

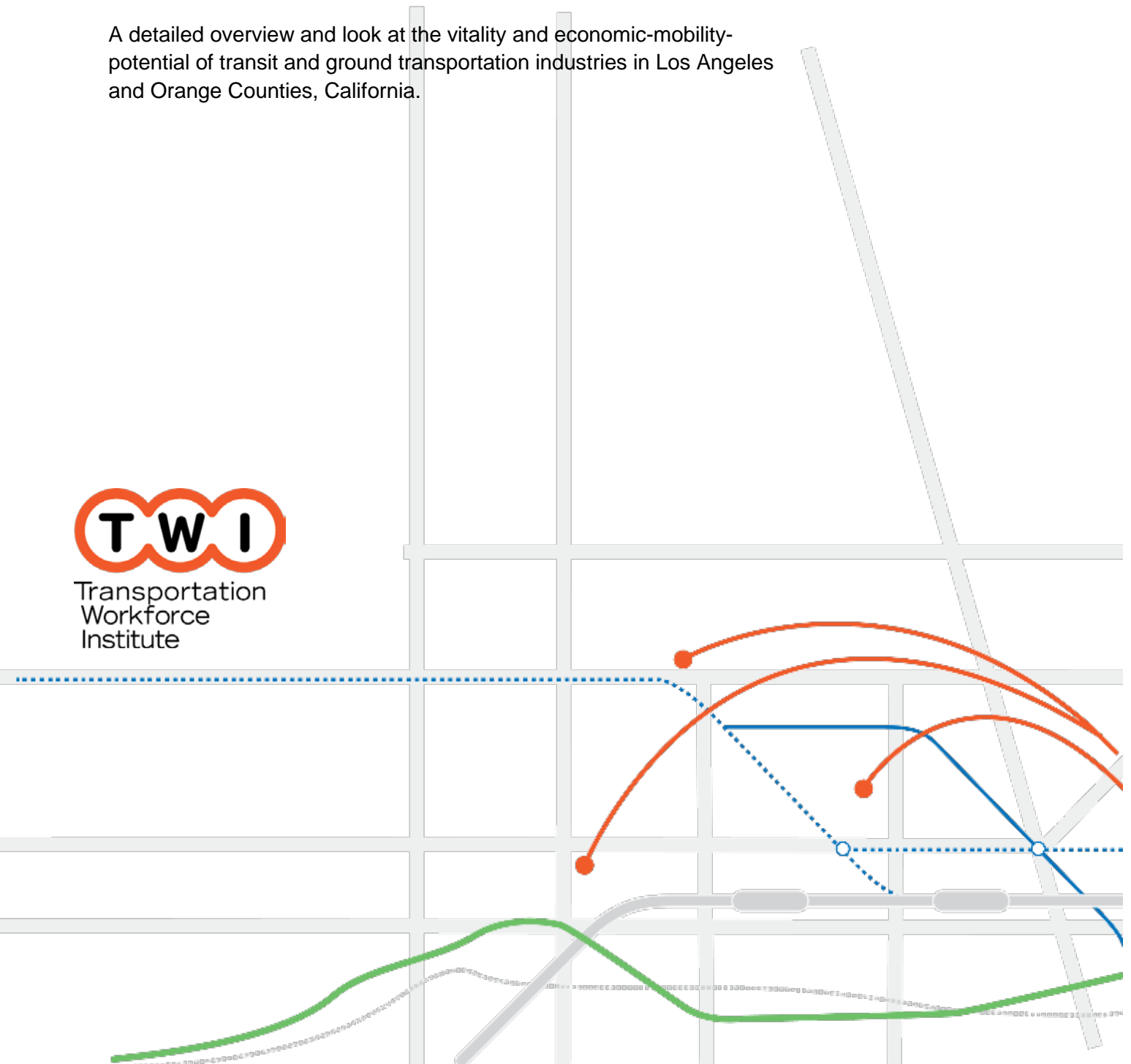
TRANSIT AND GROUND PASSENGER TRANSPORTATION IN LOS ANGELES AND ORANGE COUNTIES, CA

July, 2017

A detailed overview and look at the vitality and economic-mobility-potential of transit and ground transportation industries in Los Angeles and Orange Counties, California.



Transportation
Workforce
Institute



Acknowledgments

This report was made possible through a Federal Transit Administration (FTA) Innovative Public Transportation Workforce Development grant.

Author and Inquiries

Author. Marcy Drummond, Senior Fellow, Transportation Workforce Institute at Los Angeles Trade-Technical College.

Transportation Workforce Institute (TWI). TWI ensures a well-trained and diverse transportation workforce by collaborating with industry, education, and workforce development partners to create competency- and standards-based curriculum, programs, and services that meet immediate and long-term employer needs while connecting diverse communities and citizens through transportation projects and workforce development efforts.

Inquiries. Further inquiries can be made by contacting TWI at twi@lattc.edu.

Data Sources

Multiple and varied data sources were utilized in the preparation of this report and are included in Appendix A. Two sources were primarily relied upon which we would like to specifically acknowledge here. First, the Southern California Association of Governments' (SCAG) 2016 *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) was extensively utilized for the *Nature of the Transit and Ground Transportation Industry in Los Angeles and Orange Counties* section of the report. Specialized economic, industry, occupation, and education program reports--available through Economic Modeling Specialists, Inc. (EMSI)--were extensively used in the *Regional Specialization, Workforce Statistics, and Employment Opportunities* and in the *Postsecondary Education, Training, and Workforce Development* sections.

Transportation and Warehousing Industry Sector Report Series

This report is one of several reports developed by TWI examining industries in the Transportation and Warehousing Industry Sector in Los Angeles and Orange Counties, California. All reports are available on TWI's website at twi.lattc.com.

Table of Contents

Report Sections	Page
Introduction	3
Report Highlights	4
Population and Urbanization	4
Transportation Characteristics and Challenges	4
Transit and Ground Transportation Network and Use	4
Industry Specialization and Employment	4
Middle-Skill Occupations with Economic-Mobility-Potential	5
Postsecondary Education, Training, and Workforce Development	5
Nature of the Transit and Ground Transportation Industry in Los Angeles and Orange Counties	6
Demographics and Transportation Characteristics and Challenges	6
Population Density	6
Zero Car Households	6
Transportation Challenges	7
Aging Population	7
Low-Income Population	7
Environmental Sustainability	7
Transit Agencies, Establishments, and Transit Use	8
Los Angeles County Network Overview	10
Los Angeles County Metropolitan Transportation Authority (Metro)	10
Municipal Operators of Transit	10
Specialized and Local Operators	11
Planning for the Future	11
Measure M	11
Orange County Network Overview	12
Planning for the Future	13
Inter-County Network	13
Metrolink	13
Regional Specialization, Workforce Statistics, and Employment Opportunities	14
Regional Specialization	14
Workforce Statistics	15
Employment	15
Largest Employers	16
Employment Change, 2017-2020	16
Workforce Demographics	17
Earnings	18
Occupations	18
Median Hourly Earnings and Typical Employment Requirements	18
Middle-Skill Occupations with Economic-Mobility-Potential	19
Bus Drivers, Transit and Intercity	20
Bus and Truck Mechanics and Diesel Engine Specialists	22
Dispatchers, Except Police, Fire, and Ambulance	23
Postsecondary Education, Training, and Workforce Development	25
Providers and Credential Completions	25
Bus and Truck Driver Programs and Completions	25

Report Sections	Page
Diesel and Heavy Equipment Maintenance Technology Programs and Completions	26
Alternative Fuels and Advanced Transportation Programs and Completions	27
Dispatcher Programs and Completions	30
Workforce Development Challenges	30
Workforce Development Initiatives and Collaboratives	30
Advanced Transportation and Renewable Energy (ATRE)	30
California Council on Diesel Technology Education and Technology (CCDET)	31
City of Los Angeles Workforce Development Board Sector Strategists	31
Los Angeles Economic Development Corporation (LAEDC) e4 Mobility Alliance	31
Southern California Regional Transit Training Consortium (SCRTTC)	32
Advanced Transportation Regional Workforce Collaborative	32
Workforce Initiative Now-Los Angeles (WIN-LA)	32
Appendix A: Data Sources, Calculations, and Methodologies	35
Appendix B: Transit and Ground Transportation Transit Mode Descriptions	38
Appendix C: Postsecondary Education and Training Providers	39
Appendix D: List of Exhibits	40

INTRODUCTION

The transit and ground transportation industry is made up of a cluster of specialized industries as follows:

- Mixed Mode Transit Systems: NAICS 485111
- Commuter Rail Systems: NAICS 485112
- Bus and Other Motor Vehicle Transit Systems: NAICS 485113
- Other Urban Transit Systems: NAICS 485119
- Interurban and Rural Bus Transportation: NAICS 485210
- Taxi Service: NAICS 485310
- Limousine Service: NAICS 485320
- School and Employee Bus Transportation: NAICS 485410
- Charter Bus Industry: NAICS 485510
- Special Needs Transportation: NAICS 485991
- All Other Transit and Ground Passenger Transportation: NAICS 485999

It is one of eleven industries that make up the broader transportation and warehousing industry sector along with: Air Transportation, Rail Transportation, Water Transportation, Truck Transportation, Pipeline Transportation, Scenic and Sightseeing Transportation, Support Activities for Transportation, Postal Service, Couriers and Messengers, and Warehousing and Storage. Reports on all these industries, and the broader transportation and warehousing sector, in Los Angeles and Orange Counties are available on the Transportation Workforce Institute's website at twi.lattc.com.

The remainder of this report provides a more detailed overview of transit and ground transportation industries in Los Angeles and Orange Counties, California. More specifically, the purpose of this report is to illuminate the vitality and the economic-mobility-potential of these industries by analyzing the following:

- The extent of the transit and ground transportation network and its challenges to provide an indication of its strength and plans for future development;
- Regional specialization of transit and ground transportation industries in Los Angeles and Orange Counties to provide an indication of competitive concentration in the region;
- Current and projected workforce statistics to ascertain short- and longer-term employment potential;

- Median hourly earnings to identify occupations that pay living wages;
- Middle-skill occupations with high employment potential to illuminate positive economic mobility¹ opportunities; and
- Postsecondary education and training availability to identify if there are sufficient programs and services for individuals to gain the skills necessary to enter the workforce and for incumbent workers to up-skill to advance and keep pace with industry changes.

We have chosen to focus on middle-skill occupations in this report for several reasons. First, because of the importance of these occupations to the economic vitality of the region. Second, and most importantly, middle-skill occupations provide an opportunity for thousands of individuals to achieve positive economic mobility through occupations that pay family-sustaining wages and have promising employment and career advancement opportunities².

Findings in a recent report, *The Importance of Middle Skill-Jobs*, illustrate the importance of middle-skill jobs as follows:

- critical vacancies exist in occupations that primarily employ middle-skill workers,
- the number of middle-skill workers is unlikely to keep pace with demand,
- a majority of middle-skill occupations exhibit high and rising wages as well as projected growth through 2022, and
- jobs held by middle-skill workers appear to be complementary to those held by high-skill workers.

¹ Economic mobility is "the ability of an individual, family or some other group to improve (or lower) their economic status—usually measured in income. Economic mobility is often measured by movement between income quintiles". https://en.wikipedia.org/wiki/Economic_mobility

² Modestino, A.S. (Fall 2016). The importance of middle-skill jobs. *Issues in Science and Technology* 33, no. 1.

REPORT HIGHLIGHTS

Population and Urbanization

- The region is one of the largest in the United States--home to a little more than 13 million residents, 10+ million in Los Angeles County and 3+ million in Orange County.
- The region is projected to grow by nearly 1 million new residents by 2030.
- The region includes 4 U.S. Census Bureau-designated urbanized areas (UZAs): Lancaster-Palmdale, Los Angeles-Long Beach-Anaheim, Mission Viejo-Lake Forest-San Clemente, and Santa Clarita.

Transportation Characteristics and Challenges

- Within the region, the Los Angeles-Long Beach-Santa Ana Metropolitan Statistical Area (MSA) has the third largest number of zero car households in the U.S., behind New York-Northern New Jersey-Long Island NY-NJ-PA and Chicago-Naperville-Joliet IL-IN-WI.
- The most dramatic changes to the region, that will impact transit and ground transportation industries, revolves around the region's aging and low-income populations.
 - The number of residents over 65 will grow by 75 percent and comprise 13 percent of the total population by 2030 and 26 percent by 2040. Many of these residents will likely need mobility assistance--greatly increasing the capacity requirements of the demand response network in the region.
 - Average poverty rates range between 21 and 26 percent, the concentration of poverty in the Los Angeles-Long Beach-Anaheim, CA UZA has increased, and poverty rates in the region are projected to grow. Lower income households tend to have less access to vehicles and, overall, higher public transportation needs.
- Another major challenge is environmental sustainability. California will continue to lead the way with adopting and expanding clean and green policies and regulations (as environmental needs and new technologies arise) with an effort to achieve the lofty goal of zero emissions and transportation environmental impact--to which industries will need to quickly adjust and adapt.

Transit and Ground Transportation Network and Use

- The region has an extensive and complex transit and ground transportation network comprised of numerous agencies who operate fixed-route local and express bus; bus rapid transit; community circulators; demand response; and commuter, light, and heavy rail.
- Los Angeles County Metropolitan Transportation Authority (Metro), serving Los Angeles County, is the third largest transit agency nationally, when ranked by number of passenger trips, and fourth largest in terms of passenger miles.
- Orange County Transportation Authority (OCTA), Long Beach Transit (LBT), the City of Los Angeles Department of Transportation (LADOT), and the Southern County Regional Rail Authority (Metrolink) also make the list of the 50 largest transit agencies in the U.S.
- 17 major transit projects are becoming possible through the recent passage of a ballot measure in Los Angeles County (Measure M) including rail connectors, rail line and subway extensions, express bus extensions, and transit corridors--greatly expanding the transportation network in the region.

Industry Specialization and Employment

- Several transit and ground transportation industries are regionally competitive--Other Urban and Transit Systems, Limousine Service, Special Needs Transportation, Mixed Mode Transit Systems, and Other Transit and Ground Transportation.
- 22,002 individuals were employed in transit and ground transportation industries in Los Angeles and Orange Counties in 2016, employment has steadily increased since 2013 and is projected to continue to do so, at least to 2025.
- Several industries will experience double-digit employment growth increases in the next three years: Taxi Service, Bus and Other Motor Vehicle Transit Systems, Interurban and Rural Bus Transportation, and Other Transit and Ground Passenger Transportation.
- The transit and ground transportation workforce is predominately male, Hispanic or Latino, and nearly 1/3rd are over the age of 55. Significant numbers of retirements from an aging workforce will require a primed pipeline of new workers and career ladders, with upskilling opportunities, for incumbent workers.
- Average annual earnings in transit and ground transportation industries are higher in Orange County

(\$36,038) compared to Los Angeles County (\$33,805) and range from a low of \$24,536 in the Taxi Service industry to a high of \$65,926 in the Interurban and Rural Bus Transportation industry.

- Median hourly wages vary from a high of \$51.66 for General and Operations Managers to a low of \$10.71 for Cleaners of Vehicles and Equipment. Typical education requirements range from a high school diploma or equivalent to a bachelor's degree. While most occupations require a high school diploma or equivalent, most of these occupations also require short- to moderate-term on-the-job training. And, work experience required ranges from none to 5 years or more, with most occupations requiring no prior work experience.

