

Issue 1

Contemporary Conversations: An Equitable Transportation Workforce



Contemporary Conversation: An Equitable Transportation Force

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Introduction

About These Series

The Contemporary Conversation (CCs) Series is a compilation of voices from experts in the transportation sector, focusing on specific topics and divided into their relevant subtopics. These pieces are taken from the Regional Mobility Dialogue Series, a series of conversations made from Dialogues organized by the Leonard Transportation Center (LTC). These Dialogues include a diverse panel of experts, from researchers and PhD professors, to key players/stakeholders in the transportation sector.

The purpose of the CCs is to provide the reader with an overview of the transportation issues faced in the Inland Empire and California. It is to do so by including a wide variety of perspectives which bring about a further understanding of the issues faced and their respective solutions proposed. The topics discussed can vary from housing, sustainability, fiscal policy, among others.

About This Issue

This Contemporary Conversation will provide an overview of the workforce from 2020 onward and explore how it is expected to evolve over the next 20 to 30 years. Across the United States, a large proportion of the current workforce (baby boomers) is retiring, creating gaps in all industries that businesses will need to fill. By the end of this CC, we will examine some responses to this issue and envision the future workforce.

This Contemporary Conversation is organized into three topics:

- **Workforce overview:** It's no secret that after Covid many sectors were impacted and some jobs were terminated as well as new jobs created. This goes around the problems of retirement of baby boomers, new trends in job growth, and comprehensive analysis of current competencies in transportation.
- **Future-Workforce Development Programs:** This conversation follows the previous one, focusing more on the programs and solutions available to ensure there is enough workforce to fill the gap left by the retiring generation. It will also address how to ensure that the new workforce is qualified and equipped to take advantage of new technologies.
- **Equity in Workforce Development:** Finally, this section will discuss how we can ensure equal opportunities for the children who will take on the jobs of tomorrow.

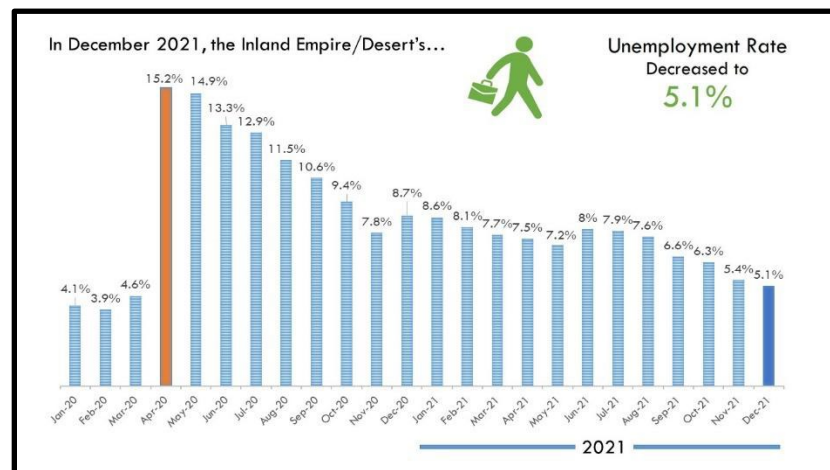
Transportation Workforce Overview

In the ever-evolving landscape of the transportation industry, discussions on the array of jobs within this sector resonate as a central theme among industry experts. Delving into the broader context of employment, these conversations extend beyond mere job descriptions, encapsulating the transformative impact of new technologies. The discourse on jobs within the transportation industry invariably interweaves with the overarching narrative of technological advancements, with speakers often shedding light on the evolving landscape of smart cities and the critical role of cybersecurity in this ever-changing domain. As the industry adapts to the demands of the future, the Dialogue presentations underscore the integral relationship between workforce dynamics, emerging technologies, and the perpetual evolution of transportation infrastructure. This conversation begins with an overview of the workforce data for the region pre- and during the pandemic. This presentation shows the importance of the transportation sector for the region's workforce.

Transportation & Logistics Inland Empire/Desert Region

Michael Goss, Director of the Inland Empire/Desert Centers of Excellence for Labor Market Research, Member of the U.S. Bureau of Labor Statistics Data User Advisory Committee and the Southern California Association of Governments

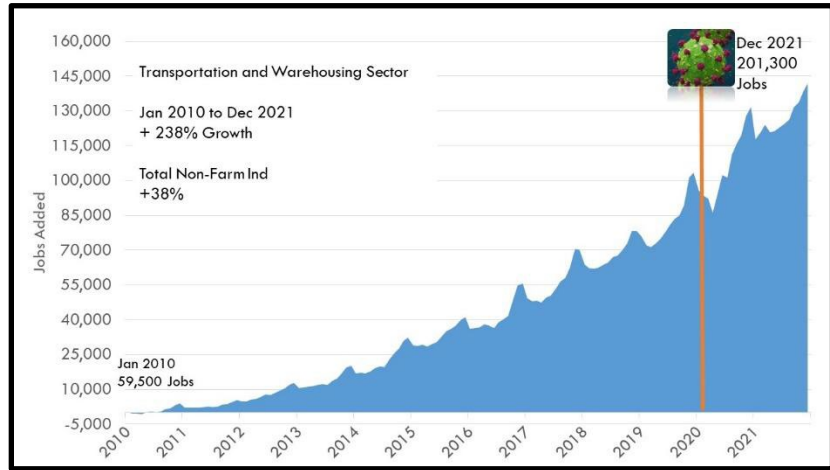
Michael starts the conversation topic by stating that the Center of Excellence's main purpose is to provide the California Community College Chancellor's Office (CCCO) with data regarding aspects of logistics, transportation, and jobs within the Inland Empire. Goss goes on to talk about the unemployment rate, starting in



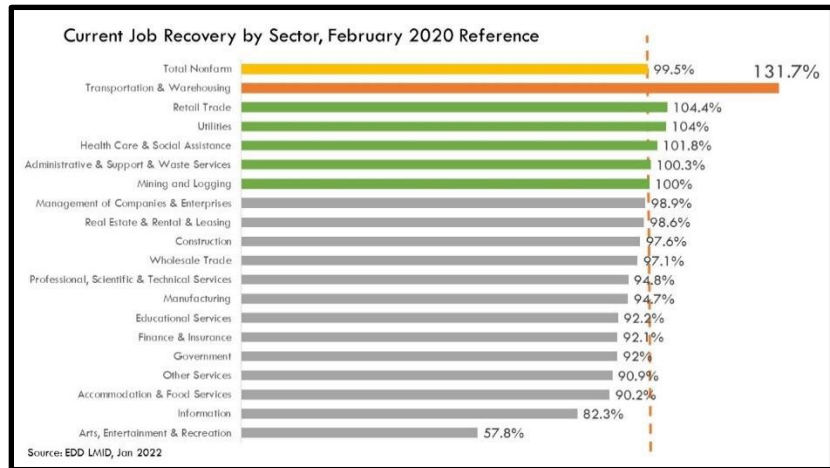
December 2021, and compares it to previous rates, showing that the unemployment rate dropped 0.3%, originally 5.4% in November 2021 to 5.1%. Although the current unemployment rate is higher than the pre-pandemic rate of 3.5% in May 2019, it has significantly decreased from the astonishing 15.2% observed in April 2020 during the early stages of the pandemic lockdown.

Shifting focus to jobs added, there were 2,300 jobs newly added in the last month, the average at the time was 5,500 jobs a month for 2021.

Goss continues to speak about all other sectors, shown as total nonfarm employment. This highlights the transportation and warehouse sector job growth at 131.7%, greater than all other industries for the month of 2020. We can attribute This growth can be attributed to the increased reliance on home delivery of goods during the pandemic lockdown.



Goss then demonstrated how job growth in the transportation and warehouse sector has evolved over the past 11 years, starting from approximately 59,000 jobs in January 2010. Goss revealed that as of December 2021, the industry has grown by 201,300 jobs or 238%. For reference, the non-farm industry employment over the past 11 years had gone up by 38%. From this chart, we see that the transportation industry plays a very significant role for the area's workforce.



Michael Goss focused on the unemployment trend, job growth in the transportation and warehousing industry, with a detailed breakdown of each job sector. In the next speaker, Eric Cowle, will go over rapid technological changes, developing trends in smart infrastructure, shift to prioritize pedestrians, public transit, and bicyclists, changes in employment and how universities are structured, and the need to prepare for newer technologies.

