at the state and federal level and how environmental policy measures may impact the workforce needs of the transport sector.

The survey responses help us understand the impact of a number of factors on workforce capacity. For regional transportation planning agencies, the survey results point to an increased need for functional modeling expertise to comply with SB 375 mandates.

Information gathered from the in-depth interview acknowledges that fundamental MPO-level change was established through SB 375 and that the need for modern skill sets includes a combination of technical and soft skills. There is an increasing need for multi-disciplinary professionals to contribute their skills to effectively change the nature, process, and delivery of sustainable transportation projects. In addition, SB 375 created an environment of legal complexity which has led MPOs to walk a fine line between getting sued and developing a SCS compliant RTP.

SB 375 has the potential to change the way California communities are planned. These changes have many benefits, primarily reducing GHG emissions to mitigate climate change. Other benefits include developing more livable and walkable communities.

Travel demand modeling is an important component of being able to accurately estimate GHG emissions. SB 375 mandates a reduction in GHG emissions by reducing Vehicle Miles Traveled (VMT). In order to maximize the effectiveness of planning to reduce VMTs, modeling tools need to be upgraded. These upgrades are costly both in terms of software and human resource capital. In follow-up interviews, respondents indicated that the impacts of SB 375 were being felt by planning agencies at the same time as they were moving toward activity-based modeling. This creates an additional challenge for agencies attempting to identify skill sets for planners.

SB 375 has added a considerable amount of responsibility to MPOs without necessarily adding adequate means to meet these demands. In an interview, a representative for one large MPO stated that the SCS created the need for additional full-time equivalent employees. There is also the question of technical capacity. Whether the work is performed in-house or by outside consultants, education and training programs for planners will need to adapt in order to remain relevant.

Recommendations

Recommendations for MPOs

While it is evident that SB 375 has steered MPOs in search of specialist and functional skills, MPOs find it challenging to hire the increasingly technical personnel capable of performing these tasks. Intervening at an earlier age, such as targeting middle and high school students, could be helpful to spread awareness of industry jobs. MPOs could be part of education programs aimed at creating curiosity in schools about city, transportation, and regional planning priorities and job opportunities.

It could also prove imperative to include MPO perspectives in curriculum development at planning schools in undergraduate and post-graduate levels. At colleges, where most of the sector-specific skills are imparted (e.g. GIS, land use planning, software skills for modeling), curriculum that is relevant and reflective of the current and future workforce needs will make hiring effective candidates much easier. In addition, constant collaboration with students from a college/department will ensure that the right material is taught using the latest technology, thereby keeping up with the changing needs of the job.

Also, pathways for internships which run the course of the entire college year could yield better results in students graduating with real-time experiences and skill sets. MPOs could also share accurate job postings and job descriptions with universities and planning schools so that these schools could craft their curriculum to reflect the dynamic nature of a job such as Transportation Planner.

However, these are merely suggestions, and further research is needed to see whether more collaboration between MPOs and educational institutions results in better quality and younger workforce members joining and leading MPOs within the transportation planning domain.

Recommendations for educational institutions

The onus of generating quality professionals rests with institutions such as colleges, schools, and certification bodies. The course content that is taught within these institutions must reflect the current and future trends within a sector/industry. For example, through this research it was evident

that MPOs did not find capable and confident candidates who could perform modeling tasks with little or no supervision. A study conducted by the Southwest Transportation Workforce Center (SWTWC) highlights the traditional curriculum for a student in urban/transportation planning profession (Figure 10).

Figure 10. Curriculum for transportation professionals

There is no doubt that there is a lag between what is needed in the industry and what is taught. Some suggestions for creating more dynamic course content cognizant of the changing nature of jobs include:

- Developing real-time curriculum, which could include conducting a capstone/research project with MPOs for credit;
- Creating externship programs;
- Creating a platform for students to experience the public planning process (i.e., attend city wide planning workshops, regional council meetings etc.);
- Incorporating certification courses through the American Institute of Certified Planners (AICP) as part of the graduating curriculum, thereby making courses more professional;
- Offering continuous learning opportunities for non-planner background candidates such as project managers, graphic designers, and programmers, with the opportunity of applying their skills to the transportation planning sector as well;
- Ensuring a hands-on approach to imparting knowledge through the use of advanced software and analytics; and,
- Constant collaboration with national and state authorities responsible for transportation planning education.

Educational institutions ought to envision the next generation of transportation professionals and design programs capable of providing both the technical and soft skills.

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Appendix A: Regional Transportation Planning Survey Instrument

1. CONSENT TO PARTICIPATE IN RESEARCH

Changing Workforce Development Needs for
Regional Transit and Transportation Planning Agencies in California

You are asked to participate in a research study conducted by Thomas O'Brien, PhD Director of Research for the Center for International Trade and Transportation at California State University, Long Beach. You were selected as a possible participant in this study because your agency is involved in transportation planning or operations.