Middle-Skill Occupations with Economic-Mobility-Potential

- There are two, middle-skill occupations (occupations that pay a living wage and have ample current and continued employment opportunities) in transit and ground transportation industries in Los Angeles and Orange Counties with positive economic-mobility-potential. They are: Bus Drivers (Transit and Intercity) and Bus and Truck Mechanics and Diesel Engine Specialists.
- A majority of Bus Drivers (Transit and Intercity) are employed by Bus and Other Motor Vehicle Transit Systems, Special Needs Transportation, and Charter Bus industries.
- 40 percent of the Bus Drivers (Transit and Intercity) workforce is 1-10 years away from or are at the typical retirement age of 65. When these older workers retire, there will likely be a large demand for new workers.
- A majority of Bus and Truck Mechanics and Diesel Engine Specialists are in industries outside of transit and ground transportation such as in Local Government, Automotive Repair, and Freight Trucking industries. Within transit and ground transportation industries, most are employed in the School and Employee Bus Transportation and Special Needs Transportation industries.

in-house or employer-sponsored training; some are offered in partnership with a postsecondary education and training institution.

- Seven providers of postsecondary, diesel and heavy equipment maintenance technology education and training had program completers in the past 13 years. Five, collectively, had 135 program completions in 2015.
- Many large employers/agencies offer in-house, employer-sponsored training and apprenticeship programs for this occupation; some are offered in partnership with a postsecondary education and training institution.
- Because a major challenge for the industry is environmental sustainability, postsecondary Alternative Fuels and Advanced Transportation programs and completions were also explored. Five postsecondary education and training providers had program completers in the past 13 years. Four, collectively, had 42 program completions in 2015. Most notably, these 2015 completions accounted for 84 percent of all completions in the state of California and 27 percent of all completions in the U.S.
- There are seven, regional workforce development initiatives and collaboratives that intersect with transit and ground transportation industries, they are: Advanced Transportation and Renewable Energy (ATRE), California Council on Diesel Technology Education and Technology (CCDET), City of Los Angeles Workforce Development Board Sector Strategists, Los Angeles Economic Development Corporation (LAEDC) e4 Mobility Alliance, Southern California Regional Transit Training Consortium (SCRTTC), and the Advanced Transportation Regional Workforce Collaborative. They all have common goals of promoting robust industries in the region and ensuring they have the requisite, skilled workforce.

Postsecondary Education, Training, and Workforce Development

- One institution in Orange County has a bus and truck driver program that had completions in the past 13 years and 197 certificate completions in 2015.
- Because of the high-demand for Bus Drivers and the limited number of postsecondary education and training programs/completers, many employers offer

NATURE OF THE TRANSIT AND GROUND TRANSPORTATION INDUSTRY IN LOS ANGELES AND ORANGE COUNTIES

The Southern California Association of Governments (SCAG) is the designated Metropolitan Planning Organization (MPO) for Los Angeles and Orange Counties, California, along with Imperial, Riverside, San Bernardino, and Ventura Counties. SCAG is mandated by the federal government to develop a multimodal, long-range transportation plan that provides a 20-year vision for investing in the region's transportation system along with an update at least once every four years. The most recent update was completed in 2016. Information for this section of the report is derived from SCAG's 2016 *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). More specifically, from the *Transportation Transit System Appendix* to the plan. Multiple sources and metrics, derived from the plan, were utilized in this report and were updated to reflect more current results and projections. Watch the 2016 RTP/SCS video to find out more about the plan at: <http://scagrtppscs.net/Pages/2016RTPSCS.aspx#2016-RTPSCSvideo>. And an interactive, executive summary of the plan is also available at: <http://scagrtppscs.net/SiteAssets/ExecutiveSummary/index.html>.

Demographics and Transportation Characteristics and Challenges

Population Density

The region is one of the largest in the United States--home to a little more than 13 million residents, 10+ million in Los Angeles County and 3+ million in Orange County³. The region is projected to grow by nearly 1 million new residents by 2030⁴ and contains 4 urbanized areas (UZAs) as designated by the United States Census Bureau (refer to Exhibit 1).

Exhibit: 1 Urbanized Areas (UZA) Los Angeles and Orange Counties, CA	
Los Angeles County	Orange County
Lancaster-Palmdale	Mission Viejo-Lake Forest-San Clemente
Los Angeles-Long Beach-Anaheim (Los Angeles and Orange Counties)	

Exhibit: 1

Urbanized Areas (UZA)

Los Angeles and Orange Counties, CA

Los Angeles County

Orange County

Santa Clarita

Exhibit: 2

Los Angeles and Orange Counties, CA Map



Zero Car Households

While the region has a notorious reputation for its auto-centricity, the industry plays an important role in providing transportation choices and enabling mobility for individuals with limited or no access to vehicles. The Los Angeles-Long Beach-Santa Ana Metropolitan Statistical Area (MSA) has the third largest number of zero car households in the U.S., behind New York-Northern New Jersey-Long Island NY-NJ-PA and Chicago-Naperville-Joliet IL-IN-WI. The 358,705 zero car households (10% of households in Los Angeles County and 5% of households in Orange County) represent nearly 5 percent of the national total and are nearly as much as the combined total of the San

³ American Community Survey 2011-2015 5-Year Estimates. Downloaded from: <https://factfinder.census.gov> March 21, 2017.

⁴ Demographic Research Unit, California Department of Finance, February 2017.

Francisco-Oakland-Fremont CA and Washington-Arlington-Alexandria DC-VA-MD-MV MSAs⁵.

Transportation Challenges

The most dramatic changes to the region--that will impact transit and ground transportation industries--revolves around the region's aging and low-income populations and the state's environmental sustainability policies.

Aging Population

The number of residents over 65 will grow by 75 percent and comprise 13 percent of the total population by 2030 and 26 percent by 2040. Those over 85 will comprise a five percent share of residents in 2040⁶. The percentage of the population over 65 and 85 is similar in both counties. Many of these residents will likely need mobility assistance, greatly increasing the capacity requirements of the demand response network in the region. Planning for this future demand is confounded by the expanding role of alternative transportation network companies such as Instacab, Wingz, Lyft, and Uber.



Low-Income Population

Recent and continued housing market instability and the recessions of the 2000s has resulted in increased poverty in the region. The rate of poverty has grown as a percentage of total population and by its geographic dispersion. The California Poverty Measure⁷ reveals the average poverty rates between 2012 and 2014 for Los Angeles County were 25.6 percent and 21.5 percent for Orange County⁸. More recently, the improving economy is helping poverty rates fall. For example, the individual

poverty rate in Los Angeles County is now at 16.6 percent, a decrease of 2.5 percent since 2012. But even with these recent decreases, inflation-adjusted household incomes are still six percent below where they were in 1990⁹. And the concentration of poverty in the Los Angeles-Long Beach-Anaheim, CA UZA has increased since 2000 (as measured by the share of poor residing in tracts with poverty rates of 20 and/or 40 percent or more)¹⁰. Moreover, poverty rates in the region are projected to grow.

Low-income households tend to have less access to vehicles and, overall, higher public transportation needs. This condition is illustrated by The *Los Angeles Equity Atlas Framework*¹¹, a study conducted by the California Community Foundation and Reconnecting America. The study found that nearly 90 percent of transit commuters in Los Angeles County had incomes under \$50,000 and 70 percent had incomes below \$25,000. Of households with incomes under \$25,000 who live near frequent transit, 31 percent take it to work, versus 13 percent of workers in households earning between \$25,000 and \$50,000. These lower-income workers also make up 71 percent of the commute-to-work trips on the existing transit system. Another key finding of the study was that low- and middle-wage jobs are increasingly decentralized throughout both counties and are not as well-served by frequent transit options or located near station stops. Therefore, a key challenge of future transit service in the region will be to find better ways to serve low-income individuals, with dispersed jobs and residences, with more frequent and convenient service.

Environmental Sustainability

Another major challenge for the industry is environmental sustainability. California is recognized as one of the most progressive states for its clean and green policies and regulations; many of which apply to transit and ground transportation industries. This includes requirements for the purchase of bulk diesel, biodiesel, and renewable hydrocarbon diesel (renewable diesel) fuels. The California Department of General Services' sustainable fleet policies emphasize the purchase of more fuel-efficient vehicles and the reduction of petroleum usage. And, the California Air Resources Board's Diesel Risk Reduction Program mandates an 85 percent reduction in

⁵ Adie Tomer, (2011). *Transit access and zero vehicle households*. Report prepared on behalf of the Brookings Institution as part of the Metropolitan Infrastructure Initiative Series and Metropolitan Opportunity Series.

⁶ Demographic Research Unit, California Department of Finance, February 2017.

⁷ The California Poverty Measure is a more comprehensive measure of poverty that incorporates the state's high—and variable—cost of living and the effect of social safety net programs.

⁸ Bohn, S., Danielson, C., Levin, M., Mattingly, M., & Wimer, C. (October, 2013). *The California Poverty Measure: A new look at the social safety net*.

Report prepared on behalf of the Public Policy Institute of California in collaboration with the Stanford Center on Poverty and Inequality.

⁹ 2015 American Community Survey 1-year estimates.

¹⁰ Kneebone, E., & Holmes, N. (March, 2016). *U.S. concentrated poverty in the wake of the Great Recession*. Brookings Institute. Downloaded from <https://www.brookings.edu/research/u-s-concentrated-poverty-in-the-wake-of-the-great-recession/>.

¹¹ Report is available for download at <http://reconnectingamerica.org/laequityatlas/index.php>.

diesel particulate exposure by 2020. California will continue to lead the way with additional policies and regulations as environmental needs and new technologies arise, and also in an effort to achieve the lofty vision of zero emissions and transportation environmental impact--to which industries will need to quickly adjust and adapt. Education, training, and other workforce development efforts will also need to keep pace with these changes to ensure programs and services are training individuals with the requisite skills to meet these regulations and standards.

Transit Agencies, Establishments, and Transit Use



Each county has a state designated county transportation commission: the Los Angeles County Metropolitan Transportation Authority (Metro) and the Orange County Transportation Authority (OCTA). Metro and OCTA are also designated as transit districts by the State of California. These commissions play an important role in establishing the vision for public transportation; apportioning local, state, and federal transit funds; and selecting transit projects in their respective counties.

The region is further divided into 9 sub-regional units, represented by sub-regional Councils of Government:

- Arroyo Verdugo Sub-region
- City of Los Angeles
- Gateway Cities Council of Governments
- Las Virgenes-Malibu Council of Governments
- Orange County Council of Governments

- San Gabriel Valley Council of Governments
- San Fernando Valley Council of Governments
- South Bay Cities Council of Governments
- Westside Cities Council of Governments



The region has an extensive and complex transit and ground transportation network comprised of numerous agencies who operate fixed-route local and express bus; bus rapid transit; community circulators; demand response; and commuter, light, and heavy rail¹². Metro is the third largest transit agency nationally, when ranked by number of passenger trips, and the fourth largest in terms of passenger miles. In 2014, there were 479,654 passenger trips taken and 2,339,177 passenger miles logged on Metro. In addition, OCTA, Long Beach Transit, the City of Los Angeles Department of Transportation (LADOT), and the Southern County Regional Rail Authority (Metrolink) also make the list of the 50 largest transit agencies, when ranked by passenger trips and/or passenger miles in 2014¹³.

Taking a look at bus agencies in urbanized areas in the region, Metro ranks second in the nation both in terms of passenger trips and miles. Rounding out the list of the 50 largest bus agencies in urbanized areas in the nation are OCTA, Long Beach Transit, LADOT, Santa Monica's Big Blue Bus, and Foothill Transit¹⁴. Metro also ranks third in passenger trips and first in passenger miles among national urbanized areas for bus rapid transit¹⁵. And the LADOT ranks 12th in passenger trips and 21st in passenger miles among commuter bus agencies¹⁶.

¹² Descriptions/definitions of these transportation modes are provided in Appendix B.

¹³ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 3: 50 Largest Transit Agencies Ranked by Unlinked Passenger Trips and Passenger Miles.

¹⁴ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 30: 50 Largest Bus

Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles.

¹⁵ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 31: Bus Rapid Transit Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles

¹⁶ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 32: Largest Commuter

Exhibit 3 illustrates how agencies that make up the regional transit and ground transportation network rank nationally compared to other transit agencies in APTA's 2016 Public Transportation Fact Book.

Exhibit: 3 National Rankings of Transit Agencies Los Angeles and Orange Counties, CA			
APTA Ranking Category	Regional Transit Agency	Unlinked Passenger Trips Rank	Passenger Miles Rank
50 Largest Transit Agencies	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	3	4
	Orange County Transportation Authority (OCTA)	29	34
	Long Beach Transit (LBT)	45	
	City of Los Angeles Department of Transportation (LADOT)	50	
	Southern California Regional Rail Authority (Metrolink)		21
50 Largest Bus Agencies in Urbanized Areas	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	2	2
	Orange County Transportation Authority (OCTA)	23	22
	Long Beach Transit (LBT)	35	43
	City of Los Angeles Department of Transportation (LADOT)	40	
	Santa Monica's Big Blue Bus	47	
	Foothill Transit		38
Bus Rapid Transit Agencies in Urbanized Areas	Los Angeles County Metropolitan Transportation Authority (LACMTA)	3	1
30 Largest Commuter Bus Agencies in Urbanized Areas	City of Los Angeles Department of Transportation (LADOT)	12	21
50 Largest Demand Response Agencies in Urbanized Areas	Access Services	3	2
	Orange County Transportation Authority (OCTA)	12	7
	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro) – Small Operators	22	
Light Rail and Street Car Agencies	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	2	1

Bus Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles.

¹⁷ American Public Transportation Association. (February, 2017). 2016 public transportation fact book: 67th edition. Table 4: 50 Urbanized Areas with the Most Transit Travel, Ranked by Unlinked Passenger Trips, Passenger Miles, and Population.

¹⁸ American Public Transportation Association. (February, 2017). 2016 public transportation fact book: 67th edition. Table 34: 30 Largest Transit

Exhibit: 3 National Rankings of Transit Agencies Los Angeles and Orange Counties, CA			
APTA Ranking Category	Regional Transit Agency	Unlinked Passenger Trips Rank	Passenger Miles Rank
Heavy Rail Agencies	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	9	9

Source: American Public Transportation Authority, 2016 Public Transportation Fact Book.

Los Angeles-Long Beach-Anaheim UZA ranks second among the 50 urbanized areas with the most transit travel, both in terms of unlinked passenger trips and passenger miles. Further, the Lancaster-Palmdale UZA ranks 49th in terms of passenger miles¹⁷.

Metro also ranks first, nationally among the 30 largest vanpool agencies in urbanized areas and OCTA ranks ninth¹⁸. Metro also ranks eighth (in terms of passenger trips) and seventh (in terms of passenger miles) among commuter and hybrid rail agencies nationally¹⁹. Collectively, the three agencies' rankings in 2014 were as follows (refer to Exhibit 4).

Exhibit: 4 Additional Rankings of Transit Agencies Los Angeles and Orange Counties, CA				
Regional Transit Agency	Unlinked Passenger Trips Thousands	Rank	Passenger Miles Thousands	Rank
Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	3,983.6	1	177,435.2	1
Orange County Transportation Authority (OCTA)	1,224.5	9	42,638.7	9
Southern California Regional Rail Authority (Metrolink) (Note: Rank Among Commuter Rail and Hybrid Rail Agencies)	13,429.4	8	440,984.5	7

Source: American Public Transportation Authority, 2016 Public Transportation Fact Book.

Vanpool Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles.

¹⁹ American Public Transportation Association. (February, 2017). 2016 public transportation fact book: 67th edition. Table 37: Commuter Rail and Hybrid Rail Agencies Ranked by Unlinked Passenger Trips and Passenger Miles.

Transit use provides numerous benefits to the region's transportation system, through investment, business growth, reduced traffic congestion, travel and vehicle ownership cost savings, and air pollution emissions reductions. APTA estimates that for every billion dollars invested in transit (as of 2014) the total, long-term economic impact is \$3.7 billion and slightly more than 50,000 jobs are created by the direct purchasing power of transit agencies and also by the spending power of the employees of transit agencies²⁰. Given the size of regional transit agencies, the economic impact of these industries in the region is significant.