Transportation Engineers Employment

Eric Cowle, Transportation Program Manager, CVAG.

Technology has rapidly changed over the last 35 years. “This has got to be the most exciting time to be in our field because it is changing so fast,” said Cowle. Coming from an engineering background, Cowle explained how the engineering field was based in either design or construction. As opposed to today, engineering is a more diverse, interdisciplinary field. In some aspects, things have not changed, but there are many areas that have changed drastically.

The foundational elements of transportation infrastructure, such as bridges, pavement, and asset management, remain unchanged. These have not changed. It used to be that engineers and planners

worked together to ensure a level of service in the transportation infrastructure. The primary question was often whether to widen the roads. As indicated by Cowle, “that’s what engineers were doing, they weren’t planning. They were just widening everything as soon as money became available.” Today, everything has changed and what worked years ago, may not be applicable today. Funding is no

TRANSPORTATION, ENGINEERS AND EMPLOYMENT

Transportation: What hasn't changed?

- Pavement, Bridges – Construction
- Asset Management

What has changed?

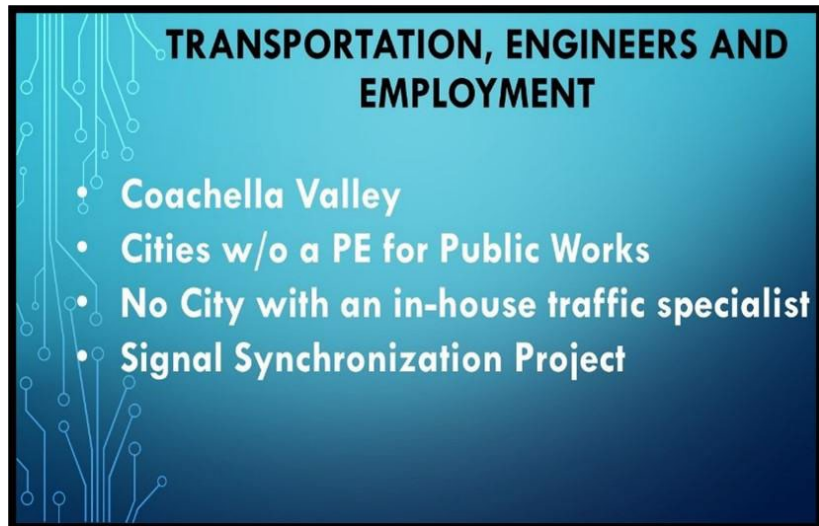
- **EVERYTHING ELSE**

time for **CHANGE**

longer based on the level of service. This is partly because the source of revenues has changed. Governments cannot rely upon gas tax as more vehicles are now powered by electricity. Cities are now monitoring Vehicle Miles Traveled (VMT). The technology is advancing, which is modifying funding streams, and thereby, policies. Two big changes we notice are the electrification of vehicles and the implementation of the Internet of Things (IoT). In IoT, everything is moving towards connectivity, smart lighting, smart watering, and smart parking. “You name it, if there is infrastructure you can make it smart by connecting it to everything else, and largely that is being done through transportation,” said Cowle.

Intelligent Transportation Systems (ITS) monitor traffic using video cameras and sensors that continuously track the flow and conduct origin-destination studies “If there is an event in town, we can see who is going to it, where they are traveling from, and when they are leaving. It is just a different world that didn’t even exist ten years ago,” said Cowle.

Vehicles can communicate with each other and with the infrastructure through advanced communication technologies. This occurrence is known as vehicle-to-vehicle (V2V) communication. This has led to commodities such as broadband internet access to be a part of the transportation network. Broadband is a necessary component in the smart infrastructure as vehicles connect to other vehicles and to the infrastructure. In addition, Mobility as a Service (MaaS) is becoming more prevalent as people discontinue vehicle ownership.



The services offered by transportation network companies (TNC) such as Uber and Lyft are helping to move the adoption of MaaS's idea forward. There has also been a shift in focus from automobile-centric infrastructure planning, to transportation planning that includes pedestrians and bicyclists. We are seeing infrastructure being retrofitted to accommodate this shift to make it safer and more enjoyable for all.

As for the workforce, there has been a shift in employment. Cowle stated that, "we already have two cities that don't have a Professional Engineer (PE) in charge of Public Works. This didn't exist 30 years ago" Everything is moving towards the use of consultants. Cowle stated it was primarily because, "it has become too technologically advanced to keep on board a full-time equivalent staff, and pay all their benefits. Also, it has become too technical for cities to keep the necessary staff".

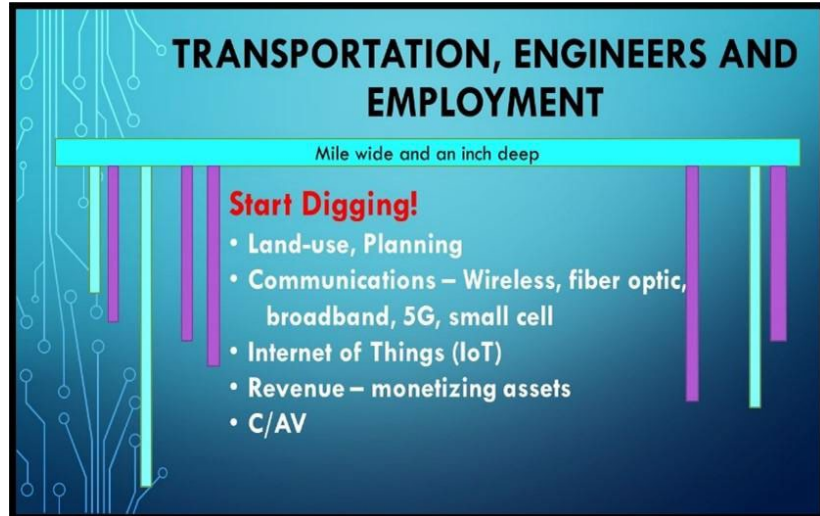
This is the same for counties and the State of California (Caltrans). Most agencies now rely on consultants for transportation engineering projects. "When I graduated, we were taught to be a mile wide and an inch deep," said Cowle. Universities will need to have a better understanding of land use and planning that incorporate aspects of both civil engineering and transportation. In addition, the technology aspects need to be integrated into the system as broadband, 5G, fiber optics and IoT become more integral to the functioning of the transportation infrastructure.

As an example of the transportation infrastructure development In the Coachella Valley, CVAG is implementing a Signal Synchronization Project to optimize traffic flow with synchronized traffic signals. This lays the groundwork for smart cities and allows for better planning, measuring, and tracking tools. To conclude, Cowle noted that society needs to prepare for the use of drones not

only for carrying packages, but for transporting people. We need to prepare the infrastructure for this transition to new modes of travel.

Eric Cowle looked at changes in technology and the need to prepare for these changes, shifts in city infrastructure prioritizing non-car modes of transport, and changes in employment at universities and cities. In the next speaker,

Christopher Grey, will explain further changes in employment and job dynamics within the transportation industry, emphasizing the importance of cybersecurity, and infrastructure maintenance.



Employment in the Transportation Sector, Challenges & Opportunities

Christopher Gray, Director of Planning and Transportation, Western Riverside Council of Governments.

Christopher Gray continued the conversation with focus on the changing dynamics of jobs in the transportation industry. “According to our researchers, about 60% or 70% of the jobs are probably going to go away in their current form,” said Gray. The majority of these jobs are warehousing and manufacturing positions. This can certainly be a bad thing for employees that hold those jobs but simultaneously, this is a great thing as there are quite a bit of opportunities emerging. Automation and new technologies are changing the industry and how manufacturing works. There is a decrease in demand for humans and an increase in demand for productivity, and this is where automation comes in. Automation is now becoming part of service jobs as seen in call centers and fast food; where you cannot differentiate between talking to a person on the line or a computer.

Repetitive jobs are being replaced by robots or computers, whereas jobs that require a heavier level of creativity and communication with people are less likely to be automated

The use of automation can help augment humans in certain jobs. An example from the transportation construction sector is the “cobot”. This machine is operated under the direction of a human to jackhammer cement slabs.