PURPOSE OF THE STUDY
The purpose of this project is to identify the workforce needs of California's regional transportation planning agencies as well as regional transit agencies. This includes the impact of Senate Bill (SB) 375 on Metropolitan Planning Organizations (MPOs). SB 375 requires agencies to develop plans to achieve reductions in greenhouse gas emissions. These plans are called Sustainable Communities Strategies (SCS).

PROCEDURES
If you volunteer to participate in this study, you will do the following things: Read this consent form thoroughly and check the appropriate box below giving your consent to participate in the study.
Upon completion of this form, you will be asked a series of questions as part of an online survey. The survey should take approximately 20 minutes to complete. The survey consists of questions about your organization, including questions about your existing workforce needs, and anticipated future needs.

POTENTIAL RISKS AND DISCOMFORTS
There will be no risks to the subjects' dignity, reputation, rights, health, welfare, or psychological well-being/comfort present in this research and invited participants will have an option to opt out of the survey.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY
The participants invited to take part in the survey and/or interview are already engaged in workforce development efforts and transportation planning. This project gives them an opportunity to share the lessons of their work in an academic study. They will further benefit from having their and other's efforts documented.

PAYMENT FOR PARTICIPATION
There will be no payment for participation.

CONFIDENTIALITY
Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. Participation or non-participation will not affect your employment status. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

IDENTIFICATION OF INVESTIGATORS
If you have any questions or concerns about the research, please feel free to contact Tom O'Brien at 562-985-2875.

RIGHTS OF RESEARCH SUBJECTS
You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Office of University Research, CSU Long Beach, 1250 Bellflower Blvd., Long Beach, CA 90840; Telephone: (562) 985-5314 or email to research@csulb.edu.

Approved from September 27, 2011 to September 26, 2012 by the CSULB IRB.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

○ I understand the procedures and conditions of my participation described above. My questions have been answered to my satisfaction, and I agree to participate in this study.

○ I do not wish to proceed

2. What is the name of your organization?

3. What is your job title?

4. What best describes your organization's structure?

- [ ] Independent organization
- [ ] Public planning MPO
- [ ] Transit operator
- [ ] Part of a regional council/council of governments
- [ ] Part of a county government office
- [ ] Part of a city government office
- [ ] Part of the state department of transportation (DOT)
- [ ] Other (please specify)

5. How many employees does your organization currently have? If you do not know, please state in the I don't know field.

Full-time

Part-time

Contracted employees

I don't know

6. What kind of governing board does your organization have? (e.g., 1 agency, 1 vote, weighted voting, etc.)

7. How often does the governing board meet?

8. How many cities fall within your organization's planning area? If not applicable, please state in the N/A field.

Cities

N/A

9. In addition to the federally-mandated transportation planning duties, does your organization have any of the following responsibilities?

	Yes	No	Not Applicable	I don't know
Conducting all or a portion of the region's land use forecasts or planning	○	○	○	○
Conducting air quality/emissions analysis beyond federally-required conformity tests	○	○	○	○
Conducting environmental or water quality planning	○	○	○	○
Operating all or a portion of the regional transit system(s)	○	○	○	○
Implementing transportation projects	○	○	○	○
Implementing transportation programs	○	○	○	○
Conducting all or a portion of the region's aviation planning	○	○	○	○
Conducting all or a portion of the region's freight rail planning	○	○	○	○
Conducting transportation-related studies (e.g., traffic and safety studies)	○	○	○	○
Operating all or a portion of the region's emergency management system	○	○	○	○
Serving as the area agency on aging	○	○	○	○
Preparing a Regional Transportation Plan (RTP)	○	○	○	○

Other (please specify)

[   ]

10. How, if at all, does your organization coordinate its planning activities with the following types of organizations? Please mark all that apply.

	Through regular meetings	Through regular correspondence	Solicitation of input/feedback on an ad-hoc basis	By sharing travel demand modeling capacity	Representation on MPO committees	Does not coordinate
Federal DOT (FHWA and FTA)	☐	☐	☐	☐	☐	☐
State DOT	☐	☐	☐	☐	☐	☐
City and county entities (e.g. planning boards)	☐	☐	☐	☐	☐	☐
Adjacent MPO(s)	☐	☐	☐	☐	☐	☐
Councils of government/regional council	☐	☐	☐	☐	☐	☐
Regional transit operators	☐	☐	☐	☐	☐	☐
Environmental agency (e.g., EPA or state department of natural resources)	☐	☐	☐	☐	☐	☐
Air quality organization (e.g., ARB, regional air quality management district)	☐	☐	☐	☐	☐	☐
Advocacy group(s) (e.g., business-oriented or environmental-oriented interest groups)	☐	☐	☐	☐	☐	☐

Other (please specify)

[   ]

11. To what extent, if at all, does your organization use the following indicators to evaluate its effectiveness?

	Very great extent	Great extent	Moderate extent	Some or little extent	No extent	No basis to judge
Number of projects from plans and TIP implemented	○	○	○	○	○	○
Travel demand model accuracy (e.g., outcome of implemented projects align with model projections)	○	○	○	○	○	○