Los Angeles County Network Overview

Los Angeles County is comprised of 88 incorporated cities and other unincorporated areas (refer to Exhibit 5), within nearly 4,058 square miles, of which about 35 percent is urbanized. Most of the population of Los Angeles County is located in the south and southwest, with major population centers in the Los Angeles Basin, San Fernando Valley, and San Gabriel Valley. Other population centers are found in the Santa Clarita Valley, Pomona Valley, Crescenta Valley, and Antelope Valley²¹.

The county is one of the largest transit markets in the nation (refer to Exhibit 3). Transit service in Los Angeles County can be categorized into three types of services/providers: Metro, Municipal Operators of Transit and Specialized and Local Operators (refer to Exhibit 6).



Source: Los Angeles Economic Development Corporation.

Los Angeles County Metropolitan Transportation Authority (Metro)

Metro provides the majority of transit services in the county. Metro's service area includes portions of Los Angeles County south of the Angeles National Forest. Metro operates multiple transit modes including light rail, heavy rail, bus rapid transit, and fixed route bus services. Where there are local operators, Metro operates trunk routes and serves long distance markets. Metro also funds Metrolink service (described later in this report) in Los Angeles County.

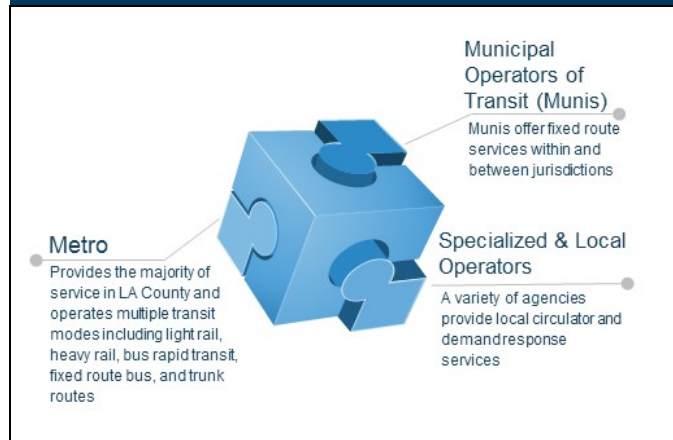
Municipal Operators of Transit

Referred to as "Munis", Municipal Operators of Transit offer fixed route services between jurisdictions, though their service areas tend to be centered around the jurisdiction that owns them. In most cases, these operators provide the bulk of local trips within their service area while Metro service is overlaid to support longer distance trips⁴. Some of the Munis have smaller service areas, such as Beach Cities or Culver City Transit. Others, including Long Beach Transit, and Foothill Transit, have very large service areas.

²⁰ American Public Transportation Association (2014). *Economic impact of public transportation investment*. 2014 update.

²¹ Wikipedia-https://en.wikipedia.org/wiki/Los_Angeles_County,_California

Exhibit: 6
Categories of Transit Services in Los Angeles County, CA



As shown in Exhibit 3, Foothill Transit, Long Beach Transit, and Santa Monica's Big Blue Bus ranked in the top 50 largest bus agencies in urbanized areas in the U.S. LADOT was also the 12th largest provider of commuter bus trips, while Metro was the largest provider of light rail passenger miles and the second largest provider of light rail trips in the country in 2014.

Antelope Valley Transit Authority (AVTA) is the sole provider of fixed route bus service in the Lancaster-Palmdale UZA. Exhibit 7 illustrates the municipal operators, and their respective service areas, in Los Angeles County.

Exhibit: 7
Municipal Transit Operators, Los Angeles County, CA

Agency	Service Area
Arcadia Transit	City of Arcadia
Antelope Valley Transit Authority	Lancaster-Palmdale UZA
Beach Cities Transit	Western Southbay Subregion
Claremont Dial-a-Ride	Pomona Valley
Commerce Municipal Bus Lines	City of Commerce and Surrounding Communities
Culver City Municipal Bus Lines	City of Culver City and Surrounding Communities
Foothill Transit	San Gabriel Valley Subregion
Gardena Municipal Bus Lines	Northern Gateway Cities, Near City of La Mirada
Los Angeles Department of Transportation	City of Los Angeles
La Mirada Transit	Northern Gateway Cities Near City of La Mirada
Long Beach Transit	Southern Gateway Cities
Montebello Bus Lines	Northwestern Gateway Cities
Norwalk Transit System	Eastern Gateway Cities
Santa Clara Transit	Santa Clarita UZA

Exhibit: 7
Municipal Transit Operators, Los Angeles County, CA

Agency	Service Area
Santa Monica's Big Blue Bus	Cities of Santa Monica, Culver City, and Los Angeles (Westside Cities Region)
Torrance Transit System	Southern South Bay Cities

Specialized and Local Operators

Local circulator and demand response services are provided by a variety of transit agencies throughout Los Angeles County. Access Services of Los Angeles, Incorporated (ASI) is the largest provider of Americans with Disabilities Act (ADA) paratransit trips in the county and provides some or all complimentary ADA paratransit service for Metro and various municipal bus operators. Pomona Valley Transit Authority provides demand response service in eastern Los Angeles County. More localized providers, referred to as "local operators", are typically municipally-owned and provide demand response or circulator services within jurisdictional boundaries.

Planning for the Future

Metro continues to work on updating their *Long-Range Transportation Plan* (LRTP) that was last adopted in 2009. The LRTP is a focused, ten-year plan that guides actions through 2024 and lays out a 30-year vision for addressing growth and traffic including doubling rail vehicle revenue miles by 2024. The 2009 LRTP is available for download at <https://www.metro.net/projects/reports/>. In addition, the 2016-2019 *Coordinated Public Transit-Human Services Transportation Plan* for Los Angeles County outlines results from an assessment of transportation services and needs of target populations; strategies, activities, and projects to address identified gaps based on the assessments; and priorities for implementation. The report is available for download at https://media.metro.net/projects_studies/fta5310/images/2016-2019_coordinated_plan_072015.pdf.

Measure M

Arguably most significantly for the near- and long-term future of transit and ground transportation in Los Angeles County was the passage of Measure M, also referred to as the *Los Angeles County Traffic Improvement Plan*, in November 2016. Approved was a ½ cent sales tax and the continuance of an existing ½ cent traffic relief tax (until voters decide to end it) that supports multiple and significant transit projects. According to the *Measure M: The Los Angeles County Traffic Improvement Plan Information Guide*, the goals of Measure M are to:

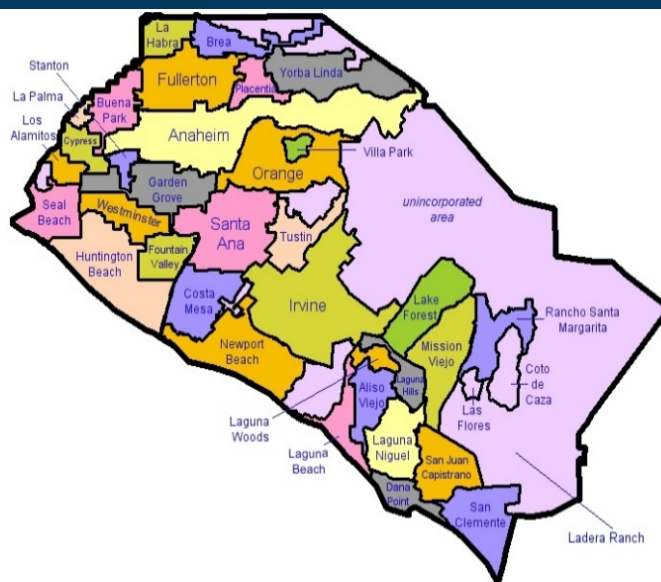
- Ease traffic congestion, improve freeway traffic flow, and reduce bottlenecks.
- Expand rail and rapid transit system; accelerate rail construction and build new rail lines; enhance local, regional, and express bus service; and improve system connectivity.
- Repave local streets, repair potholes, and synchronize signals; improve neighborhood streets and intersections; and enhance bike and pedestrian connections.
- Make public transportation more accessible, convenient, and affordable for seniors, students, and the disabled and provide better mobility options for our aging population.
- Earthquake-retrofit bridges and keep the transit and highway system safe and in good working condition.
- Embrace technology and innovation; incorporate modern technology, new advancements, and emerging innovations into the local transportation system.
- Create jobs, reduce pollution, and generate local economic benefits; increase personal quality time and overall quality of life.
- Provide accountability and transparency; protect and monitor the public's investments through independent audits and oversight.

Also according to the guide, 17 major transit projects are made possible through Measure M including rail connectors, rail line and subway extensions, express bus extensions, and transit corridors. More information on Measure M is available at: <http://theplan.metro.net/>.

Orange County Network Overview

Orange County is the third most populous county in California. The county's four largest cities are Anaheim, Santa Ana, Irvine, and Huntington Beach. Portions of the Los Angeles-Long Beach-Anaheim MSA are also included in Orange County. The county includes thirty-four incorporated cities. But unlike Los Angeles County, there is no defined urban center and it is mostly suburban, except for a few urban areas at in the centers of the older cities of Anaheim, Fullerton, Huntington Beach, Orange, and Santa Ana. The county is most known for its tourist attractions' Disneyland, Knott's Berry Farm, and several beaches along the coastline²².

Exhibit: 8
Orange County, CA Map



Source: Wikipedia. Downloaded from https://en.wikipedia.org/wiki/Orange_County,_California#/media/File:OrangeCountyCA_Map.gif

Within Orange County, OCTA is the primary service provider and was the nation's 29th largest provider of transit trips and 34th largest provider of passenger miles in 2014 (see Exhibit 3). OCTA operates ADA paratransit and funds Metrolink commuter rail service. The cities of Irvine, La Habra, and Laguna Beach operate local circulator service and the cities of Anaheim, Garden Grove, and Santa Ana are working with OCTA to implement rail. The Anaheim Transit Network, a non-profit organization composed of stakeholders throughout the Anaheim Resort area, operates Anaheim Resort Transit.



²² Wikipedia - https://en.wikipedia.org/wiki/Orange_County,_California

Planning for the Future

OCTA's 2014 *Long Range Transportation Plan* is focused on strategies for identifying and investing in high performing services and increased mobility choice by integrating city shuttles to connect Metrolink service (described later in this report) and community circulators with the fixed route network, expanding Metrolink service, making improvements to Metrolink stations, matching service products to markets, and improving service efficiency and speeds in an integrated network. The plan is available for download at <http://www.octa.net/Projects-and-Programs/Plans-and-Studies/Long-Range-Transportation-Plan/>.

Inter-County Network

Many transit and ground transportation routes and agencies cross one or more county lines. So do the riders who may live in one county yet work or travel for leisure in another. Metrolink provides a majority of the intercounty transit and ground transportation services.

Metrolink



California Regional Rail Authority (SCRRA) operates commuter rail service, under the Metrolink brand, at a regional scale crossing multiple counties. Metrolink operates 165 daily trains on seven different lines over 536 route miles. These lines are the Antelope Valley Line, connecting Los Angeles to Palmdale and Lancaster in the Antelope Valley; the Inland Empire/Orange County Line (IEOC), connecting San Bernardino and Riverside with Oceanside via Orange County; the Orange County Line, operating between Los Angeles and Oceanside through Orange County; the Riverside Line from Los Angeles to downtown Riverside; the San Bernardino Line, between Los Angeles and the City of San Bernardino; the Ventura County Line, operating between Los Angeles and East Ventura via the San Fernando Valley; and the 91 Line, operating between downtown Los Angeles to downtown Riverside via Fullerton and along State Route 91. The Orange County Line extends south to Oceanside in San Diego County, where it connects with the COASTER commuter rail service to San Diego and the SPRINTER

rail service inland to Escondido. Both of these services are operated by the North County Transit District.

Metrolink operates mostly along track and right-of-way owned by the transportation commissions, however, much of their track in the region is owned by Burlington Northern Santa Fe who has cooperative agreements with SCRRA. Oftentimes, these agreements limit track use and, therefore, service.

REGIONAL SPECIALIZATION, WORKFORCE STATISTICS, AND EMPLOYMENT OPPORTUNITIES

Regional Specialization

Location quotients reveal the extent to which employment in transit and ground transportation industries in Los Angeles and Orange Counties is attributable to regional specialization. As Exhibit 9 reveals several industries are regionally competitive, these are: Other Urban and Transit Systems, Limousine Service, Special Needs Transportation, Mixed Mode Transit Systems, and Other Transit and Ground Transportation. Whereas employment in the Bus and Other Motor Vehicle Transit Systems industry is likely more attributable to the economic vitality and strength of the industry nationally. The following industries have a lower than average concentration of employment in the region compared to the national average: Charter Bus Industry, Taxi Service, Interurban and Rural Bus Transportation, School and Employee Bus Transportation, and Commuter Rail Systems.

Exhibit: 9

Transit and Ground Transportation Industries Location Quotients and Projected Growth, 2020 Los Angeles and Orange Counties, CA (Combined)

Industry	2020 Location Quotient	Growth to 2020
Other Urban Transit Systems	2.59	32%
Limousine Service	1.63	7%
Special Needs Transportation	1.35	2%
Mixed Mode Transit Systems	1.21	6%
All Other	1.05	12%
Bus and Other Motor Vehicle Transit Systems	0.92	2%
Charter Bus Industry	0.71	(8%)
Taxi Service	0.58	7%
Interurban and Rural Bus Transportation	0.41	(10%)
School and Employee Bus Transportation	0.35	(5%)
Commuter Rail Systems	0.14	Insf. Data
Total		3%

Source: Quarterly Census of Employment and Wages (QCEW) Employees, Non-QCEW Employees & Self-Employed, Economic Modeling Specialists (EMS) Inc., 2017.

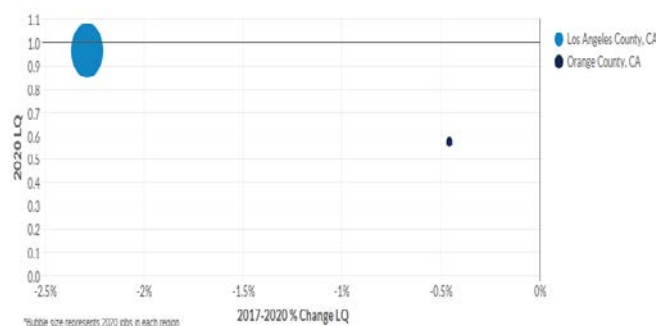
Exhibits 10 and 11 show industry location quotients for each county and reveals that competitiveness differs between Los Angeles and Orange Counties where Los

Angeles County has significantly more regional specialization.

More specifically in Los Angeles County, Other Urban and Transit Systems, Limousine Service, Mixed Mode Transit Systems, Special Needs Transportation and All Other Transportation and Ground Passenger Transportation industries are regionally competitive. Whereas in Orange County, only the Limousine Service industry is.

Exhibit: 10

Transit and Ground Transportation Industry Location Quotient Percentage Change, 2017-2020 Los Angeles and Orange Counties, CA



Source: Quarterly Census of Employment and Wages (QCEW) Employees, Non-QCEW Employees & Self-Employed, Economic Modeling Specialists (EMS) Inc., 2017.

Exhibit: 11

Transit and Ground Transportation Industry Location Quotients, 2016 Los Angeles and Orange Counties, CA

Industry	Los Angeles County	Orange County
Other Urban Transit Systems	3.49	0.00
Limousine Service	1.78	1.19
Mixed Mode Transit Systems	1.63	0.00
Special Needs Transportation	1.62	0.57
All Other Transit and Ground Passenger Transportation	1.27	0.42
Bus and Other Motor Vehicle Transit Systems	0.95	0.83
Charter Bus Industry	0.66	0.84
Taxi Service	0.65	0.40
Interurban and Rural Bus Transportation	0.47	0.26
School and Employee Bus Transportation	0.38	0.29
Commuter Rail Systems	0.19	0.00
Total	0.97	0.57

Source: Quarterly Census of Employment and Wages (QCEW) Employees, Non-QCEW Employees & Self-Employed, Economic Modeling Specialists (EMS) Inc., 2017.1 Class of Worker

Workforce Statistics

Next, we examine current and projected workforce statistics to ascertain short- and longer-term employment potential in the region.