This work decreases the number of people working on the job, but increases the efficiency for the project. Another example of using automation is found in the new technologies that are bringing about autonomous vehicles. WRCOG staff had the opportunity to visit the Toyota automation campus and see the engineers teaching one of their vehicles to back up. It was not being programmed; it was being taught. The artificial intelligence (AI) in the vehicle was learning to back up and at the end of two weeks, it had mastered it.

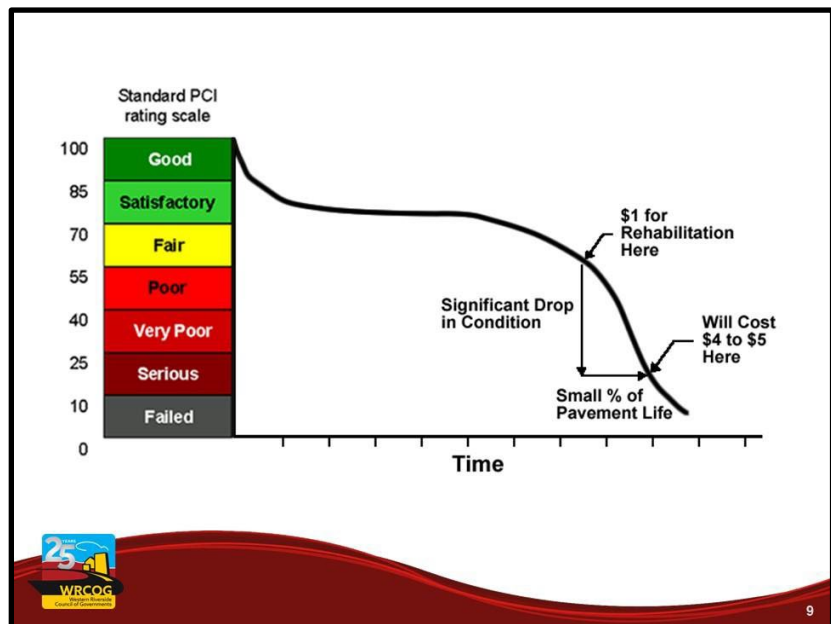
This brings us to a very crucial point, cybersecurity in transportation. We will have to have a substantial amount of cross training in different disciplines. For example, engineers will have to have an understanding of information technology systems (ITS), as well as cybersecurity and communications. For instance, hackers have been known to attack roadside signs, mainly because they are an easy target. Many agencies do not change the locks or simply use the default credentials for these signs. Hackers can then change the password and lock out the agencies.

Another example can be found in the City of Banning. This city fell victim to a ransomware attack when an employee opened an email that contained a virus. As a result, Banning had to shut down its computer system for a month. The State of Colorado was also a victim of a breach and the DMV



had to resort to issuing paper licenses. Other government agencies that have been hacked recently include the Orange County Transportation Agency, Imperial County, and the City of Atlanta.

Gray stated that one of the efforts by the WRCOG to help combat the possible attacks has been a partnership with the Leonard Transportation Center to review the current condition of transportation cybersecurity in the Western Riverside region. A case in point is that cybersecurity is a big challenge in the private sector as well, with banks being an important example. Banks spend a tremendous amount of money on cybersecurity prevention and they still get hacked. As compared to the transportation and government arena where cybersecurity spending is not remotely as close to that of financial institutions. Gray urged that it is only a matter of



time before our systems are hacked and we must keep security in mind. Shifting to infrastructure, many cities do not have adequate funds to make the necessary repairs to their infrastructure. This ends up making the costs go up exponentially.

“What we see happening over the next 20 years, is cities are going to be forced to maintain the roads they have. What this all means is that there many people right now with low skills and low-tech jobs are probably going to get replaced. They are going to get augmented. They are going to get supplemented by technology,” stated Gray. But for those who are smart, and can communicate well with others, or if they have specific skills such as that in cybersecurity, they will be in demand. There will be quite a different skill set for those in the labor force and industries will change. Gray

echoed Cowle's sentiments on the importance of teaching students both the technical skills as well as the people skills as they will be the things that matter.

Technical skills are clear. We are going to need people that understand cybersecurity and know how to operate and maintain systems. They will need to know how to secure and safeguard our systems from adversaries. As for soft skills, we know that the role of a bus driver will eventually be obsolete. However, the general public may not feel comfortable getting on a bus with a robot, so the idea is to have a transportation concierge to greet them to ensure that passengers feel safe or to help them with their luggage. This could possibly be a new job developed. It will require great communication and customer service skills.

"There are thousands of people working in warehouses and logistics distribution centers in the Inland Empire. A lot of those jobs are going away," said Gray. Amazon is an example of a company changing job opportunities to those people affected. As Amazon becomes more automated, they are supporting individuals to become small business owners as delivery drivers. Jobs will continue to shift and professions that are relevant today may no longer be relevant in the next five or ten years. Gone are the days where people can start and stay in a profession for 40 years. Gray closed by reiterating that we need to ensure that we are providing students with both the technical skills, and the soft skills for a brighter and more sustainable future.

Understanding the importance and changing nature of workforce employment along with technological advances in different sectors are only half of understanding the changing nature of the transportation industry. In the next section we will focus on the educational environment and the important aspect of preparing a new workforce.

Developing the Future Workforce

The transportation industry is undergoing a generational shift, together with upcoming technologies that rapidly invade the market. The transformation of transportation to Electric Vehicles (EVs) and Compressed Natural Gas (CVG) will require a skilled workforce equipped with the necessary skills and knowledge to address the needs of the new market landscape. This section will focus on how school programs are being designed to make sure the workforce of the future has everything that is necessary to take on their new challenges.

Personal Transformation – Competencies and Behaviors of the Future

Teri Fisher, CEO and Managing Partner, Insight Strategies

Insight Strategies has been able to see the transit sector evolve since 1994. Today 50% of their client base is in the public sector transit. “One of the more notable events within the industry recently was Transit Network Companies (TNCs). The onset of Uber and Lyft coming into the space of the transit industry.” The industry was not prepared for this change and it was a wakeup call. Now that TNC’s have come into the picture, transit agencies have to compete for riders, and they have to compete for dollars.

Present

Jobs that didn't exist 10 years ago

1. Customer Experience Officer
2. Social Media Manager
3. Chief Equity Officer
4. Chief Innovation Officer
5. What else?



INSIGHT STRATEGIES

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We are on the brink of a new decade. We have come so far in a short amount of time. We used to have elevator operators, switchboard operators, gas lamp lighters and milk deliverers. This was not that long ago. “Now, fast forward to the present, let us come up to today right now. The jobs that didn't exist even 10 years ago, customer experience officer, social media manager, chief equity officer, there is a chief innovation officer these jobs did not exist,” said Fisher. LA Metro was the first to create the Customer Experience Officer position and now those positions are popping up everywhere because it is all about the customer experience. Another new position is the Innovation Officer. Companies have to start recruiting for these new positions and think about the skill set needed. They have to look through a brand-new paradigm.

“Now we are going to look forward, what do we see? When we look at the future, how do we predict and prepare so that we are not caught off guard again?” asked Fisher. As a consulting and training company, Insight Strategies takes several things into consideration when trying to prepare for the transportation sector’s future. They use their own experience, look at what they have seen, what is evolving, and where the trends are headed. They also observe the financial and customer trends of the industry. “Competency research, it is like strategies, our own research based on what we know to be true about what creates success in an organization towards the future.” Insight Strategies has collected research from the Pew Center, Forbes, and the U.S. Chamber of Commerce to make informed decisions on the future competencies and skills in the workplace. Furthermore, they have monitored generational shifts. The transportation industry is going to be ahead of the curve in terms of retirements.

Once the data had been analyzed they went door to door to local transit agencies and offered their services to help with succession planning. “Leadership development has been popping up for the last few years, but succession planning talks about high potentials. Who is going to be filling that executive turnover that was referred to in this

session?” It is about readiness; it is about making sure you are treating people within the organization who are the future leaders special.