	Very great extent	Great extent	Moderate extent	Some or little extent	No extent	No basis to judge
Transportation system safety	○	○	○	○	○	○
Transportation system reliability	○	○	○	○	○	○
Transportation system accessibility	○	○	○	○	○	○
Transportation system security	○	○	○	○	○	○
Compliance with federal and state transportation planning rules	○	○	○	○	○	○
Satisfaction among local stakeholders (e.g., elected officials) with plans and projects	○	○	○	○	○	○
Satisfaction among the general public for plans and projects	○	○	○	○	○	○
Extent of coordination and stakeholder involvement	○	○	○	○	○	○
Measure(s) of public participation	○	○	○	○	○	○
Level of highway congestion	○	○	○	○	○	○
Air quality	○	○	○	○	○	○
Mobility for disadvantaged populations (e.g., elderly, people with disabilities)	○	○	○	○	○	○
Condition of transportation network (e.g., pavement and bridge condition)	○	○	○	○	○	○

Other (please specify)

12. Regardless of your individual answers to the previous question, from your perspective, how useful, if at all, could the following indicators be for evaluating the effectiveness of MPOs?

NCST

	Very useful	Useful	Moderately useful	Of some or little use	Of no use	No opinion or no basis to judge
Number of projects from plans and TIP implemented	○	○	○	○	○	○
Travel demand model accuracy (e.g., outcome of implemented projects align with model projections)	○	○	○	○	○	○
Transportation system safety	○	○	○	○	○	○
Transportation system reliability	○	○	○	○	○	○
Transportation system accessibility	○	○	○	○	○	○
Transportation system security	○	○	○	○	○	○
Compliance with federal and state transportation planning rules	○	○	○	○	○	○
Satisfaction among local stakeholders (e.g., elected officials) with plans and projects	○	○	○	○	○	○
Satisfaction among the general public for plans and projects	○	○	○	○	○	○
Extent of coordination and stakeholder involvement	○	○	○	○	○	○
Measure(s) of public participation	○	○	○	○	○	○
Level of highway congestion	○	○	○	○	○	○
Air quality	○	○	○	○	○	○
Mobility for disadvantaged populations (e.g., elderly, people with disabilities)	○	○	○	○	○	○
Condition of transportation network (e.g., pavement and bridge condition)	○	○	○	○	○	○

Other (please specify)

13. How important, if at all, are the following when determining which projects to include in your organization's short range plan (generally called the Transportation Improvement Program)?

	Very important	Important	Moderately important	Of some or little importance	Of no importance	No basis to judge
Federally-defined planning factors	○	○	○	○	○	○
State transportation or environmental goals	○	○	○	○	○	○
Regional or self-imposed transportation or environmental goals	○	○	○	○	○	○
Results of economic analysis (e.g., benefit-cost analysis)	○	○	○	○	○	○
Transportation plans developed by other local or regional jurisdictions	○	○	○	○	○	○
Public support	○	○	○	○	○	○
Political support	○	○	○	○	○	○
Available funding	○	○	○	○	○	○
Potential for economic development benefits	○	○	○	○	○	○
Estimated impact of project on regional air quality emissions	○	○	○	○	○	○
Inclusion of project on voter approved ballot measure	○	○	○	○	○	○
The loss of redevelopment agencies and the resulting loss of land uses that could support transit.	○	○	○	○	○	○

Other (please specify)

NCST

14. What type of impact do you think the retirement of baby boomers will have on the transportation workforce?

- ○ Severe impact
- ○ Moderate impact
- ○ Some impact
- ○ No impact
- ○ Other (please specify)

15. Does your organization conduct outcome evaluations on completed projects to assess the accuracy of your forecasts (e.g., project cost, ridership, etc.)?

- ○ Yes, on all projects
- ○ Yes, on some but not all
- ○ No
- ○ Not sure

16. Why does your organization not conduct outcome evaluations on all completed projects? Please mark all that apply.

☐ State conducts such evaluations

☐ Project sponsor(s) conduct such evaluations

☐ Lack of necessary funding

☐ Lack of necessary time

☐ Lack of trained staff

☐ Lack of necessary data

☐ Lack of necessary modeling capacity (e.g., software and trained staff)

☐ Organization is federally evaluated

☐ Other (please specify)

[   ]

17. What amount or percentage, excluding in-kind funds or services, of your fiscal year 2011-12 actual expenditures dedicated to transportation planning were provided by each of the following sources? Total among columns should add to 100%

	0-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%
FHWA (PL) and FTA 5303	○	○	○	○	○	○	○	○	○	○
STP	○	○	○	○	○	○	○	○	○	○
CMAQ	○	○	○	○	○	○	○	○	○	○
State	○	○	○	○	○	○	○	○	○	○
Local (e.g., local sales, gas, or property taxes)	○	○	○	○	○	○	○	○	○	○
EPA	○	○	○	○	○	○	○	○	○	○
FAA	○	○	○	○	○	○	○	○	○	○
Transit fare box revenue	○	○	○	○	○	○	○	○	○	○
Other funds	○	○	○	○	○	○	○	○	○	○
I don't know	○	○	○	○	○	○	○	○	○	○