By the Numbers: Transit and Ground Transportation Employment and Earnings



Source: Economic Modeling Specialists (EMS) Inc.

Employment

In 2016, transit and ground transportation industries (comprised of 703 establishments) in Los Angeles and Orange counties employed 22,002 individuals, 11% below the national industry average. It is estimated that only a few ore individuals, 22,398, will be employed by the industries in 2017. It is also estimated employment will grow slower (3.4%) between 2017 and 2020 compared to national growth estimated at 6.1 percent. While employment rates in the region fall below national averages, conversely the average earnings per job in the region, \$34,177, outpaced national average earnings of \$32,958 in 2016 (refer to Exhibit 12).

Exhibit: 12

Transit and Ground Transportation Employment, Earnings, and Establishments Los Angeles and Orange Counties, CA

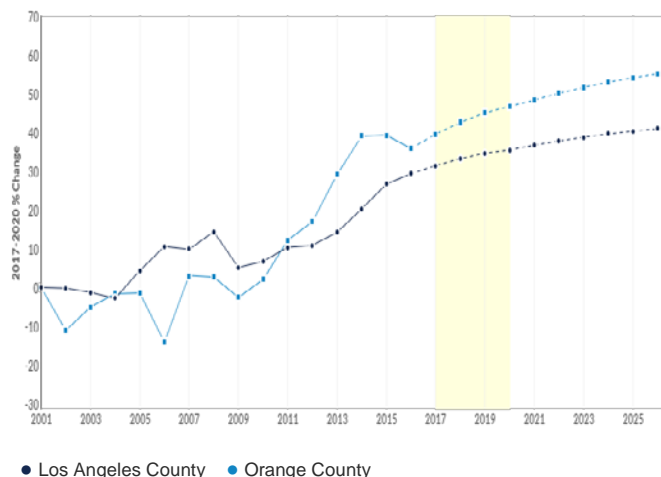
Region	2017 Jobs	2020 Jobs	Change	% Change	2016 Average Earnings	2016 Establishments
Los Angeles County	18,632	19,205	573	3%	\$33,805	586
Orange County	3,766	3,960	194	5%	\$36,038	117
Both Counties	22,398	23,165	767	3.4%	\$34,177	703

Source: Economic Modeling Specialists (EMS) Inc.

Moreover, employment has steadily increased since 2013 and is projected to continue to do so, at least to 2025, as Exhibit 13 depicts.

Exhibit: 13

Transit and Ground Transportation Employment % Change 2001-2025 Los Angeles and Orange Counties, CA



Source: Economic Modeling Specialists (EMS) Inc.

Total transit and ground transportation employment in Los Angeles and Orange Counties in 2016 was 18,632 and 3,766, respectively. In both counties, the largest employment is in Limousine Service industry followed by Special Needs Transportation in Los Angeles County and School and Employee Bus Transportation in Orange County.

Exhibit: 14

Transit and Ground Transportation Employment by Industry, 2016 Los Angeles and Orange Counties, CA

Industry	Los Angeles County	Orange County
Limousine Service	6,089	1,386
Special Needs Transportation	4,092	577
School and Employee Bus Transportation	2,607	650
All Other Transit and Ground Passenger Transportation	1,535	169
Taxi Service	1,533	318
Bus and Other Motor Vehicle Transit Systems	1,317	297
Charter Bus Industry	674	325
Mixed Mode Transit Systems	343	0
Interurban and Rural Bus Transportation	342	44
Other Urban Transit Systems	88	0
Commuter Rail Systems	12	0
Total	18,632	3,766

Source: Economic Modeling Specialists (EMS) Inc.

Largest Employers

The seven largest transit and ground transportation employers in Los Angeles and Orange Counties, all employing more than 250 workers, are Metro; Keolis Transit America, Inc.; First Transit, Inc.; Veolia Transportation; Yellow Cab AA&A; and OCTA (refer to Exhibit 15).

Exhibit: 15 Largest Transit and Ground Transportation Employers, 2016

Los Angeles and Orange Counties, CA

Agency/Establishment	Industry
LA County	
Metro	Interurban and Rural Bus Transportation
Keolis Transit America, Inc.	All Other Transit and Ground Passenger Transportation
Transdev	Charter Bus Industry
First Transit Inc	Other Urban Transit Systems
Veolia Transportation	All Other Transit and Ground Passenger Transportation
Orange County	
Yellow Cab AA&A	Taxi Service
OCTA	Interurban and Rural Bus Transportation

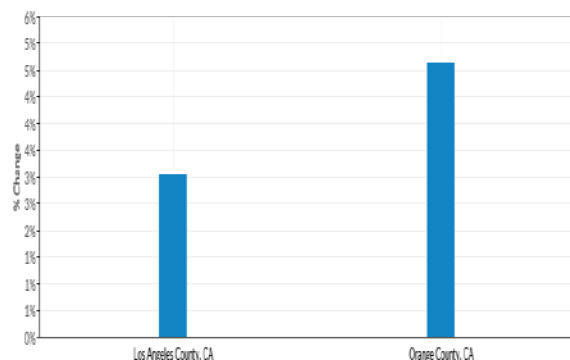
Source: Economic Modeling Specialists (EMS) Inc.

Employment Change, 2017-2020

Three-year (2017 to 2020) job growth rates in transit and ground transportation industries are projected to be greater in Orange County than in Los Angeles County. There is five percent employment growth projected in Orange County compared to three percent in Los Angeles County (refer to Exhibit 16).

Exhibit: 16 Transit and Ground Transportation Employment % Change, 2017-2020

Los Angeles and Orange Counties, CA



Source: Economic Modeling Specialists (EMS) Inc.

Industries with the largest growth in Los Angeles County will be Other Urban Transit Systems (32%) and All Other Transit and Ground Passenger Transportation (11%); and in Orange County will be Bus and Other Motor Vehicle Transit Systems (30%) and Interurban and Rural Bus Transportation (25%). All of these industries are projected to experience double-digit growth rates in the next three years. Conversely, industries projected to have the largest declines are Interurban and Rural Bus Transportation (-15%) and School and Employee Bus Transportation (-6%) in Los Angeles County and Charter Bus Industry (-13%) and Special Needs Transportation (-9%) in Orange County (refer to Exhibit 17).

Exhibit: 17 Transit and Ground Transportation Employment % Change, by Industry, 2017-2020

Los Angeles and Orange Counties, CA

Industry	Los Angeles County	Orange County
Other Urban Transit Systems	32%	0%
All Other Transit and Ground Passenger Transportation	11%	17%
Limousine Service	7%	9%
Taxi Service	6%	11%
Mixed Mode Transit Systems	6%	0%
Special Needs Transportation	4%	-9%
Bus and Other Motor Vehicle Transit Systems	-5%	30%
Charter Bus Industry	-5%	-13%
School and Employee Bus Transportation	-6%	0%
Interurban and Rural Bus Transportation	-15%	25%
Commuter Rail Systems	--	0%
Total	3%	5%

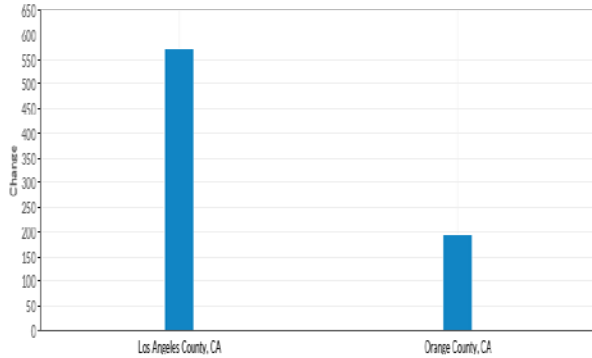
Source: Economic Modeling Specialists (EMS) Inc.

Even though Orange County will have the largest percentage job gains, Los Angeles County will experience significantly more employment opportunities given the



larger number of establishments and jobs in this industry in Los Angeles County (as shown in Exhibits 18 and 19).

Exhibit: 18
Transit and Ground Transportation Employment Change, 2017-2020
Los Angeles and Orange Counties, CA



Source: Economic Modeling Specialists (EMS) Inc.

Exhibit: 19
Transit and Ground Transportation Job Change, by Industry, 2017-2020
Los Angeles and Orange Counties, CA

Industry	Los Angeles County	Orange County
Limousine Service	405	125
All Other Transit and Ground Passenger Transportation	168	28
Special Needs Transportation	155	-52
Taxi Service	98	36
Other Urban Transit Systems	28	0
Mixed Mode Transit Systems	21	0
Commuter Rail Systems	--	0
Charter Bus Industry	-37	-43
Interurban and Rural Bus Transportation	-51	11
Bus and Other Motor Vehicle Transit Systems	-60	90
School and Employee Bus Transportation	-150	-2
Total	573	194

Source: Economic Modeling Specialists (EMS) Inc.

Workforce Demographics

The transit and ground transportation workforce is predominately male, Hispanic or Latino, and nearly 1/3rd are over the age of 55 (refer to Exhibits 20, 21, and 22). Significant numbers of retirements from an aging workforce will require a primed pipeline of new workers and career ladders, with upskilling opportunities, for

incumbent workers. Moreover, the demand for a workforce that mirrors the growing ethnic diversification of the region requires a robust outreach network coupled with engaging activities to attract individuals from historically underserved communities and youth.

Exhibit: 20
Gender of Transit and Ground Transportation Workers, 2016
Los Angeles and Orange Counties, CA

Gender	2016 Jobs	2016 Percent
Males	15,484	70.4%
Females	6,518	29.6%

Source: Economic Modeling Specialists (EMS) Inc.

Exhibit: 21
Ethnicity of Transit and Ground Transportation Workers, 2016
Los Angeles and Orange Counties, CA

Race/Ethnicity	2016 Jobs	2016 Percent
Hispanic or Latino	8,066	36.7%
White	7,066	32.1%
Black or African American	3,667	16.7%
Asian	2,605	11.8%
Two or More Races	459	2.1%
Native Hawaiian or Other Pacific Islander	89	0.4%
American Indian or Alaska Native	51	0.2%

Source: Economic Modeling Specialists (EMS) Inc.

Exhibit: 22
Age of Transit and Ground Transportation Workers, 2016
Los Angeles and Orange Counties, CA

Age	2016 Jobs	2016 Percent
14-18	59	0.3%
19-24	1,188	5.4%
25-34	3,921	17.8%
35-44	4,798	21.8%
45-54	5,642	25.6%
55-64	4,793	21.8%
65+	1,600	7.3%

Source: Economic Modeling Specialists (EMS) Inc.

Earnings

Overall, average annual earnings in transit and ground transportation industries are higher in Orange County (\$36,038) compared to Los Angeles County (\$33,805). The highest earnings in Orange County are in the Charter Bus (\$51,917) and Bus and Other Motor Vehicle Transit Systems (\$50,772) industries and in Los Angeles County are in the Interurban and Rural Bus Transportation (\$65,926) and the Mixed Mode Transit Systems (\$48,794) industries (refer to Exhibit 23).

Exhibit: 23**Transit and Ground Transportation Median Annual Earnings, 2016****Los Angeles and Orange Counties, CA**

Industry	Los Angeles County	Orange County
Interurban and Rural Bus Transportation	\$65,926	\$44,033
Mixed Mode Transit Systems	\$48,794	\$0
Bus and Other Motor Vehicle Transit Systems	\$42,150	\$50,772
All Other Transit and Ground Passenger Transportation	\$40,911	\$36,091
Other Urban Transit Systems	\$39,473	\$0
Charter Bus Industry	\$38,414	\$51,917
Special Needs Transportation	\$36,913	\$49,377
Commuter Rail Systems	\$36,886	\$0
School and Employee Bus Transportation	\$35,489	\$32,328
Limousine Service	\$26,118	\$26,891
Taxi Service	\$24,536	\$25,895
Total	\$33,805	\$36,038

Source: Economic Modeling Specialists (EMS) Inc.

Occupations

Exhibit 24 lists occupations with more than 100 persons employed in Los Angeles and Orange Counties, the percent of jobs in each occupation, and projected percentage change in total number of jobs in the next three years. Taxi Drivers and Chauffeurs; Bus Drivers (Transit, Intercity, School, or Special Client); Dispatchers (Except Police, Fire, and Ambulance), and Protective Service Workers (All Other), combined, make up 77 percent of the industry's workforce—a total of 15,815 jobs.

Exhibit: 24**Transit and Ground Transportation 2016 Employment Distribution and Projected Job Growth, by Occupation, 2017-2020****Los Angeles and Orange Counties, CA**

Occupation	Employed in Industry Group (2016)	% of Total Jobs in Industry Group (2016)	% Change (2017 - 2020)
Taxi Drivers and Chauffeurs	8,074	36.7%	9.5%
Bus Drivers, Transit and Intercity	3,489	15.9%	.1%
Bus Drivers, School or Special Client	3,063	13.9%	(.4%)
Dispatchers, Except Police, Fire, and Ambulance	1,188	5.4%	(1.3%)
Protective Service Workers, All Other	936	4.3%	(2.7%)
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	435	2.0%	1.4%
Office Clerks, General	370	1.7%	(2.4%)
Bus and Truck Mechanics and Diesel Engine Specialists	368	1.7%	(.5%)
General and Operations Managers	354	1.6%	.6%
Customer Service Representatives	304	1.4%	1.6%
Cleaners of Vehicles and Equipment	281	1.3%	(1.1%)
Reservation and Transportation Ticket Agents and Travel Clerks	260	1.2%	(.8%)
First-Line Supervisors of Office and Administrative Support Workers	199	0.9%	.5%
Transportation Attendants, Except Flight Attendants	169	0.8%	(.6%)
Bookkeeping, Accounting, and Auditing Clerks	154	0.7%	(5.3%)
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	132	0.6%	(.8%)
Light Truck or Delivery Services Drivers	130	0.6%	7.4%
Automotive Service Technicians and Mechanics	124	0.6%	(4.9%)
Managers, All Other	121	0.5%	4.8%
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	111	0.5%	5.3%
Sales Representatives, Services, All Other	109	0.5%	(2.8%)
Transportation, Storage, and Distribution Managers	105	0.5%	.9%

Source: Economic Modeling Specialists (EMS) Inc.

Median Hourly Earnings and Typical Employment Requirements

The median hourly earnings and typical entrance requirements (in terms of level of education, work experience, and on-the-job training) varies by occupation

as Exhibit 25 reveals. Median hourly wages vary from a high of \$51.66 for General and Operations Managers to a low of \$10.71 for Cleaners of Vehicles and Equipment. The typical education level required ranges from a high school diploma or equivalent to a bachelor's degree. While most occupations require a high school diploma or equivalent, most of those occupations also require short-to moderate-term on-the-job-training. And work experience requirements range from none to 5 years or more, with most occupations requiring no prior work experience.