Fisher then addressed life in the 21st century workforce saying, “53% of employer surveys said they are having trouble finding people, hiring, training, skilling, educating raise your hand if you can relate to that.” It is not only the technical skills that are needed, it is the professional soft skills that are missing as well. Technology has overloaded us with information, and we are losing sight of connection. Fisher highlighted the top five skills that Insight Strategies found in the research, focusing on the first two –Change Readiness, and Business Mindset & Critical Thinking Skills. An individual can work on these skills and try to prepare themselves as much as possible for the future in order to remain employed. However, organizational commitment plays a crucial role:

Life in the 21st Century Workforce: A National Perspective

- 53% of the employers surveyed said they are having a tough time finding people with the skills, training, and education needed
- When it comes to getting hired, beyond technical skills and education, it’s as important to have certain professional (soft) skills (behaviors & competencies)
- 2024 the Bureau of Labor Statistics estimates that 25% of the US workforce will be composed of workers over the age of 55

INSIGHT STRATEGIES, INC. Sources: UoPX & U.S. Chamber of Commerce 2017 Study, Forbes, Insight Strategies

embedding these skills into the culture, incorporating them into performance evaluations, and aligning them with core values are essential steps that can truly drive meaningful change.

For the first skill, adaptability means being able to shift gears when the context calls for it and responding accordingly. Furthermore, resilience is someone who possesses the ability to bounce back in the face of adversity, obstacles, disappointments, and failures. Then, there is business mindset and critical thinking. Connecting what you do to the

impact on customers, clients, and to the bottom line. This includes an objective analysis and evaluation of an issue or problem to be solved. “So, what we find, the leaders and public sector organizations that are most successful are the ones that come with the private sector mindset, protecting the taxpayer dollars. Not relying upon local, regional, federal funding to pull off what you want to pull off.”

Teri Fisher focused on technological changes, new perspectives on transportation planning, smart infrastructure implementation, and a shift in employment. The next speaker, Nicholas Kocek, will look at emphasis on logistical education, career related skills, passive learning, networking, and community involvement.


Ten Steps to Change: The Future of Logistic Education and Development

Nicholas Kocek, Executive Operations Officer and a Certified John Maxwell Coach, Trainer and Speaker

Moving the conversation forward, Nicholas Kocek discussed the ten steps to the future of employment in logistics. Kocek believes these ten steps show us how academia and the logistics community can learn from each other through collaboration with the goal of finding and onboarding new talent. “I was with UPS for 38 years and had a great career. East Coast and West Coast, most of it in operations and industrial engineering, HR and all that good stuff,” said Kocek. After he retired, he met with the president of UPS and started an intern program called Novice2Noble. The internship program provides credit hours, to incentivize students to not only network and have an internship, but also learn from it. These ten steps are based on what Nick has learned thus far from the Novie2Noble interns.

Skills, Knowledge, and Abilities (SKA's) → Future

- Change Readiness: Adaptability & Resilience
- Business Mindset & Critical Thinking Skills
- Communication
- Collaboration & Teamwork Across Diverse Populations
- Creativity & Innovation



INSIGHT STRATEGIES, INC. Sources: UoPX & U.S. Chamber of Commerce 2017 Study, Forbes, Insight Strategies

6

Step one, transforming how to prepare us students for logistics careers. Students in the program provided the following feedback more hybrid classes; meeting on a Monday and the rest of the week going to the workplace; learning about logistics and engineering functions; and learning more human resources functions. “The one

thing that I understand working with this university is that the talent pool is amazing. In Cal State San Bernardino, all the Cal States, the talent pool is amazing,” said Kocek.

Step two is changing the environment of being just a student to an “intentional student”. In other words, making sure the students are intentionally there, and want to be there. They are mindful and intentional about their decisions. “You have to have a timeline; you have to know exactly where to go and when you’re doing it. We have to encourage that with the help from academia; students need encouragement to be intentional about everything they do, especially with self-development,” said Kocek.



Step 1: Transforming How We Prepare Our Students For Logistic Careers

- Move to a Hybrid of class room and experience
- Internships key to experience
- Move from 10% Internships to 50%
- Partner with logistic companies to provide opportunities
- Provide credit hours to allow students to graduation in less time



3



Step 2: Change The Environment of Being a Student To An INTENTIONAL Student

- Intentional about learning
- Intentional about self-development
- Intentional about career

4

In step three, Novice2Noble calls their student interns, Driven Positive Disrupters. The program encourages the students to be positive, to disrupt, and to be driven. In today’s fast paced world, in

order for students to compete and excel in their workplaces, they need to be ready to move quickly, develop new systems faster, and challenge the status quo. Step four is all about networking. Students are encouraged to join an association, or a non-profit. They teach them the importance of networking. “You can’t have enough networking. Network, network, inside the organization and outside the organization. I think it is just as important both ways,” said Kocheck.

Step 4: Network , Network, Network



- Teach the development of relationships
 - Associations
 - Chamber of Commerce
 - Non-Profit





For step five, the interns learn how to interview. This is an important part of the intern process. Within 12 weeks, students need to have four interviews inside of the organization. The students must seek out leadership and interact, and learn how to develop their skills, this is all a part of the process.




Step 5: Interview, Interview, Interview

- Teach to ask for opportunities
- Develop skillset to interview
- Even if you are happy go get another interview



As part of step six, the interns are asked to create a career map to set a timeline for their education and self-development. “Get an intern position, volunteer for a nonprofit, achieve your degree, join a professional organization, secure your position, become a board member of a non-profit, get to the next level, enroll in your masters, and keep going and going and going. Map it out,” said Kocheck.

Step 6: Set a Personal Pathway Map



- Education
- Self-Development
- Timelines

In step seven, the interns help teach a class, mentor, or volunteer in a community. By volunteering and mentoring, these students gain an experience and make new connections along the way. Looking back at step four, this is a great way to network.

Step eight is called stretching the rubber band. This analogy is used to describe how far the


program can stretch the students. Have them accomplish things they think are impossible: joining a non-profit; going to school full-time; having a part-time job; volunteering on weekends.

Step nine is learning financial discipline. Many of these students come out of school with financial debt and might not have been taught the tools needed to effectively manage their money. “Some of that debt may not be needed because you know what, I go to Starbucks every day, that’s five bucks; I go out for lunch, that’s 12 dollars; that’s 17 dollars total each day. I multiply that by five days a week for 52 weeks. What could you do with that money?” Teaching them financial discipline when they’re 20 years old will help them when they get into an organization.


Step ten is career planning. Once they get into an organization, what does that look like? This step teaches students to think about when they get that job, how do they master it and the steps to take to move up within an organization.

Step 7: The Multiplier Effect
Teach – Coach – Give Back

- Help Teach a class
- Mentor a classmate
- Volunteer in the community



10





Step 9: Learn Financial Discipline

- The Rule of Compounding
- Tools to save
 - 401K
 - Real Estate Investment
 - Limit your student loans
 - Limit your credit card dept
 - Make your own coffee
 - Make your own lunch

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This ten-step process has proven to be very effective. “We have had amazing success with the talent from this university – 14 have full-time careers, ten are more likely in the next six months, and they all have proven to be top performers within months in the organization”, said Koçek. Included in these interns are six from Valley

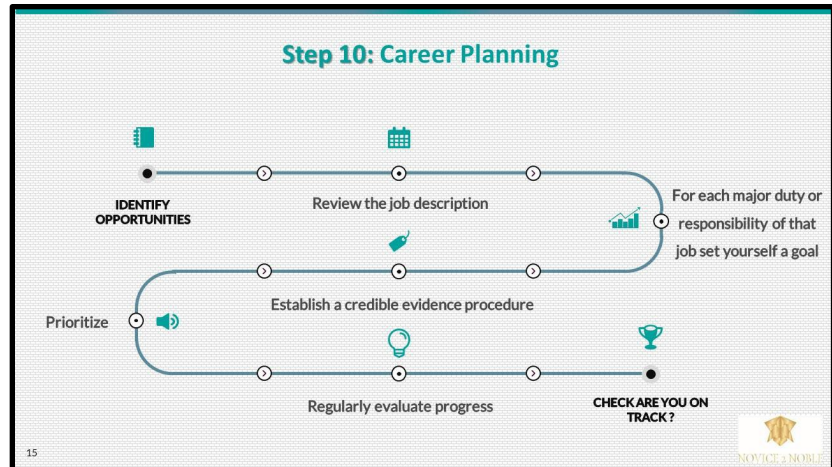
College in business development careers. Between all of them, they have accumulated over \$4.2 million in sales. This program teaches our students to be driven by positive disrupters for change within this industry.