Other (please specify)

[   ]

18. How has your organization addressed any funding shortfalls within the past 5 years?

	Yes	No	I don't know
Reduced operation expenses (e.g., staff raises, benefits, and travel)	○	○	○
Reduced size of workforce through attrition, hiring freezes, or layoffs	○	○	○
Delayed purchase of new technology, such as modeling packages	○	○	○
Reduced contract support services	○	○	○
Reduced or eliminated internal or external training for staff	○	○	○
Delayed initiation of UPWP activities or scaled back UPWP activities	○	○	○
Reduced the number of projects and programs implemented	○	○	○

Other (please specify)

[   ]

19. What percentage of your organization's budget was allocated to modeling? If you don't know the percentage please write that as your response.

[   ]

Questions regarding SB 375 and the development of a SCS.

20. Did your organization apply for a Strategic Growth Council (SGC) planning grant in 2010?

○ Yes

○ No

○ I don't know

Other (please specify)

[   ]

21. If a grant was received, how did the funding assist in your organization's development of the SCS?

22. Were there any issues in receiving the grant money in time to use it for developing the SCS?

◯ Yes

◯ No

◯ I don't know

◯ Other (please specify)

23. Was there a need for your organization to add full time equivalents (FTE) in order to comply with SB375?

◯ Yes

◯ No

◯ I don't know

Other (please specify)

[   ]

24. What skills do you think are the most important to being able to create a SCS?

[   ]

25. What travel demand model type(s) does your organization use?

☐ Four-step model

☐ Three-step model

☐ Activity-based model

☐ I don't know

☐ Other (please specify)

[   ]

26. Who designs the travel demand model?

[   ]

27. Were there any software upgrades made and/or training to aid in modeling?

○ Yes, software and training

○ Yes, software only

○ Yes, training only

○ No

○ I don't know

Other (please specify)

[   ]

28. Do you think that SB375 is going to lead to an increased demand for modeling?

○ Yes

○ No

○ I don't know

Other (please specify)

[   ]

29. Which agency performs most, if not all, of the travel modeling for your organization's long range plan?

○ In-house

○ State DOT

○ Consultants or other contractors

○ Other regional planning body

○ Regional or local transit agency

○ Other (please specify)

[   ]

30. If you were unable to create the travel demand model internally what was the reason(s)?

☐ Limited personnel

☐ Staff availability

☐ Lack of knowledge about travel demand models

☐ I don't know

☐ Other (please specify)

[   ]

31. To what extent, if at all, does your organization use travel demand modeling to carry out the following planning activities?

	Very great extent	Great extent	Moderate extent	Some or little extent	No extent	No basis to judge
Estimating future travel demand	○	○	○	○	○	○
Traffic simulation	○	○	○	○	○	○
Identifying areas for transportation improvement	○	○	○	○	○	○
Evaluating proposed transportation projects	○	○	○	○	○	○
Estimating the impact of transportation on land-use	○	○	○	○	○	○
Air quality conformity analysis	○	○	○	○	○	○
Providing data services to others	○	○	○	○	○	○
Integrating land-use planning (e.g., conducting land-use projections)	○	○	○	○	○	○
Planning for special events	○	○	○	○	○	○

Other (please specify)

[   ]

32. Does your organization's travel demand model specifically quantify (i.e., forecast) the following modes of transportation?

☐ Transit

☐ Automobile travel (including ride-sharing)

☐ Walking

☐ Biking

☐ Aviation

☐ Intercity passenger rail

☐ Freight rail

☐ Freight truck trips

☐ Other (please specify)

33. Typically, how often is the travel model your organization uses validated?

○ More often than once a year

○ Yearly

○ When appropriate (e.g., for updates to long or short range plans)

○ Never

○ I don't know

34. What tools were used to to estimate and quantify GHG reductions? (If you don't know or are unable to answer the questions please type that as your response)

35. Did your organization issue a RFP for a consultant for the development of a SCS?

○ Yes

○ No

○ I don't know

○ Other (please specify)

36. What were the responsibilities of the consultant?

☐ Scoping the SCS

☐ The entire SCS

☐ Travel demand modeling

☐ Community outreach

☐ Other (please specify)

[   ]

37. How many staff members from your organization, if any, were assigned to work on the SCS?

[   ]

38. What percentage, if any, of those staff members time was dedicated to the SCS?

○ 0%

○ 1-20%

○ 21-40%

○ 41-60%

○ 61-80%

○ 81-100%

39. How does your organization plan on measuring the GHG reduction performance measures of the SCS? Are policy considerations being used to measure the performance?

[   ]

40. In your opinion, how much of a challenge, if any, do the following issues present for your organization in carrying out the federal and/or state requirements for transportation planning?