Exhibit: 25
**Transit and Ground Transportation Median Hourly Earnings and Typical Employment Requirements, 2016
Los Angeles and Orange Counties, CA**

Occupation	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical on-the-job Training
Taxi Drivers and Chauffeurs	\$10.94	No formal educational credential	None	Short-term on-the-job training
Bus Drivers, Transit and Intercity	\$18.43	High school diploma or equivalent	None	Moderate-term on-the-job training
Bus Drivers, School or Special Client Dispatchers, Except Police, Fire, and Ambulance	\$14.57	High school diploma or equivalent	None	Short-term on-the-job training
Protective Service Workers, All Other	\$17.09	High school diploma or equivalent	None	Moderate-term on-the-job training
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	\$29.44	High school diploma or equivalent	Less than 5 years	None
Office Clerks, General	\$15.11	High school diploma or equivalent	None	Short-term on-the-job training
Bus and Truck Mechanics and Diesel Engine Specialists	\$24.74	High school diploma or equivalent	None	Long-term on-the-job training
General and Operations Managers	\$51.66	Bachelor's degree	5 years or more	None
Customer Service Representatives	\$17.42	High school diploma or equivalent	None	Short-term on-the-job training
Cleaners of Vehicles and Equipment	\$10.71	No formal educational credential	None	Short-term on-the-job training
Reservation and Transportation Ticket Agents and Travel Clerks	\$19.34	High school diploma or equivalent	None	Short-term on-the-job training
First-Line Supervisors of Office and Administrative Support Workers	\$27.37	High school diploma or equivalent	Less than 5 years	None

Exhibit: 25
**Transit and Ground Transportation Median Hourly Earnings and Typical Employment Requirements, 2016
Los Angeles and Orange Counties, CA**

Occupation	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical on-the-job Training
Transportation Attendants, Except Flight Attendants	\$12.33	High school diploma or equivalent	None	Short-term on-the-job training
Bookkeeping, Accounting, and Auditing Clerks	\$20.28	Some college, no degree	None	Moderate-term on-the-job training
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	\$18.32	High school diploma or equivalent	None	Short-term on-the-job training
Light Truck or Delivery Services Drivers	\$14.54	High school diploma or equivalent	None	Short-term on-the-job training
Automotive Service Technicians and Mechanics, All Other	\$16.86	Postsecondary nondegree award	None	Short-term on-the-job training
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	\$32.83	Bachelor's degree	Less than 5 years	None
Sales Representatives, Services, All Other	\$11.47	High school diploma or equivalent	None	Moderate-term on-the-job training
Transportation, Storage, and Distribution Managers	\$25.46	High school diploma or equivalent	None	Moderate-term on-the-job training
	\$40.11	High school diploma or equivalent	5 years or more	None

Source: Economic Modeling Specialists (EMS) Inc.

Middle-Skill Occupations with Economic-Mobility-Potential

Of interest, for purposes of this report, are middle-skill occupations with strong, positive employment and economic-mobility-potential. The importance of middle-skill occupations to economic vitality and mobility were discussed in the introduction. Some postsecondary education and/or training, but less than a four-year degree, are the typical entry requirement for middle-skill occupations. Such postsecondary education or training requirements can include associates degrees, certificates, "some college but no certificate or degree", moderate- to long-term on-the-job training, and/or previous work experience. Because for this report we are interested in middle-skill occupations that foster economic mobility, we have included these additional criteria for determining middle-skill occupations with potential: (1) occupations that pay a living wage; (2) current employment

opportunities, and (3) near-term, future employment opportunities. Further explanation of the criteria and methodology used to identify these middle-skill occupations is included in Appendix A.

Utilizing this criteria, we identified three middle-skill occupations with economic-mobility-potential in transit and ground transportation industries in Los Angeles and Orange Counties: Bus Drivers (Transit and Intercity); Bus and Truck Mechanics and Diesel Engine Specialists, and Dispatchers (Except Police, Fire, and Ambulance) as shown in Exhibit 26.

Exhibit: 26

Transit and Ground Transportation Middle-Skill Occupations with Economic-Mobility-Potential, 2016 Los Angeles and Orange Counties, CA

Middle-Skill Occupation Criteria	Bus Drivers (Transit and Intercity)
Median Hourly Earnings	\$18.43
Typical Entry Level Education	High school diploma or equivalent
Work Experience Required	None
Typical On-the-job Training	Moderate-term on-the-job training 3,489
Current Employment Demand	Employed in Industry Group (2016)
Near-Term. Future Employment Demand	.1% Employment Change (2017 - 2020)
Middle-Skill Occupation Criteria	Bus and Truck Mechanics and Diesel Engine Specialists
Median Hourly Earnings	\$24.74
Typical Entry Level Education	High school diploma or equivalent
Work Experience Required	None
Typical On-the-job Training	Long-term on-the-job training 368
Current Employment Demand	Employed in Industry Group (2016)
Near-Term. Future Employment Demand	(.5%) Employment Change (2017 - 2020)
Middle-Skill Occupation Criteria	Dispatchers, Except Police, Fire, and Ambulance
Median Hourly Earnings	\$17.09
Typical Entry Level Education	High school diploma or equivalent
Work Experience Required	None
Typical On-the-job Training	Moderate-term on-the-job training 1,188
Current Employment Demand	Employed in Industry Group (2016)
Near-Term. Future Employment Demand	(1.3%) Employment Change (2017 - 2020) Results from July, 2017 Employer Survey Indicates 1/3 rd will be hiring this occupation in next 3 years

Source: Economic Modeling Specialists (EMS)

Five, additional middle-skill occupations should be monitored for their economic-mobility-potential. They are not included in this report because employment growth projections, in the transit and ground transportation industry, for these occupations is slightly declining. These

occupations are: Automotive Service Technicians and Mechanics; Bill and Account Collectors; Bookkeeping, Accounting, and Auditing Clerks; Payroll and Timekeeping Clerks; and Sales Representatives (Wholesale and Manufacturing, Except Technical and Scientific Products). However, because these occupations are identified as growing in other transportation industries, they are included in a special report “*Middle Skill Occupations with Economic-Mobility-Potential in Transportation and Warehousing Industries: Los Angeles and Oranges Counties, California*”. These occupations are also included in specific transportation and warehousing sector reports for which they are projected to have employment growth.

It is also important to note industry advisors in transit-related industries indicate there are several, middle-skill occupations that are hard-to-fill, particularly given the expansion of light- and heavy-rail passenger transportation in the region. These occupations include Railroad Brake, Signal, and Switch Operators; Rail Car Repairers; Rail-Track Laying and Maintenance Equipment Operators; Signal and Track Switch Repairers; and Transportation Inspectors. These occupations are covered in the Rail Transportation sector report as these occupations are predominately employed within that industry.

All reports are available on the TWI website at: twi.lattc.com.

Bus Drivers, Transit and Intercity

Individuals in the Bus Drivers (Transit and Intercity) occupation (Bus Drivers) drive buses or motor coaches, including regular route operations, charters, and private carriage. They drive a range of vehicles, from 15-passenger buses to 60-foot articulated buses (with two connected sections) that can carry more than 100 passengers. They may assist passengers with baggage and collect fares or tickets. They also typically have the following duties.

- Memorize routes, transfer points, and fare structures
- Perform inspection of bus or carriage, safety-check equipment, and inform mechanics when adjustments or repairs are necessary
- Refer to and implement route maps and time schedules
- Collect and count fares and issue transfer tickets
- Provide schedule, route, and fare information to passengers seeking assistance
- Operate wheelchair lifts and assist passengers with disabilities in boarding and riding in a safe manner,

which may include pushing a wheelchair up and down the ramp

- Secure wheelchairs of passengers with disabilities and clearly communicate the action being taken
- Receive and transmit two-way radio messages
- Report hazardous or dangerous conditions along routes and at passenger loading zones including such hazards as unusual traffic, road conditions, obstructions, construction, and potential criminal activity
- Write reports and complete forms

Bus drivers must possess a valid driver's license for a specified period of time and must have a commercial driver's license (a California Class C driver's license). This can sometimes be earned during their education/training program or during on-the-job training. There are strict state and federal regulations for driving a commercial vehicle that require drivers to take specific steps in order to be eligible for a commercial driver's license. More information on the Class C license and requirements is available through the California Department of Motor Vehicles (DMV) at <http://www.dmv.org/ca-california/apply-cdl.php>.

A Bus Driver must possess a clean driving record (e.g., free of driving violations/points, DUIs, suspensions) such as no more than three 1-point violations; no 2-point violations; and/or no DUIs, reckless driving violations, or active license suspensions for a specified period-of-time (typically three years or more). In California, the driving record is verified via an H-6 DMV printout. Bus drivers are also likely to be required to pass a background check. They also must meet physical (e.g., lifting, pushing, and pulling specified weight amounts; bending, etc.); hearing; vision; language; and age (typically 21 years of age) requirements. There are specific medical requirements for the commercial driver's license including a Medical Examiner's Certificate signed by a health care professional. More information on commercial driver license medical requirements in California are available at https://www.dmv.ca.gov/portal/dmv/detail/dl/driversafety/cdl_guide_lines.

Bus Drivers must be available to work various shifts on weekdays, weekends, evenings, and holidays.

The Bus Driver occupation is also considered safety-sensitive and subject to drug and alcohol testing, including

random testing, under Federal Transportation Administration(FTA) drug and alcohol regulations.

Other, common job titles related to this occupation are: Bus Driver, Bus Operator, Charter Coach Driver, Charter Driver, Driver, Motor Coach Driver, Motor Coach Operator, Transit Bus Driver, Transit Coach Operator, Transit Operator.

There were 2,560 total job postings for Bus Drivers in Los Angeles and Orange Counties from January 2017 to March 2017, of which 315 were unique. These numbers result in a Posting Intensity²³ of 8-to-1, meaning that for every 8 postings there is 1 unique job posting. This is higher than the Posting Intensity for all other occupations and companies in the region (6-to-1), indicating employers may be trying harder to hire for this position.

A majority of Bus Driver occupations in transit and ground transportation industries in Los Angeles and Orange Counties are employed by Bus and Other Motor Vehicle Transit Systems, Special Needs Transportation, and Charter Bus industries. Bus Driver jobs make up a majority of all jobs in the Bus and Other Motor Vehicle Transit Systems and Charter Bus industries; 69.9 percent and 60 percent, respectively (refer to Exhibit 27).

Exhibit: 27

Top Transit and Ground Transportation Industries Employing Bus Drivers (Transit and Intercity), 2016 Los Angeles and Orange Counties, CA

Industry	Occupation Jobs in Industry (2016)	% of Occupation in Industry (2016)	% of Total Jobs in Industry (2016)
Bus and Other Motor Vehicle Transit Systems	1,117	12.2%	69.9%
Special Needs Transportation	834	9.1%	18.0%
Charter Bus Industry	621	6.8%	60.0%
All Other Transit and Ground Passenger Transportation	291	3.2%	18.0%

Source: Economic Modeling Specialists (EMS) Inc.

Bus Drivers in the 55-64 and the 65+ categories are 1-10 years away from the typical retirement age of 65. In Los Angeles and Orange Counties, 27.6 percent of Bus Drivers are between the ages 55-64, and 11.6 percent are over the age of 65. Therefore, nearly 40 percent of the workforce is nearing or are at retirement age. When these

²³ Posting Intensity is a ratio of *total* job postings to *unique*, or de-duplicated job postings. A higher than average posting intensity can mean that

employers are putting more effort than normal into hiring that position. (Economic Modeling Specialists, Inc.).

older workers retire, there will likely be a large demand for new workers.

Bus and Truck Mechanics and Diesel Engine Specialists

Individuals in the Bus and Truck Mechanics and Diesel Engine Specialists occupation (Bus and Truck Mechanics) diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engine. Bus and Truck Mechanics work on a vehicle's electrical system, make major engine repairs, or retrofit engines with emission control systems to comply with pollution regulations. They typically have the following duties.

- Plan work procedures, using technical charts and manuals
- Read and interpret diagnostic test results and perform basic diagnosis of malfunctions, determine the probable cause, and recommend necessary remedial action
- Repair or remove and replace dysfunctional components of major systems including, but not limited to, engine, electrical, suspension, fueling, pneumatic and hydraulic systems
- Tune engines
- Perform regular preventive maintenance inspections and repair problems; following checklists to ensure that all critical parts are examined
- Perform acceptance testing and pre-service preparations to newly acquired vehicles
- Repair minor damage to interior or exterior of vehicles including, but not limited to, torn seats, broken windows and windshields, minor dents, and cosmetic paint damage
- Respond to road failure situations
- Disassemble, clean, inspect, and rebuild engine systems and their mechanical and electrical components
- Test-drive vehicles to ensure they run smoothly



Bus and Truck Mechanics may be required to obtain a Class A or Class C (commercial) driver's license. Requirements for these licenses are the same as those that were described above for the Bus Driver occupation.

Some employers require Bus and Truck Mechanics to pass a criminal, background check; meet physical (e.g., lifting, pushing, and pulling specified weight amounts; bending, etc.) and normal color vision requirements. And some employers may require individuals to provide their own tools.

Industry certifications may be required or are often highly desirable. They may also enable individuals to receive additional compensation. Employers in transit and ground transportation industries mostly commonly recognize current and verifiable Automotive Service Excellence (ASE) certifications for this purpose. Transit employers typically recognize the ASE Transit Bus Certifications (H Series)--most notably the H1-CNG, H3-Drive Train, H4-Brakes, H5-Suspension/Steering, and H6-Electrical/Electronics certifications. Other ASE certification series recognized by transit and ground transportation employers are the Truck Equipment Certifications (E Series), the Alternate Fuels Certifications (F Series), Electronic Diesel Engine Diagnosis Specialist Certifications (L2 Series), and the School Bus Certification (S1 – S7 Series). More information on ASE certifications is available at www.ase.com.

Bus and Truck Mechanics must be available to work various shifts on weekdays, weekends, evenings, and holidays and must be able to respond to emergencies 24 hours a day, 7 days per week.

This occupation is also considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration(FTA) drug and alcohol regulations.

Other, common job titles related to this occupation are: Mechanic, Diesel Mechanic, Diesel Technician, Fleet Mechanic, General Repair Mechanic, Mechanic, Service Technician, Transit Mechanic, Truck Mechanic.

There were 6,208 total job postings for Bus and Truck Mechanics in Los Angeles and Orange Counties from January 2017 to March 2017, of which 1,130 were unique. These numbers result in a Posting Intensity of 5-to-1, meaning that for every 5 postings there is 1 unique job posting. This is close to the Posting Intensity for all other occupations and companies in the region (6-to-1), indicating employers are putting average effort toward hiring for this position.

The majority Bus and Truck Mechanic jobs are in industries outside of transit and ground transportation such as in Local Government, Automotive Repair, and Freight Trucking industries. Within transit and ground transportation, most Bus and Truck Mechanics are employed in the School and Employee Bus Transportation and Special Needs Transportation industries. Bus and Truck Mechanic jobs make up 3.8 and 1.7 percent of all jobs in these industries, respectively (refer to Exhibit 28).

Exhibit: 28

Top Transit and Ground Transportation Industries Employing Bus and Truck Mechanics and Diesel Engine Specialists, 2016 Los Angeles and Orange Counties, CA

Industry	Occupation Jobs in Industry (2016)	% of Occupation in Industry (2016)	% of Total Jobs in Industry (2016)
School and Employee Bus Transportation	127	1.8%	3.8%
Special Needs Transportation	77	1.1%	1.7%
Bus and Other Motor Vehicle Transit Systems	66	.9%	4.1%
Charter Bus Industry	38	.5%	3.7%
All Other Transit and Ground Passenger Transportation	25	.3%	1.5%

Source: Economic Modeling Specialists (EMS) Inc.

Bus and Truck Mechanics in the 55-64 and the 65+ categories are 1-10 years away from the typical retirement age. In Los Angeles and Orange Counties, 18.3 percent of Bus and Truck Mechanics are between the ages 55-64, and 3.4 percent are over the age of 65. Less than a quarter of the workforce is nearing or is at retirement age, therefore it is not likely large numbers of new hires will result from retirements in the near-term future.