Nicholas Koçek focused on an educational career path for students who are interested in the field of transportation along with an emphasis on more student involvement in the community. The next speaker, Kenny Melancon, will take a closer look at diesel, electric and zero emission vehicles; their challenges, technological advancements and their overveiling changing nature within the industry. We will also be looking at the need for mechanics and engineers who understand the vehicle thoroughly along with the education needed.

Applied Technology: Transportation and Culinary Arts Division

Kenny Melancon, Assistant Professor, San Bernardino Valley College

San Bernardino Valley College plays a significant role in developing the next generation of diesel mechanics into electric technicians. Professor Kenny Melancon was hired by San Bernardino Valley College in 2012 to manage the Heavy-Duty Truck Department. Since his hiring, he has brought in new technologies with the support of trucking industry companies. “When you heard the word diesel years ago, it was pretty much a dirty word, everything was heavy. The thought was they are greasy, dirty, work with big parts, expensive, and black smoke. The list goes on and on,” said Melancon. The definition and terminology of diesel mechanics are changing with the advancement of technology. It was previously mentioned that a large portion of our workforce will be retiring and the same goes for diesel mechanics. The new wave of diesel technicians is coming in and they will need a mentor as Nicholas Koçek discussed.



“The next generation of professionals will need new skill sets to adapt to the technological advancements,” said Melancon. A few examples of the technology the new technicians will be working with include:

- On Guard Collision Mitigation Systems.
- Adaptive Cruise Control.
- Forward looking cameras for lane departure.
- Mobile communication platforms.
- Roll Stability.
- Anti-lock Braking Systems.
- Engine Control modules.
- Body control modules.
- Automatic Transmission Control modules.

It is not only the truck cabs that are becoming more intricate, but the trailers come with ABS controllers and tracking systems. The controller is used for refrigerated units that run on shore power when the trucks are parked at the loading dock. This translates into inverted/converted technology. “So, the diesel mechanic is now a


heavy/medium duty diesel technician. They have a very strong background in multiplexing, electrical diagnostics, electrical theory, and specialize in their field.”

Currently only CNG (compressed natural gas) or electric trucks are on the market, diesel is no longer available. Therefore, the new wave of technicians will need to know and understand CNG in addition to electric vehicle technologies. This includes being certified to perform tank inspections, and CNG motors. The heavy/medium duty truck technician, CNG specialist, and electrical engineer are now all rolled into one technician.

San Bernardino Valley College is focusing on these skills and offers a diesel engine and fuel injection technology certificate that gets students into the industry working, as well as continuing their educational career. In addition, they also offer a non-credit certificate for students. “We know there are people out there that just can’t afford to go to college and we give them the opportunity. All they have to do is register, come to class and sit right alongside the student that is getting this technology certificate. They are paying for a certificate to go towards an associate degree,” said

Technology transforming Diesel Technicians

Diesel Engine and Fuel Injection Technology Noncredit Certificate



San Bernardino
Valley College

DIESEL 621	Heavy-Duty Diesel Engines
DIESEL 624	Advanced Heavy-Duty Diesel Engines
DIESEL 628	Heavy-Duty Truck Systems
DIESEL 634	Diesel Alternative Fuels
DIESEL 664	Auto/Truck Electrical Systems

Melancon. This certificate allows the student to be in the same class, get the same knowledge and opportunity as someone that is paying. Once they pay, they can give the official certificate and credits towards their associate degree.

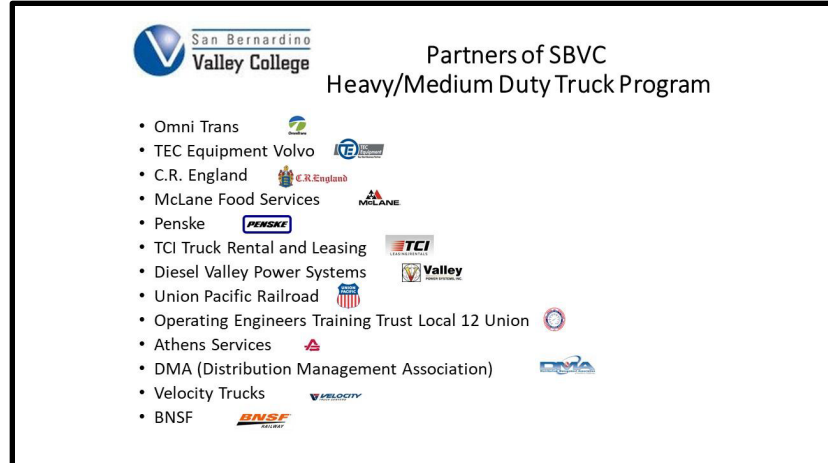
Valley College is equipping students with the skills needed to adapt and is transforming diesel technicians for the new era of zero emissions vehicles. The new technicians will need to be experienced in electrical assessments and high voltage applications. There are now 700-volt applications used in vehicles, and technicians will need to know how to work on

those. Valley College is also working with Rio Hondo College on the Volvo LIGHTS Project. “The Volvo LIGHTS Project stands for Low Impact Green Heavy Transportation Solution. We are writing the curriculum for the industry to bring students/technicians up to speed on how to work on these vehicles safely,” said Melancon. The college's certificate program in heavy/medium-duty clean vehicle technology covers AC (Alternating Current) and DC (Direct Current) motor repairs, along with training in high and low voltage applications.

Technology transforming Diesel Technicians		
Heavy/Medium Duty Clean Vehicle Technology Certificate		
AUTO 010	Introduction to Hybrid and Electric Vehicle Technology	4
DIESEL 021	Heavy-Duty Diesel Engines	4
DIESEL 024	Advanced Heavy-Duty Diesel Engines	4
ELECTR 110	Direct Current Circuit Analysis	3
ELECTR 111	Direct Current Circuit Laboratory	1
ELECTR 115	Alternating Current Circuit Analysis	3
ELECTR 116	Alternating Current Circuit Laboratory	1
TECALC 087	Technical Calculations	4

Recommendations from the Center of Excellence (COE) states employer demands for electric vehicle technicians is challenging to quantify using traditional labor market data and employer job posting research. “What that means is, the literature review shows that electric vehicles will enter the market as soon as 2020, but there are very few mentions of the demand for electric vehicle skills across California over the last 12 months. There have only been 23 job postings between September 2018 and August 2019.” Employers are hiring and training from within their companies, rather than hiring new electric vehicle technicians, looking to join the workforce. This is not to say that electric vehicle companies in California are not seeking more workers. They are, but the majority of these jobs are non-service technician jobs. Companies are not focusing on what will be needed in the future, and it is possible they will not be prepared. According to Melancon, the labor market demand for mechanics working specifically on fully electric trucks reflects this. “The COE recommends that local colleges identify and collaborate with employers to discuss their

future hiring needs and training requirements for their electric vehicle workforce.” If things continue the way they are going, those industry positions will not get filled. Melancon invited more people to attend his department’s advisory meetings to provide suggestions on how to best disseminate this information to the industry.



In the last speaker, Kenny Melancon, focused in how SB Valley College is making an effort to provide an educational career for those interested in the transportation field. The next speaker, Dr. Beverly A. Scott, is going to talk about how we can replenish the retiring workforce on a long run.

Workforce and Talent Management Study: Study Results and Recommendations

Dr. Beverly A. Scott, currently serves on the national Board of the American Public Transportation Association, APTA. Part of the African Heritage Studies Association, AHSA, International Transportation Learning Center (labor-management workforce development consortium), and recently appointed to the Zero Emissions Transportation Association (ZETA), Education Fund Board.

Dr. Beverly Scott started by talking about the comprehensive study focused on workforce development within critical infrastructure sectors in the United States. The research revealed a significant disconnect between traditional education systems and the readiness required for careers in these sectors. The study highlighted that while the education system predominantly handles the preparation phase, the actual readiness for the workforce is primarily shaped by employers, both in the public and private sectors. A notable finding was the lack of coordination across federal, state, and local workforce programs, resulting in fragmented efforts and missed opportunities to maximize the impact of successful practices.

The study emphasized the siloed nature of the different sectors and the urgent need for improved coordination at various levels to enhance the overall effectiveness of workforce development initiatives. Additionally, Dr. Scott pointed out the persistent under-representation of women and people of color in critical infrastructure sectors, underscoring the importance of diversity and the need for targeted efforts to address this issue.