	Very great challenge	Great challenge	Moderate challenge	Some or little challenge	No challenge	No basis to judge
Lack of transportation planning funding	○	○	○	○	○	○
Lack of certainty for federal transportation funding	○	○	○	○	○	○
Competing priorities between transportation planning and other duties	○	○	○	○	○	○
Obtaining public input	○	○	○	○	○	○
Lack of flexibility of transportation planning funds (e.g., the lack of ability to use federal MPO funds on non-transportation planning activities)	○	○	○	○	○	○
Lack of ability to find funding sources for local match of federal transportation planning funds	○	○	○	○	○	○
Fiscally constraining the long-range transportation plan and short-range TIP	○	○	○	○	○	○
Limited authority to implement short-range projects and plans	○	○	○	○	○	○
Limitations in travel demand modeling capacity	○	○	○	○	○	○
Data limitations	○	○	○	○	○	○
Coordination with land-use planning agencies	○	○	○	○	○	○
Coordination with regional planning entities (e.g., neighboring MPOs and overlapping regional councils)	○	○	○	○	○	○

	Very great challenge	Great challenge	Moderate challenge	Some or little challenge	No challenge	No basis to judge
Coordination with your state DOT	○	○	○	○	○	○
Lack of trained staff	○	○	○	○	○	○

Other (please specify)

* 41. 1. Invitation to a Follow-Up Interview

California State University Long Beach, Center for International Trade and Transportation (CITT) would like to invite you to participate in a follow-up interview as part of the survey you have just completed.

The purpose of this project is to identify the workforce needs of California's regional transportation planning agencies as well as regional transit agencies. This includes the impact on Metropolitan Planning Organizations (MPOs) of Senate Bill (SB) 375, which requires agencies to develop plans to achieve reductions in greenhouse gas emissions. These plans are called Sustainable Communities Strategies (SCS).

The follow-up questions will attempt to gather further and more in-depth information about your organization, including questions about your existing workforce needs, and anticipated future needs.

PROCEDURES
If you wish to volunteer to participate in the telephone interviews, you will do the following things: Read this consent form thoroughly and check the appropriate box below giving your consent to participate in the interviews.

POTENTIAL RISKS AND DISCOMFORTS There will be no risks to the subjects' dignity, reputation, rights, health, welfare, or psychological well-being/comfort present in this research and invited participants will have an option to opt out of the survey.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY The participants invited to take part in the survey and/or interview are already engaged in workforce development efforts and transportation planning. This project gives them an opportunity to share the lessons of their work in an academic study. They will further benefit from having their and other's efforts documented.

PAYMENT FOR PARTICIPATION There will be no payment for participation.

CONFIDENTIALITY
Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

PARTICIPATION AND WITHDRAWAL
You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. Participation or non-participation will not affect your employment status. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Tom O'Brien at 562-985-2875.

RIGHTS OF RESEARCH SUBJECTS
You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Office of University Research, CSU Long Beach, 1250 Bellflower Blvd., Long Beach, CA 90840; Telephone: (562) 985-5314 or email to research@csulb.edu.

Do you consent to participate in a telephone follow-up interview?

○ Yes

○ No

42. Please provide your name and phone number.

This concludes the survey. Thank you for your participation.

Appendix B: Theme Based Summary of the In-Depth-Interviews:

We have masked the respondents of the detailed interview. Instead, we have enlisted the size of the ten MPOs. We conducted the interview with MPOs 8 and 9 jointly and hence their responses have been combined.

MPO number	Size of MPO
MPO 1	Small
MPO 2	Medium
MPO 3	Small
MPO 4	Medium
MPO 5	Large
MPO 6	Large/Medium
MPO 7	Medium
MPO 8 and MPO 9	Large
MPO 10	Large/Medium

THEMES	MPO 1	MPO 2	MPO 3
Intensive RTP development process	1. Maybe, since RTP development process is more about SCS.	1.Yes, doubled workload 2.Yes, detailed EIR	1.Yes, SB 375 drove the purpose of an RTP
Dedicate more resources	1. Yes, taken more resources, and MPO is small size	1. Maybe, multi-tasking of planners 2. Use of external consultants	1. Yes, increased need for technically sound planners
Increased use of external consultants	1. Yes, since work has intensified, specialized work is being outsourced	1. External consultants used in modeling 2. Always had to outsource some portion of the RTP planning process	1. Maybe, since MCTC is only a supporting commission, consultants are used to validate information
Change in internal co-ordination	1. No, as the smallest MPO, change is commonplace and not very evident		1. Yes, there is a greater need to collaborate between teams
Effect of litigation	1. No, has not been affected by any litigation as yet	1. Yes, the COG was sued over its EIR	1. No
Use of a legal counsel	1. No, not used a legal counsel as public retaliation was not prevalent	1. Yes, use of legal counsels in RTP development process now a norm	1. No, have not used a legal counsel
Increased public outreach efforts	1. Yes, outreach was larger as population served was primarily rural	1. Yes, the COG staff performs more public outreach	1. Yes, increased use of outreach through social media
Risk mitigation practices		1. Yes, consultants are used as risk mitigation strategy	1. Maybe, use of consultants for validation and support
Sharing of resources with other COGS	1. Yes, there was large resource sharing with SJCOG 2. Collaborative efforts in training, modeling are shared with other COGS	1. Legal counsels are often collaborative 2. Modelers if necessary are also shared between MPOs	1. Yes, share with other COGS and partner organizations
Size of COGS impacts the extent of changes	1. Yes, Kings is the smallest MPO and hence certain issue may/may not be present	1. Yes, Merced is a small MPO, hence its SB 375 issues may be unique	1. Yes, size and spread of COG certainly impacts