Dispatchers, Except Police, Fire, and Ambulance

Individuals in the dispatchers, Except Police, Fire, and Ambulance occupation (Dispatchers) schedule and dispatch workers, work crews, equipment, or service vehicles for conveyance of materials, freight, or passengers, or for normal installation, service, or emergency repairs rendered outside the place of business. Duties may include using radio, telephone, or computer to transmit assignments and compiling statistics and reports on work progress. They also typically have the following duties.

- Answer telephone requests and/or radio calls for service, and answer questions regarding routes and time schedules; analyze the nature of the request; prioritize requests/public safety needs; assign/alert

appropriate resources; and operate a Computer Aided Dispatch (CAD) computer system, video display terminals, multiple radio frequencies and associated equipment

- Receive and record emergency and routine business calls by actively listening, appropriately controlling conversations, and expeditiously gathering pertinent and relevant information
- Provide the public with basic instructions to safeguard persons in hazardous conditions, including first aid and medical emergencies prior to arrival of trained emergency response personnel
- Dispatch public safety and/or contacts other resource agencies, in accordance with prescribed procedures
- Identify, check and report operational problems and incidents to supervisors; make recommendations and proposes solutions to operational issues
- Prepare written reports regarding transit operations, accidents, breakdowns, and mechanical defects, inspection and incident reports
- Some employers may require dispatchers to operate vehicles.

Because some employers require Dispatchers to operate vehicles, individuals in this occupation may be required to possess of a valid Class A or B driver license with a P endorsement and air brakes or a Class C driver license. There are specific requirements related to each of these license types (and endorsements) which are available on the California DMV website at: <http://www.dmv.org/ca-california/special-licenses.php>.

Dispatchers are also often required to have a clean driving record. Both of these driving-related requirements are similar to bus driver requirements described above.

Individuals in this occupation must be available to work various shifts on weekdays, weekends, evenings, and holidays.

This occupation is also considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration(FTA) drug and alcohol regulations.

Other, common job titles related to this occupation are: City Dispatcher, Dispatch Manager, Dispatcher (Dispatch), Motor Coach Supervisor, Operations Dispatcher, Rail Operations Controller.

There were 1,392 total job postings for Dispatchers in Los Angeles and Orange Counties from January 2017 to March 2017, of which 352 were unique. These numbers result in a Posting Intensity of 4-to-1, meaning that for every 4 postings there is 1 unique job posting. This is

lower than the Posting Intensity for all other occupations and companies in the region (6-to-1), indicating that they may not be trying as hard to hire for this position. However, results from a survey of transit and ground transportation employers in July 2017, by the Transportation Workforce Institute, revealed that 1/3rd of employers expect to hire for this occupation in the current year, and for the next 3 and 5 years.

Dispatcher occupations/jobs in Los Angeles and Orange Counties are widely dispersed across numerous industries. Within the Transit and Ground Transportation industry, most Dispatchers are employed in the Limousine Service and Special Needs Transportation industries. Dispatcher jobs make up approximately 7 percent of all jobs in these industries, respectively.

Exhibit: 29
Top Transit and Ground Transportation Industries Employing Dispatchers, 2016
Los Angeles and Orange Counties, CA

Industry	Occupation Jobs in Industry (2016)	% of Occupation in Industry (2016)	% of Total Jobs in Industry (2016)
Limousine Service	497	5.4%	6.9%
Special Needs Transportation	318	3.4%	6.9%
All Other Transit and Ground Passenger Transportation	99	1.1%	6.1%
School and Employee Bus Transportation	74	.8%	2.2%
Bus and Other Motor Vehicle Transit Systems	31	1.1%	6.1%

Source: Economic Modeling Specialists (EMS) Inc.

POSTSECONDARY EDUCATION, TRAINING, AND WORKFORCE DEVELOPMENT

Providers and Credential Completions

In this section, we examine postsecondary education and training programs that support the transit and ground transportation industry--more particularly, the three middle-skill occupations with economic-mobility-potential within the industry that were identified in the previous section. Data on postsecondary certificate and degree programs are derived from multiple sources (refer to Postsecondary Programs Completers Data in Appendix A). In addition, a survey was conducted by the Transportation Workforce Institute with regional postsecondary education and training providers in fall 2016. The survey was used to ascertain other types of programs and services they currently offer or plan to offer in the next three years--services and programs including noncredit courses and programs, industry- or other-sponsored training, registered apprenticeship programs, pre-apprenticeship programs, and more.

Included in Appendix C is a listing of postsecondary education and training providers, included in this report, and the programs they offer.



Provided are completion data for the year 2015 and for the three-year period 2012-13 to 2015-16. Data for 2015 is used to make comparisons between state and national findings (the year for which data was available to make such comparisons). Three-year data is provided because the number of completions can vary from one year to another. For purposes of this report, a

"completion" is defined as an individual being awarded a postsecondary certificate and/or associates degree. Completion counts may be duplicative because an individual may have received more than one award during the reporting period.

What is not reflected in this report is the on-the-job training provided by employers or other programs and services provided by community-based organizations not

represented in the data sources utilized. Therefore, data in this section is only a partial reflection of the postsecondary education and training available and completed.

Bus and Truck Driver Programs and Completions

One institution in Orange County, California Career School, had a bus and truck driver program that had completions in the past 13 years. In 2015, there were 4,699 Bus Drivers job openings in and 3,489 individuals were employed in this occupation in transit and ground transportation industries.

By the Numbers: Postsecondary Bus and Truck Driver Programs and Completions



Source: Economic Modeling Specialists (EMSI) Inc.

California Career School had 197 certificate completions in 2015. Their completions decreased 40.8 percent between 2003 and 2015 as compared to a state increase of 23.1 percent and a national increase of 25.1 percent during the same timeframe. However, program completions at the institution have remained relatively the same over the past three years. All of the certificates awarded by the school were less than one academic year in duration.

Additionally, Los Angeles Valley College and Community Career Development offer noncredit truck and bus driving training and Los Angeles Harbor College offers other truck and bus driving training/services. West Los Angeles College is planning to develop a program within the next three years.

Because of the high-demand for this occupation and the limited number of postsecondary education and training programs/completers, many employers offer in-house, or employer-sponsored training.

These data suggest additional postsecondary education and training programs may need to be developed and/or existing ones expanded to meet industry demand, further research and analysis should be conducted.

Diesel and Heavy Equipment Maintenance Technology Programs and Completions

Seven providers of postsecondary diesel and heavy equipment maintenance technology education and training had program completers in the past 13 years. Five, collectively, had 135 program completions in 2015. There were 427 Bus and Truck Mechanics and Diesel Engine Specialists job openings in the region in 2015 and there were 368 individuals employed in this occupation transit and ground transportation industries.

By the Numbers: Postsecondary Diesel and Heavy Equipment Maintenance Technology Programs and Completions



Source: Economic Modeling Specialists (EMS) Inc.

Many large employers/agencies offer in-house, employer-sponsored training and apprenticeship programs for this occupation. These programs and completions are not included in these figures. These programs may also be offered in partnership with postsecondary education and training institutions and if completers obtained a postsecondary certificate or degree, they are included in these data.

The number of postsecondary completions has increased more than 187.2 percent between 2003 and 2015 as compared to a state increase of 640.4 percent and a national increase of 140.6 percent during the same timeframe. There was a dramatic increase in state completions in 2015 whereas regional and national completion rates remained relatively the same. This data would suggest that additional or the expansion of existing education and training programs may be warranted. Further research and analysis should be considered.

Most of the credentials awarded were from programs that were less than one academic year in duration (49.6%) and then from programs that were at least one year but less than two academic years in duration (43%). A total of 125 certificates were awarded. The remaining credentials completed (7.4%) were associates degrees (10 total degrees) (refer to Exhibit 29).

Exhibit: 30 Diesel and Heavy Equipment Maintenance Technology Program Completions, by Award Level, 2015 Los Angeles and Orange Counties, CA

Award Level	Completions (2015)	Percent
Award of less than 1 academic year	67	49.6%
Award of at least 1 but less than 2 academic years	58	43.0%
Associates degree	10	7.4%
Total	135	100%

Source: Economic Modeling Specialists (EMS) Inc.

Postsecondary education and training institutions with diesel and heavy equipment maintenance technology credential completions in 2015, and the number of certificates and degrees each awarded, are provided in Exhibit 30.

Exhibit: 31 Diesel and Heavy Equipment Maintenance Technology Program Completions, by Institution, 2015 Los Angeles and Orange Counties, CA

Institution	Certificates (2015)	Degrees (2015)	Total Completions (2015)
Santa Ana College	67	2	69
Los Angeles Trade-Technical College	43	7	50
Citrus College	8	0	8
Rio Hondo College	5	1	6
Long Beach City College	2	0	2
Total	125	10	135

Source: Economic Modeling Specialists (EMS) Inc.



Over the past three years there were a total of 289 program completions, an average of 96 each year, in Los Angeles and Orange Counties. In Los Angeles County, there were a total of 187 completions (an average of 62 per year) and in Orange County there were a total of 93 completions (an average of 31 per year) (refer to Exhibit 31).

Exhibit: 32
**Diesel and Heavy Equipment Maintenance Technology Program Completions, 2013-14 to 2015-16
Los Angeles and Orange Counties, CA**

Institutions and Awards	Completions			
	2013-14	2014-15	2015-16	3 Year Average
LA County Institutions				
Los Angeles Trade-Technical College				
Associate Degree	13	7	7	9
Certificate 30 to < 60 units	39	43	36	39
Certificate 18 to < 30 units	1		1	1
Los Angeles Trade-Technical College Total	53		44	49
Long Beach College				
Associate Degree	3	0	2	2
Certificate 30 to < 60 units	6	2	1	3
Long Beach College Total	9	2	3	5
Citrus College				
Associate Degree	1			
Certificate 30 to < 60 units	2	8	3	4
Certificate 18 to < 30 units	1			
Citrus College Total	4	8	3	5
Rio Hondo College				
Associate Degree		1	1	1
Certificate 30 to < 60 units	2	5	2	3
Rio Hondo College Total	2	6	3	4
LA County Total	68	66	53	62
Orange County Institutions				
Santa Ana College				
Associate Degree	2	2	2	1
Certificate 18 to < 30 units	10	67	10	29
Santa Ana College Total	12	69	12	31
Orange County Total	12	69	12	31
LA/Orange Counties Total	89	135	65	93

Source: Centers of Excellence, LMI Supply Tables March 16, 2017.

According to the California Community College Chancellor's Office Curriculum Inventory, there are six community colleges in the region with 21 active diesel and heavy equipment maintenance technology certificate and degree programs categorized as follows:

- Associate of Arts Degree (AA): 2
- Associate of Science Degree (AS): 9
- Certificate 18 > units: 10

Programs at each of these community colleges, by county, are depicted in Exhibit 32.

Exhibit: 33
**Community College Certificate and Degree Programs in Diesel and Heavy Equipment Maintenance Technology
Los Angeles and Orange Counties, CA**

		<u>Degrees</u>		<u>Certificates</u>	
				12 to <18 sem units	18> sem units
College	Program	AA	AS		
LA County Community College Programs					
Citrus College	• Medium and Heavy Diesel Truck Technology		X		X
Rio Hondo College	• Heavy Equipment Service Technician				X
	• Heavy Equipment Technology		X		
Los Angeles Trade-Technical College	• Diesel and Related Technology		X		X
	• Diesel and Related Technology-Adjunct				X
Long Beach City College	• Diesel Mechanics - Caterpillar		X		X
	• Diesel Mechanics - General		X		X
Orange County Community College Programs					
Santa Ana College	• Mid-Range Engine Service	X	X		X
	• Diesel & Heavy Equipment Technology	X	X		X
Santiago Canyon College	• Apprenticeship: Operating Engineers, Heavy Duty Repairman		X		X
	• Diesel Mechanics - General		X		X

Source: California Community College Chancellor's Office Curriculum Inventory, February 2017.

In addition to certificate and degree programs in diesel and heavy equipment maintenance technology, other programs and services currently offered in the region include: industry-sponsored and apprenticeship training at Los Angeles Trade-Technical College, industry-sponsored training at Santa Ana College, and other diesel technology-related programs/services at Los Angeles Harbor College.

Within the next three years, West Los Angeles College is also planning to offer a diesel technology certificate program and noncredit courses and Saddleback College and Golden West College plan to offer a diesel technology certificate program.

Alternative Fuels and Advanced Transportation Programs and Completions

As discussed previously, a major challenge for the industry is environmental sustainability as California is recognized as one of the most progressive states for its clean and green policies and regulations; many of which apply to the transportation industry. The expansion and

evolution of intelligent and clean/sustainable transportation technologies means training for new skill sets will be constant for individuals in existing education and training programs and for the 36,000+ incumbent automotive and diesel mechanics in the region. Because of the importance and challenges of sustainable transportation to transit and ground transportation industries in the region, in this section we have included information on alternative fuels and advanced transportation technology programs and completions.

Postsecondary education and training providers in the region are pioneers on cutting-edge emissions devices and clean technologies such as alternative fuels, hybrid and electric vehicles, and hydrogen-fueled vehicles. They continuously monitor industry trends and emerging technologies, revise current programs, and develop new ones to ensure their programs and services remain state-of-the-art. For example, automotive technology programs have incorporated alternative fuels instruction and diesel technology programs have incorporated emerging technologies such as Diesel Particulate Filters, Selective Catalyst Reduction systems, and On-Board Diagnostics which impact emission performance and ensure vehicles remain as clean as possible. Looking ahead, postsecondary education and training providers will be monitoring the impact of new trends such as autonomous vehicles, demand/response systems, alternative power sources, and various “smart” technologies that will necessitate further programmatic changes.



Five postsecondary education and training providers had alternative fuels and advanced transportation program completers in the past 13 years. Four, collectively, had 42 program completions in 2015. There were 946 alternative fuel and advanced transportation job openings in the region in 2015; of which 814 openings were for Automotive Service Technicians and Mechanics. While not all mechanics are required to be competent in alternative fuels and advanced transportation technologies; the importance of having these competencies in the region is increasing. In addition, as

mentioned above, advanced transportation technologies have been incorporated into existing programs. Further examination of the need, to determine if additional programs or increased enrollment and completions in existing programs, is warranted.

By the Numbers: Postsecondary Alternative Fuels and Advanced Transportation Programs and Completions



Source: Economic Modeling Specialists (EMS) Inc.

Most notably, 2015 completions in the region accounted for 84 percent of all completions in the state of California (which had 50 completions in 2015) and 27 percent of all completions in the U.S. (there were 155 completions in the U.S. in 2015).

Of the 2015 credentials awarded, nearly all (90.5%) were certificates from programs that were less than one academic year in duration (38 total certificates). Associates degrees comprised the remaining awards (9.5%, 4 total degrees) that were conferred in 2015 (refer to Exhibit 33).

Exhibit: 34 Alternative Fuels and Advanced Transportation Program Completions, by Award Level, 2015 Los Angeles and Orange Counties, CA

Award Level	Completions (2015)	Percent
Award of less than 1 academic year	38	90.5%
Associates degree	4	9.5%
Total	42	100%

Source: Economic Modeling Specialists (EMS) Inc.

Postsecondary education and training institutions with alternative fuels and advanced transportation credential completions in 2015, and the number of certificates and degrees awarded by each, are provided in Exhibit 34.

Exhibit: 35**Alternative Fuels and Advanced Transportation Program Completions, by Institution, 2015
Los Angeles and Orange Counties, CA**

Institution	Certificates (2015)	Degrees (2015)	Total Completions (2015)
Los Angeles Trade-Technical College	15	0	15
Long Beach City College	11	1	12
Saddleback College	8	1	9
Rio Hondo College	4	2	6
Total	38	4	42

Source: Economic Modeling Specialists (EMS) Inc.

An extended look over the past three years reveals there were a total of 119 program completions, an average of 40 each year, in Los Angeles and Orange Counties (refer to Exhibit 35).