Although she acknowledged that we have come a long way to where we are right now and we have made big progress, Dr. Scott made some recommendations for the public on how to tackle these different issues:

- **Near-Term:** The establishment of a federal Coordinating Council to address the lack of coordination across workforce programs, the launch of a public awareness campaign for critical infrastructure sectors, and the implementation of tracking mechanisms for federal spending on workforce training.
- **Mid-Term:** Increase funding and support for workforce development, reshaping cultural perceptions of technical careers, and developing national standards for critical infrastructure sectors.
- **Long-Term:** The overarching goal is to build a national workforce plan that fosters continuous learning, promotes diversity, and prepares individuals for the evolving demands of critical infrastructure careers.

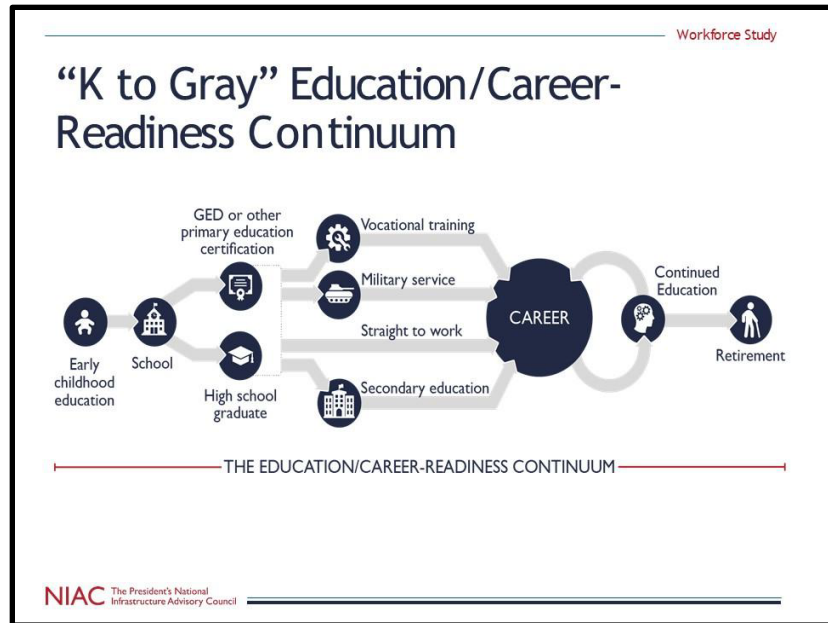
Dr. Scott views the ongoing pandemic as a unique opportunity to rebuild and enhance societal structures. She advocates for seizing this moment to "build back better" by modernizing and discarding outdated institutional models. This involves not only addressing immediate workforce challenges but also reshaping cultural perceptions of technical careers, fostering diversity, and instilling a culture of continuous learning for the 21st century. Dr. Scott sees the pandemic as a gateway to revitalizing opportunities and achieving a more inclusive, innovative, and modernized workforce landscape. Emphasizing the need for a coordinated national effort to bridge the gap between traditional education and workforce readiness. She proposes creating a national workforce plan that involves multiple stakeholders, including federal, state, and local governments,

employers, families, organized labor, and youth. The call-to-action centers on fostering collaboration, coordination, and visibility to unlock the full potential of existing programs and initiatives.

Dr. Scott's program, grounded in a multi-sectoral approach, aims to inspire and prepare the next generation for careers in critical infrastructure sectors. Collaborating with educational institutions, community organizations, and

industry stakeholders, the program fosters a deep understanding of infrastructure careers while addressing diversity and workforce readiness challenges. With an emphasis on hands-on learning, community engagement, and transformative justice, the program seeks to cultivate tomorrow's infrastructure leaders, innovators, and entrepreneurs, promoting a holistic vision of infrastructure's vital role in shaping communities and lives.

In the last section we discussed the crucial nature of an educational environment and the need to prepare for a new workforce. In the next section we will be looking at further educational development in the field of transportation, transportation challenges faced in the Coachella Valley, and an intersection of technological advances in the field of transportation and the potential for major change.



Equity in Workforce Development

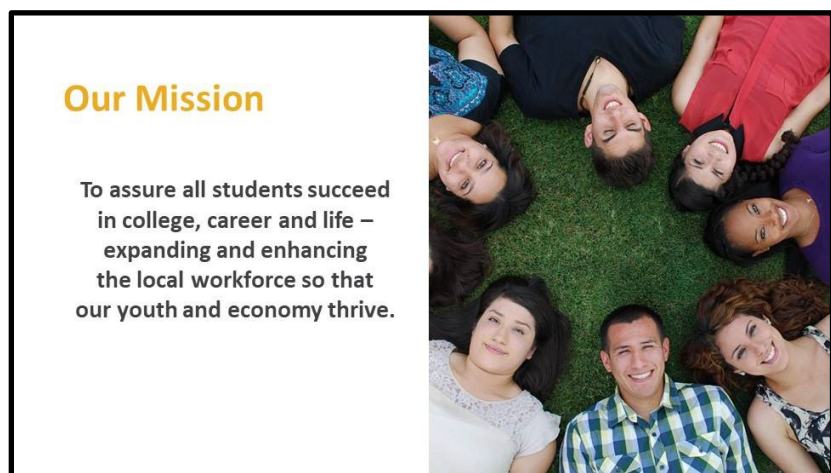
Delving into the transformative realm of Mobility as a Service (MaaS). MaaS transcends the boundaries of traditional transportation services, encompassing numerous modes of travel such as public transit, car-sharing, smart parking, and carpooling, seamlessly interwoven to provide convenient access. Sunline has pioneered a hydrogen fuel cell propulsion system, revolutionizing electric buses by extending their range and charging batteries efficiently. The OneFuture initiative, which is dedicated to ensuring that students are not only prepared for college education but also guided toward career paths aligned with their strengths. In the Coachella Valley, where reliable transportation is a challenge for many students, the transportation issues have led to individual teachers driving students to various job interviews for internships. The intersection of cutting-edge transportation technologies, education, and accessibility, aiming to bridge gaps and create a more inclusive and prepared workforce for the future.

OneFuture Coachella Valley: Preparing All Students for College, Career, and Life

Sheila Thornton, OneFuture Coachella Valley: Preparing all students for college, career, and life. President/CEO of One Future Coachella Valley.

Sheila Thornton began the discussion with a focus on the importance of all students succeeding in college, career, and life. The success of young people in the Coachella Valley will enhance and expand the local workforce – creating success for the youth and economy.

Poverty rates in the Coachella Valley are extremely high, and many of the children are relied upon to contribute to family income. “So, what does college and career readiness have to do with transportation? That's what I'm going to cover today. I don't have any solutions, but I think we are beginning to shake that out in our regional work and we're asking students to be part of the solution,” said Thornton.



The focus of OneFuture is to ensure students are ready to commit to a college education and help them find a career path that best suits them. Many of the students in the Coachella Valley do not have a reliable mode of transportation, which negatively impacts their ability to get to school or work. It is a critical issue in the CV as every one of these students (6,000 plus) have to complete an internship in their senior year. The budget cuts in the school districts reduced school transportation, therefore individual teachers drive their students where they need to go. “They have to get them to the internships and then they have to get them back to the site. Then the bus schedule doesn't run when they come back to their site, and so they figure out a way to get home,” stated Thornton.

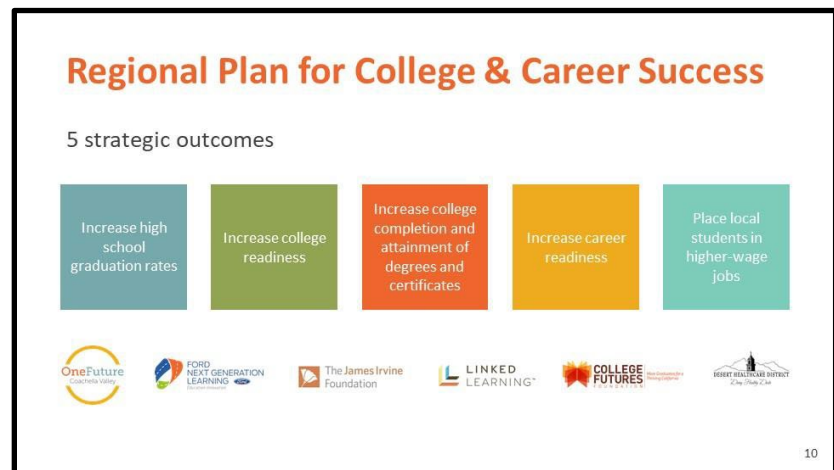
With the growth of OneFuture’s career academies—the small learning communities where students are getting core academics and relevant career learning experiences—transportation and advanced technology have

grown. Students are learning skills in these career academies that are relevant for the future of transportation, logistics, and mobility. The students studying in pathways are finishing at a faster rate and are ready to join the local workforce, but the lack of transportation available to them is a big obstacle. “The students who go to College of

the Desert (COD) now have access to the Haul Pass, which has been a phenomenal advancement and folks are very grateful,” said Thornton. The Haul Pass is a free SunLine bus service for College of the Desert students that will launch this fall at participating colleges and universities. This is a three-year pilot program to provide college students with free unlimited access to the public transit network.