(Left vertical label: Change in nature of work)

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	THEMES	MPO 4	MPO 5	MPO 6
Change in nature of work	**Intensive RTP development process**	1. Maybe, the RTP development process has tighter planning requirements. 2. SBCAG does not face acute changes in the way it operates	1.Yes, RTP is an intensive process	1. Yes, nature of work not changed, but become intensive.
	Dedicate more resources	1. Yes, SB 375 has increased the need for transportation modeling personnel.	1. Yes, more detailed the RTP process need more resources. 2. There is a combination of in-house and outsourced projects	1. Yes, cost of producing transportation plans expensive after SB 375. 2. Increased need for better training tools for planners.
	Increased use of external consultants	1. No, presently most of the technical modeling work is done in-house 2. There is potentially a chance for additional modeling expertise which maybe done using external consultants	1. Yes portions of RTPs are outsourced, Ex: data visualization, some aspects of modeling as well	1. Yes, used consultants on a case-to-case basis only if needed.
	Change in internal co-ordination	1. Yes, SB 375 and other laws like SB 743 had impacts on housing, land use planning and air quality became critical	1. Yes, stricter RTPs call for change in internal dynamics	1. Yes, there is increased inter-organization and intra-organization planning/communication strategy.
	Effect of litigation	1. No, has not been affected by any litigation as yet	1. No not sued, but increased emphasis on legal ramification.	1. No, has not been affected by any litigation as yet
	Use of a legal counsel	1. No, have not used a legal counsel	1. Yes, have a legal counsel on retainer, 2. SACOG consults with the legal counsel during the RTP development process	1. No, have not used a legal counsel
	Increased public outreach efforts	1. Yes, the public outreach component increased with the need to convey the big picture	1. Yes, public outreach efforts are conducted in-house	1. Yes, the public outreach component is more robust and there is a need to have intensive community involvement.
	Risk mitigation practices		1. Yes, consultants are used as risk mitigation strategy	
	Sharing of resources with other COGS		1. Yes, SACOG help smaller COGS with their RTPs	1. Yes, SJCOG is collaborating with Merced COG and Stanislaus County to produce a common tool to ease SCS development process.
	Size of COGS impacts the extent of changes	1. Yes, SBCAG is a medium MPO, the size of the COG determines the nature of issues	1. Yes, SACOG is a larger MPO and therefore amplified problems	1. Yes, SJCOG is a large COG, hence problems are larger and varied

	THEMES	MPO 7	MPO 8 and MPO 9	MPO 10
Change in nature of work	**Intensive RTP development process**	1. Yes, workload has increased 1/3rd and RTP development process become intensive. 2. Nexus between land use planning and transportation planning is what was required, and SB 375 brought that up	1. Yes, RTP development process more integrative with emphasis on long range plans	1. Maybe, SB 375 measures has increased the need for land use planning and policy. Different for larger MPOs
	Dedicate more resources	1. Maybe, emphasis on modeling, land use planning, transportation planning	1. Yes, the SB 375, SCS process has forced SANDAG to create positions like a Green Region Program Manager and Mobility Expert taking into account impacts of SB 375	1. Yes, use of more resources in forecasting, land use planning and scenario planning. 2. Definitely a stretch for regional transportation planners
	Increased use of external consultants	1. Yes, external consultants used in the first round of RTP development. 2. But, now 95% of work done in-house, most of it reverse-engineered through the first round of RTP		1. Yes, use of consultants based on availability of budgets. Before SB 375 most of the plans done in-house
	Change in internal co-ordination		1. Yes, various departments come together in creating a holistic SCS. Calls for extreme integration	
	Effect of litigation	1. No, not had an effect, not impact due to the EIR	1. Yes, was sued for not creating a detailed EIR, case was settled in favor of SANDAG with caveats. 2. Large litigation cost	1. No, RTP plan itself has not been sued, but land use plan has been sued
	Use of a legal counsel	1. Yes, have a legal counsel who advices as the case maybe	1. Yes, extensively uses a legal counsel in all their SCS and RTP development process henceforth	1. Yes, have a legal counsel in house
	Increased public outreach efforts	1. Maybe, public outreach component not much in the first round, but trending towards increased engagement strategy	1. Yes, greater outreach and public participation is part of the RTP development process	1. Yes, more public outreach and stakeholder engagement is part of the process now
	Risk mitigation practices	1. Yes, consultants were used from a risk mitigation stand point	1. Yes, the legal team is a risk mitigation strategy adopted by SANDAG	1. Yes, public outreach as risk mitigation strategy
	Sharing of resources with other COGS	1. Yes, close proximity to SBCOG also collaborating with 5 other counties to develop activity-based modeling which will be used for SCS in the future	1. Maybe, collaboration with cross border agency in Mexico always present. 2. Assistance to and collaboration with other MPOs in the region is done on a case-to-case basis	
	Size of COGS impacts the extent of changes		1. Yes, SANDAG is a large MPO structure and associated challenges vary	1. Yes, size of MPOs effects the way in which each MPO deals with SB 375