Exhibit: 36**Alternative Fuels and Advanced Transportation Program Completions, 2013-14 to 2015-16
Los Angeles and Orange Counties, CA**

Institutions and Awards	Completions			
	2013-14	2014-15	2015-16	3 Year Average
LA County Institutions				
Los Angeles Trade-Technical College				
Certificate 12 to < 18 units	11	15	9	12
Los Angeles Trade-Technical College Total	11	15	9	12
Long Beach				
Associate Degree	2	1		1
Certificate 18 to < 30 units	7	4	8	6
Certificate 6 to < 18 units	14	7	13	11
Long Beach Total	23	12	21	19
Rio Hondo				
Associate Degree		2		1
Certificate 18 to < 30 units		4	6	3
Rio Hondo Total		6	6	4
LA County Total	34	33	36	34
Orange County Institutions				
Saddleback				
Associate Degree	1	1	1	1
Certificate 18 to < 30 units	1	8	4	4
Saddleback Total	2	9	5	5
Orange County Total	2	9	5	5
TOTALS	36	42	41	40

Source: Centers of Excellence, LMI Supply Tables March 16, 2017.

According to the California Community College Chancellor's Office Curriculum Inventory, there are five community colleges in the region with 12 active alternative fuels and advanced transportation certificate and degree programs categorized as follows:

- Associate of Science Degree (AS): 5
- Certificate 12 < 18 units: 2
- Certificate 18 > units: 5

Programs at each of these community colleges, by county, are depicted in Exhibit 36.

Exhibit: 37**Community College Certificate and Degree Programs in Alternative Fuels and Advanced Transportation
Los Angeles and Orange Counties, CA**

		<u>Degrees</u>		<u>Certificates</u>	
College	Program	AA	AS	12 to <18 sem units	18> sem units
LA County Community College Programs					
Cerritos College	• Auto Mechanical Repair Tech: Alternate Fuels Service Tech.		X		X
Los Angeles Trade-Technical College	• Hybrid & Electric Plug-In Vehicle Technology			X	
Rio Hondo College	• Alternative Fuels & Advanced Transportation Technology		X		X
	• Electric Vehicle and Fuel Cell Technology Technician			X	
Long Beach City College	• Advanced Transportation Technology-- Alternative Fuels		X		X
	• Advanced Transportation Technology-- Electric Vehicles		X		X
Orange County Community College Programs					
Saddleback College	• Alternative Fuel Vehicle Specialist		X		X

Source: California Community College Chancellor's Office Curriculum Inventory, February 2017.

In addition to certificate and degree programs in alternative fuels and advanced transportation, other programs and services currently offered in the region include: industry-sponsored training at Los Angeles Trade-Technical College as well as other alternative fuels and advanced transportation-related programs/services at West Los Angeles College and at Los Angeles Harbor College.

West Los Angeles College is also planning to offer a certificate program and noncredit courses; Los Angeles Harbor College is planning to offer other programs/services; and Golden West college is planning to offer a degree, a certificate, noncredit courses, industry-sponsored training, and a pre-apprenticeship program in alternative fuels and advanced transportation within the next three years.

Dispatcher Programs and Completions

Data sources utilized for this report do not reveal any dispatcher education and training programs in the region at this time. Because this is a middle-skill occupation with strong employment potential (there were 299 job openings in the region in 2015), this occupation should be explored further to determine if there is a workforce development gap and if the development of postsecondary education and training programs are warranted.

Workforce Development Challenges

Over the course of several months in 2016 and 2017, the Transportation Workforce Institute convened educators, workforce development practitioners, and employers in the transportation and warehousing industry sector to identify key workforce development challenges. As a starting point for discussions and information gathering a national Framework for Action for the transportation industry was utilized. This national framework was developed as a cumulative product from working sessions at the National Transportation Workforce Summit, sponsored by the Council of University Transportation Centers (CUTC) in cooperation with the U.S. Department of Transportation (U.S. DOT), in Washington, DC, April, 2012. Culminating from these regional convenings was the development of the Transportation and Warehousing Workforce Development Framework for Action: Los Angeles and Orange Counties, California (Framework for Action). This regional Framework for Action addresses several workforce development challenges in the industry sector as follows.

- Lack of specificity in transportation and warehousing workforce/labor market demand on a local, regional level
- Pace of technological advancements – lack of awareness and access to new technologies by workforce development providers
- Limited internship, apprenticeship, work-based learning opportunities
- Lack of awareness of transportation and warehousing career options; most prevalently with youth/young adults (millennials and Generation Zs)
- Perception of transportation and warehousing career options as antiquated and limited; particularly among counselors and parents of youth/young adult

- Outdated communication methods and channels do not reach or resonate with audiences
- Misperceptions of qualifications needed for employment in transportation and warehousing industries/occupations
- Lack of resources (information, funding, access to technologies) to respond to industry workforce needs and constantly changing technology and skills needs
- Gaps in graduates' technical skills and abilities;
- Inadequate non-technical, 21st century, and “soft skills” abilities
- New workforce entrants lack practical or work experience in transportation and warehousing industry
- Limited, direct funding and resources for low-income students
- Insufficient postsecondary programs to adequately address projected growth and replacement occupations
- Lack of skill/credit portability across postsecondary providers
- Large percentage of individuals work while participating in postsecondary education; limiting participation, credits taken, sustained enrollment, and persistence

Four overarching goals, and accompanying strategies and action items, were developed and then prioritized in the Framework for Action to address these challenges. The entire framework is available on TWI's website at twi.lattc.com.

Workforce Development Initiatives and Collaboratives

Lastly, we end this report by featuring five, regional workforce development initiatives and collaboratives that intersect with transit and ground transportation industries. They all have common goals of promoting robust industries in the region and of ensuring they have the requisite, skilled workforce. A brief description of each is provided below.

Advanced Transportation and Renewable Energy (ATRE)

ATRE is a statewide partnership with industry and community colleges that represents an array of clean energy technologies that form a critical part of California's strategy for reducing its climate change impact and its dependency on foreign energy, as well as growing a robust green economy. ARTE leverages contract education and career-technical academic programs which

allows colleges to develop curriculum and support industry with the immediate needs of incumbent worker training, while providing a pipeline for highly trained students in the future. Several community colleges in Los Angeles and Orange Counties participate in ATRE initiatives and activities.

California Council on Diesel Technology Education and Technology (CCDET)

In 1992, a consortium of diesel truck and bus engine manufacturers and dealers, California community colleges, and the California Air Resource Board (CARB) came together to form the California Council on Diesel Technology Education and Technology (CCDET). Diesel technology programs at six community colleges across the state, two of which are located within the region (Los Angeles Trade-Technical College and Santa Ana College), are the backbone education and training partners of CCDET. CCDET colleges are united by two overarching goals: (1) provide the skilled workforce necessary for clean and green transportation in California; and (2) ensure underserved and disadvantaged individuals and communities have good air quality and access to education and training that sets them on a path to family-supporting careers and long-term success within a robust, clean and green transportation industry.

The CCDET colleges provide the requisite, skilled diesel technician workforce for the transportation industry who are up-to-date on clean and green technologies and practices. And they provide training to firms with fleets and individuals performing heavy-duty vehicle inspections and smoke opacity emissions testing. This training is necessary for: (a) full understanding of California Air Resources Board programs and regulations, (b) correctly administering the SAEJ1667 opacity test, and (c) servicing engines and exhaust after treatment devices so they meet state, opacity standards.

City of Los Angeles Workforce Development Board Sector Strategists

The City of Los Angeles Workforce Development Board (WDB) has launched a program to collaborate with the seven regional WDBs on workforce needs to maximize training investments, policies, and resource development. To accomplish this, Industry Sector Strategists have been contracted to examine four designated high growth sectors. The Sector Strategists work with employers and local industry councils to define the skills needed for in-demand positions and work with local education/training providers to develop appropriate courses, training, and/or certification programs. Community Career Development, Inc., together with joint venture partner Los Angeles Valley

College, have been selected as the Sector Strategists for the Logistics/Trade industry which intersects with the transit and ground transportation industries. The Transportation Workforce Institute is also partnering on this program to conduct industry sector and workforce development research and to serve as the educator and workforce development practitioner convener.

First year efforts for this program are to assess current and future workforce needs and opportunities in the sector and to develop a strategic plan for going forward with preparing candidates for training within the industry. The plan will convene industry stakeholders to identify employers, occupations, career pathways, training programs, apprenticeships, and training providers. A sample curriculum and timetable is to be designed as a part of this plan, with a justification for placement in the Eligible Training Provider List system and a recommended training provider. Feedback is to be obtained on prior sector strategies and recommendations are to be provided on aligning policies and programs to further the development of a regional sector strategy.

Los Angeles Economic Development Corporation (LAEDC) e4 Mobility Alliance

The LAEDC e4Mobility Alliance is a network of over 500 leaders in advanced transportation with a mission to promote and further develop Southern California as the leader in advanced transportation including maximizing plug-in electric, natural gas, and fuel cell vehicle adoption rates; fleet conversion; ride sharing; and a range of e-mobility solutions that will enhance a robust manufacturing cluster and infrastructure deployment resulting in job growth and investment through appropriate levels of public and private funding; technology transfer; workforce development; and policy initiatives. The Alliance has seven overarching goals:

- Continue to market Los Angeles County as an advanced transportation capital;
- Continue to leverage the intellectual property, research, and workforce training at workforce investment boards, colleges, and universities;
- Ensure Southern California gets an increased share of local, state, and federal funding for e-mobility;
- Improve eCarFests;
- Remove obstacles for alternative fuel vehicles in municipal fleets;
- Develop legislative agenda; and
- Create cluster development strategy.

Southern California Regional Transit Training Consortium (SCRTTC)

SCRTTC, a nonprofit organization, is a training resource network comprised of members including community colleges, universities, transit agencies, and public and private organizations focused on the development and delivery of training and employment of the transit workforce that is proficient at the highest standards, practices, and procedures for the industry. SCRTTC members are primarily located in the Southern California region and Colorado, including several in Los Angeles and Orange Counties. SCRTTC provides multiple solutions to solve transit training needs including:

- Improving the quality of training for the entire workforce,
- Increasing the efficiency and effectiveness of training while reducing redundancy,
- Optimizing educational resources,
- Developing funding resources to maximize the use of taxpayers' dollars,
- Providing training needs assessments and analysis,
- Maintaining an inventory of available resources and courses,
- Delivering state-of-the-art training,
- Building training capacity for public transit, and
- Developing standards for transit vehicle repairs.

Additionally, two regional initiatives/collaboratives are currently in development.

Advanced Transportation and Warehousing Regional Workforce Collaborative

As mentioned previously, the Transportation Workforce Institute facilitated the development of a regional Framework for Action to guide postsecondary workforce development strategies and actions for middle-skill occupations in the transportation and warehousing industry sector in Los Angeles and Orange Counties, California.

Subsequently, five community colleges in Los Angeles and Orange counties have formed the Advanced Transportation and Warehousing Regional Collaborative (Collaborative) to collectively implement targeted activities that, in turn, will promote the achievement of the goals and strategies outlined in the Framework. The five colleges are El Camino Compton College Center, East Los Angeles College, Los Angeles Harbor College, Los Angeles Trade-Technical College (lead college of the Collaborative), and Pierce College. The activities of the Collaborative are made possible with funding from the \$200 million Strong

Workforce Program of the California Community Colleges Chancellor's Office.

Guiding the Collaborative's efforts are the following, four overarching goals and accompanying strategies and action items of the Framework for Action (in priority order).

- **Develop partnerships between transportation employers and postsecondary education providers** through the following:

Strategies:

- Increase communication and collaboration between industry, post-secondary institutions, local governments, and community agencies
- Identify strategic technology advances on the horizon and prioritize industry requirements
- Increase transportation and warehousing industry data accessibility and reliability
- Promote and create learning-labor exchanges
- Share technology training materials across industry and workforce education providers
- Increase employer-sponsored, work-based learning opportunities and incumbent worker training

Action Items:

- Create an industry-educator forum to consistently address workforce needs
- Promote creation of paid, industry internship and apprenticeship programs
- Through a platform (described below), create centralized response system/process for responding to employer inquiries and requests for education and training assistance
- Conduct regular needs analysis and technology scans to inform curricular and program priorities at the regional level
- Identify champions to lead development of an online platform; identify resources for maintaining the database; populate platform with "consumable" career information; scholarships; resources; job opportunities, internships, and work-based training opportunities; incorporate project-, work-, and community-based learning platform/features
- Promote platform to employers, workforce development providers, counselors, career centers, community-based organizations
- Work with municipal governments and employers to create projects that address real-world transportation and warehousing problems

- **Raise interest in transportation occupations** through the following:

Strategies:

- Build a positive, accurate brand for transportation and warehousing industry
- Increase online, social media, and other communication methods and channels to reach all audiences including youth/young adults
- Raise awareness of transportation and warehousing industry and career potential; particularly with those individuals who advise students
- Communicate how transportation and warehousing industries address sustainability and livability to attract youth/young adults

Action Items:

- Develop engaging branding and communication methods/materials; partner with industry creative services departments to assist
- Provide career exposure opportunities such as field trips, virtual experiences, and internships to increase youth/young adult awareness of transportation and warehousing careers
- Distribute communication materials and engage regional secondary and postsecondary counselors and career centers
- Provide hands-on career exploration activities; year-round
- Connect “interest-raising” efforts with secondary career pathway programs and activities

- **Increase preparation for transportation occupations to meet industry needs** through the following:

Strategies

- Clearly communicate occupation qualifications
- Develop shared postsecondary curriculum and credentials to industry standards and requirements
- Expand work-connected, experiential learning options and opportunities
- Define performance measures to assess student knowledge, skills, and abilities

Action Items:

- Develop, expand internship programs that utilize flexible state and federal funding
- Develop list of core competencies for high demand/high need transportation and warehousing careers
- Gather and apply feedback from industry to recalibrate certificate and degree programs as needed
- Establish a clearinghouse of materials and resources

- Create a regional, shared idea lab; makerspace incorporating virtual access and utilization options
- Establish “platform” to create project-, work-, and community-based learning resources
- Align curriculum between educational providers across the region
- Create standardized, sharable learning modules

- **Expand access to transportation postsecondary education** through the following:

Strategies:

- Standardize skill/competency definitions for postsecondary credentials (badges, certificates, degrees, transfer requirements) and industry certifications (where applicable)
- Develop, expand flexible course/program delivery models to accommodate working students
- Streamline methods and processes for skill/credit portability between education and workforce development providers
- Increase direct funding opportunities for students
- Expand postsecondary programs
- Increase credit for prior/other learning opportunities

Action Items:

- Develop new and expand existing education and training programs including new entrant and mid-career programs
- Create regional career pathway maps including education options and the direct connections between them; ensure connections are supported by streamlined transfer/articulation processes
- Develop, expand delivery models that accommodate working learners – online learning options; flipped classrooms; cooperative education; etc.
- Develop standard skill/competency definitions; collectively working with certifying groups and employers
- Expand scholarships and other funding/resources through industry partners, state/federal grants, etc.
- Create funding map of available scholarships and aid programs
- Create shared prior/other learning assessments and processes

Workforce Initiative Now-Los Angeles (WIN-LA)

WIN-LA, led by Los Angeles County Metropolitan Transportation Authority (Metro), is designed to create career pathways in construction and non-construction

areas of operations/maintenance, administration and professional services within Metro and throughout the transportation industry by providing support to participants in areas such as life skills development, skill set enhancement, and educational attainment services including training. WIN-LA will be implemented in collaboration with employers; training entities; community colleges; community-based organizations; union, trades, and apprenticeship entities; and other stakeholders. Metro formally announced WIN-LA during Summer 2017 and will continue to develop the program over the next 18 months. The program will be implemented in 4 phases; with the second phase leveraging Metro's PLA/CCP to provide career opportunities in construction.