Sunline is at the table with OneFuture’s Business Engagement A-Team, which is working on solutions for the transportation challenges in the region with the students in the Transportation Technology Advancement pathway. They are working together to map out the transportation paths for career academy students and are preparing a presentation and proposal to add the Haul Pass. Employers in the Coachella Valley are considering the Haul Pass, however at the moment, it is still up for discussion.

Sheila Thornton touched one of the most important programs in Coachella Valley and how they are doing their part to link college students with their respective career. Now the next speaker, Lilly Acuña, is going to talk about developing from the schools to the jobs of the future.



SPARK LA Program

Lilly Acuña, Los Angeles as an environmental planner and professional development manager for HNTB, leader of the LA Spark program. Served in the United States Peace Corps in Guatemala.

Lilly Acuña started talking about her experiences before joining HNTB which included serving in the Peace Corps in South America and six months of voluntary labor in Israel. Coming back from her volunteer work outside of the country she was hired by HNTB and since then she has been the leading person of the HGTV Spark LA Program,

which is a collaborative venture with the city of LA Bureau of Engineering and the Girls Leadership Academy also known as the GALA School, the purpose of the program is to close bridges of gender in the STEM field.

The Gala School was established in 2016 as an all-girls STEM-focused school within the Los Angeles Unified School District (LAUSD). Gala School boasts noteworthy statistics, with 80% of students graduating and achieving 100% college acceptance. The school's emphasis on STEM education, coupled with its commitment to diversity, is reflected in its student body, where 78% are girls of color. Furthermore, 80% of students are first-generation college attendees, underlining the program's impact on fostering educational opportunities.

The HGTV Spark LA Program, spanning eight weeks and offering a unique after-school experience for 6th to 10th grader women, aims to bridge gender gaps in STEM fields. Lilly provided insights into the diverse curriculum, encompassing topics like tunnel engineering, rail planning, bridge design, and water engineering. Beyond

What is SPARK LA?

- SPARK LA** was developed in 2017 in collaboration with City of Los Angeles and Girls Academic Leadership Academy (GALA); Dr. Michelle King School for STEM
- Free** after-school program for students in 6th grade through 10th grade to attract more female students to pursue degrees and professions where females are traditionally underrepresented
- Partnered** with City of LA Bureau of Engineering

Benefits

- Hands-on activities with industry professionals
- Exposure to the field of engineering/design
- Effective resource for students - builds critical thinking, leadership, and presentation skills
- Empowers women/minorities
- Workforce readiness
- Inspirational for all who participate

these, the program covers emerging mobility, technology, and even aviation and airport design. Hands-on activities conducted with industry professionals enhance the student's understanding and practical skills in these areas.

Acuna emphasized the program's impact, extending beyond academic enrichment, to the development of critical skills and empowerment. The hands-on activities, designed to be both challenging and enjoyable, foster not only critical thinking, leadership, and presentation skills but also a tangible connection to STEM careers. The program has

demonstrated resilience, successfully adapting to virtual presentations during the pandemic, and it envisions future expansion to reach more schools in Los Angeles, the Inland Empire, and Orange County. This expansion underscores the program's commitment to making a lasting positive impact on education, fostering inclusivity, and providing valuable opportunities for young students.

Program

4, 5 or 8-week program covering various topics

- ❖ Tunnel engineering
- ❖ Rail planning and design
- ❖ Bridge design
- ❖ Water engineering
- ❖ Cost and schedule
- ❖ Mobility and technology
- ❖ Aviation and flight simulator
- ❖ Airport and terminal design

Program concludes with a presentation to the Board of Public Works at City Hall

We have witnessed the SPARK LA program as a way for the public agencies to bring about the equity that we are needing in this country. Moving on, to the next, Lauren Skiver, is going to talk about transit innovation in environmental sustainability.

Today's Transit for Tomorrow's World

Lauren Skiver, General Manager of Sunline Transit Agency.

The Sunline Transit Agency's buses display the slogan, "Today's transit for tomorrow's world." According to Lauren Skiver, the general manager of Sunline Transit Agency, this is exactly what Sunline is providing. It is the leader in the development of a hydrogen fuel cell propulsion system, which is now being deployed across the world. "So, we're a small transit agency, but we are one of the most well-known across the world for our hydrogen program and our work in clean fuels," said Skiver. Sunline is a technology company that provides transit services. With approximately 353 employees, Sunline is the largest employer in the Coachella Valley. Skiver has worked at four different transit systems in the U.S., and the Coachella Valley has one of the best roadway networks. Sunline has recently launched a commuter van service in the valley. "Sunline's been trying to get free transportation to students for five years and didn't get any support on it, and so I

think there's a ton more things we want to do that take both regional and city support, including bus service for high school students," stated Skiver.

Sunline prides itself on being an evolving transit system. They do not want to do the same business they did 20 years ago. They do not plan on putting the same routes out

that the users do not ride. Sunline has three business units that sets them apart from other transit agencies. The first business unit is the Sunline Transit Agency, the second is the Sunlight Service Group, and the third is SunFuels. Sunline Service Group helps regulate taxi operators, and SunFuels provides the Coachella Valley with CNG and Hydrogen. The revenue from Sunline Service and SunFuels is used to support transit service provided by Sunline Transit. This extra revenue also helps Sunline be less dependent on the federal government when there are shutdowns.

Sunline has developed a hydrogen fuel cell propulsion system—an electric bus that uses the fuel cell as a range extender and charges the batteries. Currently, Sunline runs 16 fuel cell buses, and soon they will up that number to 25. In addition, Sunline has four electric buses. Sunline also makes their own hydrogen using steam reformation. Soon they will be running the largest


electrolyzer in the United States, with the goal of producing 900 kilograms using solar energy. An electrolyzer is a device that uses an anode and cathode to separate water into hydrogen and oxygen.

Sunline has a strong solar project on their campus. They are currently working on a project that will take them to about 60 percent solar, and with the electrolyzer, they will be able to stay off the grid. In the future, the goal is to generate 100 percent of their facilities and fueling program needs through solar. Sunline received a \$13 million grant from the State of California as part of the Innovative Clean Transit rule (ICT rule). This rule states that all heavy-duty fleets will have to

SunLine Facts

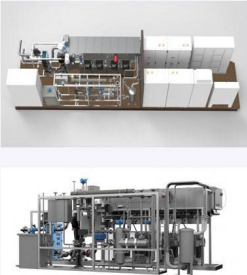
SunLine Operations

- Fourteen (14) local SunBus fixed routes, (1) express line, (1) Riverside Commuter Link, ADA Paratransit
- 123 Vehicles
- Operated 4.4 million revenue miles for 4.3 million passenger trips
- 353 Employees



Hydrogen Program

- Current method of H₂ production is steam reformation
- 16 Fuel Cell Buses in operation
- Installing a 900 kg Electrolyzer
- This will be the largest Electrolyzer in the United States



move to zero emissions by 2040. Sunline is working on their hydrogen propulsion and electric systems to help the industry convert the road truck fleet, drayage fleet, and any vehicles considered heavy-duty. “I mentioned we got a federal grant to build the Center of Excellence. The Center of Excellence will be a training facility for zero emission and clean fuels

technology, it won't just be transit. We're going to open it up to any private OEM (original equipment manufacturer), or any other disciplines that need a work area, so they're going to have a bay, garage, and classrooms,” said Skiver.