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	THEMES	MPO 1	MPO 2	MPO 3
SCS development	**Increased public outreach staff**	1. Yes, staff perform more outreach work	1. Yes, staff perform more outreach work	1. Maybe, staff now have additional responsibilities of conducting outreach
	Increased transportation modelers	1.Yes, need for transportation modeling increased	1.Yes, need for transportation modeling increased	1. Yes, need for transportation and emissions modeler has increased
	New components in RTPs		1. Yes, EIRs are more detailed and climate change aspect under SB 375 larger	1. Yes, RTPs are considerably intense with increased technical specificity
	Additional training	1. Yes, training provided on a case-by-case basis	1. Maybe	1. Yes, training is done either through webinars and lectures
	Law suites	1. Not sued	1. Yes, was sued and settled	1. Not sued

	THEMES	MPO 4	MPO 5	MPO 6
SCS development	**Increased public outreach staff**	1. Yes, staff perform more outreach work	1. Yes, staff perform more outreach work	1. Yes, staff perform more outreach work
	Increased transportation modelers	1.Yes, need for transportation modeling increased	1.Yes, need for transportation modeling increased	1.Yes, need for travel demand modeling increased
	New components in RTPs		1. Yes, EIRs are more detailed and climate change aspect under SB 375 larger	1. Yes, SB 375 forced MPOs to respond to new challenges, which the RTPs highlighted
	Additional training	1. Yes, personnel are provided intensive training on the changing regulation	1. Yes, training provided on a case-by-case basis. Done sometimes through University Extension programs	1. Yes, training was provided on land use tools, public outreach and other components of SB 375. 2. Online tools like metro class were also used to obtain training
	Law suites	1. Not sued	1. Not sued	1. Not sued

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	THEMES	MPO 7	MPO 8 and MPO 9	MPO 10
SCS development	**Increased public outreach staff**	1. Maybe	1. Yes, staff perform more outreach work	1. Yes, staff perform more outreach work
	Increased transportation modelers	1.Yes, need for travel demand modeling increased	1.Yes, need for travel demand modeling, air quality modeling increased	1. No, but management of modeling better, tools used for modeling are assumption based and based on professional judgment 2. Uniformity in modeling not required by Tahoe
	New components in RTPs	1. Yes, RTP development process become intensive for land use planning, air quality planning and transportation planning	1.Yes, SB 375 changed the nature of tasks for an RTP development. Litigation and technology know how have been the critical additive	
	Additional training	1. Maybe, mostly learned on the job and performed a mock SCS before the actual first round of SCS.	1. Yes, training will be provided on a case-to-case basis. Online training and free training provided by federal and state agencies are availed	1. Yes, training o stay more current, and reinforce new affordable tools for employees
	Law suites	1. Not sued	1. Yes, sued and ruled in favor of SANDAG	1. Not sued

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	THEMES	MPO 1	MPO 2	MPO 3
Skill sets	**Analytical skills**	1. Yes, personnel with analytical skills have good reason for progression	1. Maybe, people with Math oriented skill sets have succeeded	1. Yes, technical skills combined with analytical skills critical
	Strong technical skills (transportation demand planning, air quality modeling)	1. Yes technical skills in travel demand modeling and air quality modeling necessary 2. KCAG has to teach graduates how to do modeling even if they graduate from planning schools	1. Maybe, not necessary, background in planning useful but not necessary	1. Yes, personnel must be capable of performing emissions calculations, transportation planning 2. Strong GIS specialty coupled with programming skills essential
	Local government knowledge	1. Maybe, but not necessary, but understanding local political environment would have been useful	1. Maybe, but not necessary	1. Maybe, local knowledge useful but not necessary
	Project management	1. No	1. No	1. No
	Writing	1. Yes, important for effective communication	1. Yes, important for effective communication	1. Yes, important for effective communication
	Stakeholder engagement	1. Yes, the nature of work now includes extensive outreach	1. Yes, the nature of work now includes extensive outreach	1. Yes, the nature of work now includes extensive outreach
	Computer programing	1. Maybe	1. Maybe	1. Yes, personnel with coding and programing skills valued in a small MPO
	Data visualization		1.Maybe	1.Maybe
	Inter-disciplinary skills	1. Yes, inter-disciplinary skill sets essential for small MPOs. Ex: GIS person has potential to grow as a planner 2. Younger people with experience/internships with COGS do better	1. Yes, inter-disciplinary skill sets essential for small MPOs. Less resources doing different jobs is critical	1. Yes, inter-disciplinary skills encompassing engineering, land use planning, photography have been very successful at Madera County
	Other soft skills	1. Yes, public speaking, and using simple language useful	1. Yes, Communication, engagement and Leadership important part of planners' soft skills	1. Yes, public speaking, social media engagement and know-how of digital technology