WIN-LA's model is comprised of five, integrated workforce and community-development strategies and activities: Employer-Driven, Career Pathway Focused, Retention Support, Collaborative Impact, and Sustainable Community Development.

APPENDIX A:

DATA SOURCES, CALCULATIONS, AND METHODOLOGIES

Demographic Data

Demographic data in this report were collected from Economic Modeling Specialists, Inc (EMSI) that compiled data from several sources using a specialized process. Sources include annual population estimates and population projections from the US Census Bureau, birth and mortality rates from the US Health Department, and projected regional job growth.

Educational Attainment Data

Educational attainment numbers are based on EMSI's demographic data and the American Community Survey. By combining these sources, EMSI interpolates for missing years and projects data at the county level. Educational attainment data cover only the population aged 25 years or more and indicate the highest level achieved.

Industry Data

Industry data in this report were collected from EMSI. EMSI industry data comes from various sources depending on the class of worker. (1) For QCEW Employees, EMSI primarily uses the QCEW (Quarterly Census of Employment and Wages), with supplemental estimates from County Business Patterns and Current Employment Statistics. (2) Non-QCEW employees data are based on a number of sources including QCEW, Current Employment Statistics, County Business Patterns, BEA State and Local Personal Income reports, the National Industry-Occupation Employment Matrix (NIOEM), the American Community Survey, and Railroad Retirement Board statistics. (3) Self-Employed and Extended Proprietor classes of worker data are primarily based on the American Community Survey, Nonemployer Statistics, and BEA State and Local Personal Income Reports. Projections for QCEW and Non-QCEW Employees are informed by NIOEM and long-term industry projections published by individual states.

Infogroup Business-Level Data

Data for individual businesses is provided by Infogroup, which maintains a database of more than 16 million U.S. business entities. Note that in aggregate it will not be consistent with EMSI labor market data due to differences in definitions, methodology, coverage, and industry/geographic classification.

Middle-Skill Occupations with Economic-Mobility-Potential

Four criteria were used for determining middle-skill occupations with economic-mobility-potential.

(1) Occupations for which some postsecondary education and/or training, but less than a four-year degree, are the typical entry requirement. Such postsecondary education or training requirements include, but are not limited to, associates degrees, certificates, some college but no certificate or degree, moderate- to long-term on-the-job training, or previous work experience.

(2) Occupations that pay a living wage according to the Living Wage Calculator²⁴ (developed by Dr. Amy K. Glasmeier and the Massachusetts Institute of Technology) for Los Angeles and Orange Counties, California. The living wage calculator estimates the living wage needed to support families of twelve different compositions: one adult families with 0, 1, 2, or 3 dependent children, two adult families where both adults are in the work force with 0, 1, 2, or 3 dependent children, and two adult families where one adult is not in the work force with 0, 1, 2, or dependent children. Similar to other research studies

²⁴ According to the creators of the Living Wage Calculator "analysts and policy makers often compare income to the federal poverty threshold in order to determine an individual's ability to live within a certain standard of living. However, poverty thresholds do not account for living costs beyond a very basic food budget. The federal poverty measure does not take into consideration costs like childcare and health care that not only draw from one's income, but also are determining factors in one's ability to work and to endure the potential hardships associated with balancing employment and other aspects of everyday life. Further, poverty thresholds do not account for geographic variation in the cost of essential household expenses. The living wage model is an alternative measure of basic needs. It is a market-based approach that draws upon geographically specific expenditure data related to a family's likely minimum food, childcare, health insurance, housing, transportation, and other basic necessities (e.g. clothing, personal care items, etc.) costs. The living wage draws on these cost elements and the rough effects of income and payroll taxes to determine the minimum employment earnings necessary to meet a family's basic needs while also maintaining self-sufficiency." More information on the Living Wage Calculator and on living wages in the U.S., including those utilized in this report, are available at <http://livingwage.mit.edu/>.

examining middle-skill occupations, the living wage for two adult families with 1 dependent children (where one adult is not in the workforce) was utilized for our analysis. For Los Angeles County, this wage is \$14.85/hour and for Orange County is \$15.45/hour.

(3) Current employment opportunities as measured by occupations where 100 or more people currently employed in Los Angeles and Orange Counties combined, or Posting Intensity is higher than all other occupations and companies in the region, or industry advisors indicate they are hiring or planning on hiring next year and/or are hard-to-fill.

(4) Future employment opportunities as measured by three-year projected job growth being positive (greater than 0%), or relatively stable (no less than -.5%), or occupations industry advisors are planning on hiring the next three to five years and/or forecast will be are hard-to-fill.

Occupation Data, All Occupations

Occupation data for all occupations in this report were collected from EMSI. EMSI occupation employment data are based on final EMSI industry data and final EMSI staffing patterns (see Staffing Patterns Data below). Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry.

Occupation Data, Middle-Skill Occupations

Data on job postings and industries employing middle-skill occupations in the region were collected from EMSI. Typical job duties were also collected from regional job postings and employer job classifications. Occupational descriptions and common position titles were collected from the Bureau of Labor Statistics and O*Net OnLine as follows:

- Bus Drivers, Transit and Intercity: (1) National Center for O*NET Development. 53-3021.00. *O*NET OnLine*. Retrieved April 7, 2017, from <https://www.onetonline.org/link/summary/53-3021.00>. (2) Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Bus Drivers on the Internet at <http://www.bls.gov/ooh/transportation-and-material-moving/bus-drivers.htm> (visited April 7, 2017).
- Bus and Truck Mechanics and Diesel Engine Specialists: (1) National Center for O*NET Development. 49-3031.00. *O*NET OnLine*. Retrieved April 7, 2017, from <https://www.onetonline.org/link/summary/49-3031.00>. (2) Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Diesel Service Technicians and Mechanics, on the Internet at <http://www.bls.gov/ooh/installation-maintenance-and-repair/diesel-service-technicians-and-mechanics.htm> (visited April 7, 2017).
- Dispatchers, Except Police, Fire, and Ambulance: National Center for O*NET Development. 43-5032.00. *O*NET OnLine*. Retrieved April 7, 2017 from <https://www.onetonline.org/link/summary/43-5032.00>.

The institution data in this report is taken directly from the national Integrated Postsecondary Education Data System (IPEDS) database published by the U.S. Department of Education's National Center for Education Statistic at <http://nces.ed.gov/ipeds/datacenter>.

Postsecondary Program Completers Data

Postsecondary program completers data in this report were collected from EMSI. EMSI takes data directly from the national Integrated Postsecondary Education Data System (IPEDS) database published by the U.S. Department of Education's National Center for Education Statistic at <http://nces.ed.gov/ipeds/datacenter>. Community college program awards data was compiled using the California Community Colleges Chancellor's Office MIS Data Mart program award queries at <http://datamart.cccco.edu>. Program and completion data for four-year colleges and technical/proprietary institutions were also compiled using IPEDS and California's Center for Excellence.

Staffing Patterns Data

Staffing patterns data in this report were collected from EMSI. EMSI compiles data from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

State Data Sources

This report uses state data from the California Labor Market Information Department at <http://www.labormarketinfo.edd.ca.gov/>.

Transit Agencies and Establishments Data

Transit agency and establishment data in this report were derived from SCAG's *2016 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). More specifically, from the *Transportation Transit System Appendix* to the plan. Multiple sources were utilized and footnoted and metrics, derived from the plan and utilized in this report, were updated to reflect more current results and projections. The report is available at <http://scagrtpscscs.net/Pages/FINAL2016RTPSCS.aspx>.

Transit Use Data

This report uses data from the American Public Transportation Association's *2016 Public Transportation Fact Book, 67th Edition*.

APPENDIX B:

TRANSIT AND GROUND TRANSPORTATION TRANSIT MODE DESCRIPTIONS

The following, five transit modes in the region were identified in Southern California Association of Government's (SCAG) 2016 *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). More specifically, from the *Transportation Transit System Appendix* to the plan. The definitions utilized by SCAG are those of the National Transit Database and are as follows:

1. Fixed Route Bus Service: Referred to as Motor Bus and defined as "A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways." Most transit service in the region is provided via this mode. j
2. Demand Response: Defined as "a transit mode comprised of passenger cars, vans, or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations." OCTA Access is an example of this mode in the region.
3. Light Rail: Defined as "a transit mode that typically is an electric railway with a light volume traffic capacity compared to heavy rail. It is characterized by passenger rail cars operating on fixed rails in shared or exclusive right-of-way (ROW) and vehicle power drawn from an overhead electric line via a trolley or a pantograph." The Metro Blue, Green, Gold, and Expo lines are examples of this mode in the region.
4. Heavy Rail: Defined as "a transit mode that is an electric railway with the capacity for a heavy volume of traffic. It is characterized by separate ROWs from which all other vehicular and foot traffic are excluded and high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails." The Metro Red and Purple Lines are examples of this mode in the region.
5. Commuter Rail: Defined as a transit mode that is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs. Service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within UZAs, or between urbanized areas and outlying areas." Metrolink is an example of this mode in the region.

APPENDIX C:

POSTSECONDARY EDUCATION AND TRAINING PROVIDERS

The following community colleges and other postsecondary education and training providers are included in this report. Provided for each are the institution's name, address, website, county they operate within, and middle-skill occupation education and training programs/services they provide.

Community Colleges

Community College Name	Address	Website	County	Alternative Fuels	Diesel and Heavy Equipment Maintenance Technology	Truck and Bus Driver
Cerritos College	11110 Alondra Blvd Norwalk, CA 90650	www.cerritos.edu	LA	X		
Citrus College	1000 W Foothill Blvd Glendora, CA 91741	www.citruscollege.edu	LA		X	
Long Beach City College	1305 E Pacific Coast Hwy Long Beach, CA 90806; (Pacific Coast Campus)	www.lbcc.edu	LA	X	X	
Los Angeles Harbor College	111 Figueroa Place Wilmington, CA 90744	www.lahc.edu	LA	X	X	X
Los Angeles Trade-Technical College	400 W Washington Blvd Los Angeles, CA 90015	www.lattec.edu	LA	X	X	
Los Angeles Valley College	5800 Fulton Ave Van Nuys, CA 91401	www.lavc.edu	LA			X
Rio Hondo College	3600 Workman Mill Rd Whittier, CA 90601	www.riohondo.edu	LA	X	X	
Saddleback College	28000 Marguerite Pkwy Mission Viejo, CA 92692	www.saddleback.edu	Orange	X		
Santa Ana College	1530 W 17th St Santa Ana, CA 92706	www.sac.edu	Orange		X	
Santiago Canyon College	8045 E Chapman Ave Orange, CA 92869	www.sccollege.edu	Orange		X	
West Los Angeles College	4800 Freshman Dr Culver City, CA 90230	www.wlac.edu	LA	X		

Other Postsecondary Education and Training Providers

Post-secondary Institution Name	Address	Website	County	Alternative Fuels	Diesel and Heavy Equipment Maintenance Technology	Truck and Bus Driver
California Career School	1100 S Technology Cir Anaheim, CA 92805	http://www.californiacareerschool.edu/	Orange			X
Community Career Development	3550 Wilshire Blvd # 500 Los Angeles, CA 90010	http://www.communitycareer.org/	LA			X

APPENDIX D:

LIST OF EXHIBITS

Exhibit Number	Exhibit Title	Page
1	Urbanized Areas (UZA) Los Angeles and Orange Counties, CA	6
2	Los Angeles and Orange Counties, CA Map	6
3	National Rankings of Transit Agencies, Los Angeles and Orange Counties, CA	9
4	Additional Rankings of Transit Agencies Los Angeles and Orange Counties, CA	9
5	Los Angeles County, CA Map	10
6	Categories of Transit Services in Los Angeles County, CA	11
7	Municipal Transit Operators, Los Angeles County, CA	11
8	Orange County, CA Map	12
9	Transit and Ground Transportation Industries Location Quotients and Projected Growth, 2020 Los Angeles and Orange Counties, CA (Combined)	14
10	Transit and Ground Transportation Industry Location Quotient Percentage Change, 2017-2020 Los Angeles and Orange Counties, CA	14
11	Transit and Ground Transportation Industry Location Quotients, 2016 Los Angeles and Orange Counties, CA	14
12	Transit and Ground Transportation Employment, Earnings, and Establishments Los Angeles and Orange Counties, CA	15
13	Transit and Ground Transportation Employment % Change 2001-2025 Los Angeles and Orange Counties, CA	15
14	Transit and Ground Transportation Employment by Industry, 2016 Los Angeles and Orange Counties, CA	15
15	Largest Transit and Ground Transportation Employers, 2016 Los Angeles and Orange Counties, CA	16
16	Transit and Ground Transportation Employment % Change, 2017-2020 Los Angeles and Orange Counties, CA	16
17	Transit and Ground Transportation Employment % Change, by Industry, 2017-2020 Los Angeles and Orange Counties, CA	16
18	Transit and Ground Transportation Employment Change, 2017-2020 Los Angeles and Orange Counties, CA	17
19	Transit and Ground Transportation Job Change, by Industry, 2017-2020 Los Angeles and Orange Counties, CA	17
20	Gender of Transit and Ground Transportation Workers, 2016 Los Angeles and Orange Counties, CA	17
21	Ethnicity of Transit and Ground Transportation Workers, 2016 Los Angeles and Orange Counties, CA	17
22	Age of Transit and Ground Transportation Workers, 2016 Los Angeles and Orange Counties, CA	17
23	Transit and Ground Transportation Median Annual Earnings, 2016 Los Angeles and Orange Counties, CA	18
24	Transit and Ground Transportation 2016 Employment Distribution, and Projected Job Growth, by Occupation, 2017-2020 Los Angeles and Orange Counties, CA	18
25	Transit and Ground Transportation Median Hourly Earnings and Typical Employment Requirements, 2016 Los Angeles and Orange Counties, CA	19
26	Transit and Ground Transportation Middle-Skill Occupations with Economic-Mobility-Potential Median Hourly Earnings and Typical Employment Requirements, 2016 Los Angeles and Orange Counties, CA	20

Exhibit Number	Exhibit Title	Page
27	Top Transit and Ground Transportation Industries Employing Bus Drivers (Transit and Intercity) 2016 Los Angeles and Orange Counties, CA	21
28	Top Transit and Ground Transportation Industries Employing Bus and Truck Mechanics and Diesel Engine Specialists, 2016 Los Angeles and Orange Counties, CA	22
29	Top Transit and Ground Transportation Industries Employing Dispatchers, 2016 Los Angeles and Orange Counties, CA	24
30	Diesel and Heavy Equipment Maintenance Technology Program Completions, by Award Level, 2015 Los Angeles and Orange Counties, CA	26
31	Diesel and Heavy Equipment Maintenance Technology Program Completions, by Institution, 2015 Los Angeles and Orange Counties, CA	26
32	Diesel and Heavy Equipment Maintenance Technology Program Completions, 2013-14 to 2015-16 Los Angeles and Orange Counties, CA	27
33	Community College Certificate and Degree Programs in Diesel and Heavy Equipment Maintenance Technology Los Angeles and Orange Counties, CA	27
34	Alternative Fuels and Advanced Transportation Program Completions, by Award Level, 2015 Los Angeles and Orange Counties, CA	28
35	Alternative Fuels and Advanced Transportation Program Completions, by Institution, 2015 Los Angeles and Orange Counties, CA	29
36	Alternative Fuels and Advanced Transportation Program Completions, 2013-14 to 2015-16 Los Angeles and Orange Counties, CA	29
37	Community College Certificate and Degree Programs in Alternative Fuels and Advanced Transportation Los Angeles and Orange Counties, CA	29



Transportation Workforce Institute | Los Angeles Trade-Technical College

400 West Washington Blvd., Los Angeles, CA 90015

twi@lattc.edu | twi.lattc.com