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	THEMES	MPO 4	MPO 5	MPO 6
Skill sets	**Analytical skills**	1. Yes, technical skills combined with analytical skills critical	1. Yes, strong analytical and quantitative skills necessary	1. Maybe
	Strong technical skills (transportation demand planning, air quality modeling)	1. Yes, strong technical skills in planning, modeling, land use planning and public outreach essential 2. Skeptical in hiring graduates right out of college, could benefit from internship/basic experience in the public sector	1. Maybe, personnel with technical skills can be trained	1. Yes, there is a need to have a good grasp on travel demand modeling 2. Skills in GIS, transportation planning and other planning backgrounds are useful
	Local government knowledge	1. Maybe, but not necessary	1. Yes, personnel with understanding of local governance is helpful	1. Maybe, but not necessary
	Project management	1. No	1. Yes personnel with potential to become a strong project manager critical	1. No
	Writing	1. Yes, important for effective communication	1. Yes, important for effective communication	1. Yes, important for effective communication
	Stakeholder engagement	1. Yes, the nature of work now includes extensive outreach	1. Yes, the nature of work now includes extensive outreach	1. Yes, the nature of work now includes extensive outreach
	Computer programing	1. Maybe	1. Yes, personnel with coding and programing skills likely to grow faster	1. Maybe
	Data visualization	1. Maybe	1. Yes, personnel with data visualization skill sets will help internalize outsourced work	1. Maybe
	Inter-disciplinary skills	1. Yes, inter-disciplinary skills with the ability to convey a big picture story is important 2. Biggest challenge for SBCAG is attracting employees due to the high cost of housing in Santa Barbara	1. Yes, inter-disciplinary skills essential, personnel should be capable of moving between roles easily	1. Yes, personnel with additional skill sets are an asset at SJCOG 2. Biggest challenge is, millennials not willing to relocate to rural/semi-rural areas, hence talent pool lower
	Other soft skills	1. Yes, important to have personnel who can stay on top of changes in today's world and work effectively	1. Yes, team work and productive conversations with stakeholders	1. Yes, leadership, community involvement and enthusiasm necessary for the role

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	THEMES	MPO 7	MPO 8 and MPO 9	MPO 10
Skill sets	**Analytical skills**	1. Yes, need personnel who are detail oriented	1. Yes, analytical skills essential along with general planning skills	
	Strong technical skills (transportation demand planning, air quality modeling)	1. Yes, good grasp on GIS skills, quantitative skills essential 2. Modeling skills would be good have	1. Yes, technical skills and observatory skills in air quality modeling, freight and supply chain knowledge essential. 2. Knowledge on technical and financial feasibility of low-carbon technology would be useful	1. Maybe, technical skills can be taught, but planning background maybe useful. Finding people who are a good fit is critical
	Local government knowledge	1. Maybe, but not necessary	1. Maybe, but not necessary	1. No
	Project management	1. No	1. Yes, personnel with good grasp on project management skills could be asked to lead larger projects	1. No
	Writing		1. Yes, important for effective communication	1. Yes, important for effective communication
	Stakeholder engagement		1. Yes, the nature of work now includes extensive outreach	1. Yes, the nature of work now includes extensive outreach
	Computer programing		1. Yes, personnel with computer programing and gamification knowledge useful in a systems development process	1. Yes, young people come with that background skills like GIS, Data base management etc
	Data visualization		1. Yes, gamification and data visualization professionals enhance quicker project delivery	
	Inter-disciplinary skills	1. Maybe, academic background in city planning, transportation planning and civil engineering preferable. 2. Personnel with planning and policy background useful 3. Cal Poly schools have good courses on city/urban planning, but need emphasis on regional transportation planning	1. Yes, multi disciplinary skill sets are imperative today. Specialization is good, but not enough. Multi-disciplinary approach should be taken while drafting legislation as well. 2. Personnel with background in project management, liberal arts, computer programing preferred other than planning background	1. Yes, increasingly that's what it looks like is happening. We need people who can confidently do public outreach and talk meaningful to stakeholders
	Other soft skills	1. Yes, leadership connection with other larger COGs is necessary to maintain. 2. Challenge, loss of executive members due to retirement has affected the COG	1. Yes, soft skills in leadership, communication, ability to lead is important	1. Yes, soft skills in leadership, communication, ability to lead is important

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