Sunline currently has an estimated \$2 million to build the facility adjacent to the transit agency. The goal is to have a location for students to learn on the job while also pursuing their degree. Sunline would like to see the Coachella Valley put itself on the map as an environmental hub. Skiver sees the Coachella Valley as a desirable location to build a school for students interested in environmental science, because the Valley already has many of the needed elements—windmill farms, Sunline Transit and the Salton Sea, and lots of sunshine.

When discussing transit users' needs, communication between the riders and Sunline needs to continue to improve upon future services. “We're now working on a redesign of our entire transit network. We have been working for a year to figure out what our customers need, what's being ridden, what's not being ridden, and what do we need to run to be more productive? We

know it is not 40-foot buses in the Coachella Valley. We don't have the density here to really make fixed route transit be as productive as it needs to be, so we are looking at different options,” said Skiver.

Solar Energy

- SunLine produces approximately 33 percent of the electrical energy power will come from solar panels
- The goal is to be 100 percent reliant on solar power



Three Distinct Business Units

- 1 SunLine Transit Agency**
 - SunLine is the consolidated transportation service agency for the Coachella Valley with a 1,120 square mile service area utilizing 74 fixed route buses
- 2 SunLine Services Group**
 - Regulates taxi service
- 3 SunFuels**
 - SunFuels (Thousand Palms) provides CNG & Hydrogen Fleet and public access 24/7
 - SunFuels (Indio) provides CNG Fleet and public access 24/7

As of right now, Sunline has 15 bus lines and they are working to condense that down to nine lines so that riders do not have to take multiple buses to reach their destinations. In addition, Sunline will be introducing a rideshare application. Similar to Uber or Lyft, the Sunline Rideshare app will have a triangle as an icon, where the public can pay electronically, and will be picked up and dropped off. The hope is that this app will help solve the first-mile/last-mile gap in the Coachella Valley. The app is currently being tested by students at the College of the Desert.

Network Redesign

- **Simplifying Network Routes & Improving Customer Experience**
 - Improve frequencies
 - 30 minutes or less
 - Standardize frequencies
 - Easy connections

- **Enhancing Mobility**
 - Introduce new options
 - On demand service zones
 - Become more flexible
 - Ride share or Dial-a-Ride

Now after speaking about sustainability, zero-emission tech, and innovation brought by Sunline Transit with Lauren Skiver. The next speaker ,David Pickeral, is going to talk about the potential of Mobility as a Service (MaaS).

Going from Mass to MAAS: The Personalization of Urban Mobility

David Embrey Pickeral, Strategic Advisor in Mobility Innovation and Smart Cities.

David Pickeral, a strategic advisor to mobility innovation and smart cities, discussed the concept of Mobility as a Service (MaaS). “The biggest thing to recognize is the idea of MaaS being a product, it is not,” said Pickeral. Most car manufacturers still think of Mobility as a Service as a product that can be packaged and sold. Mobility as a Service is not one particular service. It

Mobility-as-a-Service: Key Developments

REPLACEMENT OF “PRODUCT” MENTALITY

- Rather than individual “tickets” based on timetables rail trips will become part of a seamless journey planned door-to-door
- Car ownership will continue to decrease, creating potential opportunity for other service providers

JOURNEY-BASED PLANNING VS. “RELATIONSHIP”

- Rather than be daily / habitual users of a particular mode, travellers select optimal mode or combination for their specific needs (carrying packages, bringing children, bad weather, day out, drink at the pub, etc.
- On demand replaces fixed route service for many road-based services which will increase the need for real-time integration

2

could be a multitude of things, for example, transit, car-sharing, using your individual car with smart parking, or perhaps carpooling. MaaS is the idea of tying together individual modes seamlessly so that people can have convenient access. It is a combination of all modes. According to Pickeral, from a national and international level, the Coachella Valley is leading in development of innovative projects when it comes to transit, even in comparison to LA Metro.

When it comes to the last mile, MaaS makes sense by replacing fixed route services with the idea of on demand services, because most agencies are unable to maintain a certain headway (the average interval of time between buses traveling the same direction on the same route). In addition, Mobility as a Service provides more

flexibility for elderly and mobility-challenged people. They can be picked up rather than having to stand and wait at the bus stop. One of the key elements that comes with Mobility as a Service is the creation of a data-centric environment. “One of the biggest challenges is a lot of data collection is necessary for this to work, as there is an interplay,” said Pickeral. Both the TNC’s (transportation network company) and transit agencies collect the data and share it with the computer aided dispatch automated vehicle location (CADAVL) systems. Once the data is collected, it then needs to be synthesized. With data collection comes privacy concerns as most people do not want their information shared and to be tracked. Overall, transit agencies just want to know who is using the transit route or the highway system and they want to know the demographics of their riders.

Another key component of MaaS is integration and collaboration. Within the United States, there needs to be an increase of public-private partnerships. Different modes such as car and bike sharing, jitneys, tours, pedicabs, need to be integrated into the transit system. It is important to move beyond a fixed route municipal transit, and that includes what Mr. Pickeral described as the four bins: Many TNC’s are losing money. For example, Uber lost \$4.5 billion dollars in 2017. Because of this, many of the TNC’s are now looking to collaborate with the government. From a government perspective, it is important that they close the gap in understanding who is providing what services.

MaaS users can expect to pay one time from portal to portal for each trip. In addition, they will have routing contextualized in terms of current conditions and activities. “You’re now seeing car and vanpool services basically going out there and sticking scooters or shared cars on the street

Moving Beyond Fixed Route Municipal Transit	
<p>Transportation Network Companies—TNC Examples: Uber, Lyft, Grab Strengths: Strong customer base, provide door to door service Weaknesses: Low volume and much more expensive than transit, even with newer pooling options. Perceived as competing with mass transit and often poor government relationships Strategy: Beat on price and even more on cooperation with public sector</p>	<p>Direct Outsource Operators Examples: TransDev, First, MV Strengths: Lower OPEX for traditional fixed route transit services than government operations Weaknesses: Same low farebox return (~20%) using the same vehicles (40’ buses) and facilities as transit properties (i.e. no CAPEX reduction), increasing loss of ridership to TNCs as SEPTA recently reported Strategy: Focus on not cost sustainability especially with State DoTs / FTA in providing transit funding</p>
<p>Jitney / On-Demand Transit (ODT) Examples: Via (Daimler) Strengths: Low cost service Weaknesses: Successfully opposed by many in transit establishment wanting to preserve the 40’ standard. Bridj and Chariot each failed. Strategy: Focus on monetizing cost takeout, meeting expectation of lower funding from all sources and at all levels of government especially FTA, state DoTs and city councils holding the real “purse strings” for transit</p>	<p>Ad Hoc/ Sharing Enterprises Examples: Local car and vanpooling, carsharing (ReachNow, Car2Go, Maven), bike / scooter sharing (Jump, Lime, Bird, Skip) Strengths: Little or no cost to governments and usually inexpensive for riders Weaknesses: Sporadic service, inconsistent equipment, may be seasonal only Strategy: Top candidate for better organization under #MaaS</p>

corners. They're good because they don't cost a lot to governments, but they also tend to steal riders and revenue and again, you don't really have a chance to regulate what we the public should officially know about," said Pickeral. According to Pickeral, out of the 25 major U.S. cities, Seattle and Houston are the two where the transit systems are currently losing riders to TNC's.

Lastly, Pickeral addressed the needs of the disabled community when it comes to Mobility as a Service. Special needs customers are generally unimpressed with paratransit—specialized transportation service for people with disabilities. It is being offered as an addition to fixed-route bus and rail systems by public transit

agencies. However, paratransit comes with numerous constraints, such as requiring to call 24 hours in advance for their services, in addition to being extremely costly. One idea being explored around the country is to further develop microtransit and on demand services, and blend them with carrying special needs passengers. In sum, the disabled community is happy with the idea of having one service for everybody.

MaaS Users Can Expect

- To **plan** and **pay** only once, portal-to portal, for each trip
- To have pricing, route and time **information** up front to support effective **decisionmaking** for travel
- To have **special needs** accounted for (age, physical constraints, security concerns, carbon footprint neutral, etc.)
- To have routing **contextualized** in terms of current conditions and activities (weather, protests, sporting events, road closures, traffic)
- To receive content that is both **multimodal** and **mode agnostic** in favor of providing neutral choices
- To have these options available in **any community** and serving **all demographics**

Conclusion

The transportation sector as a whole is going through some major changes. It has been seen throughout the different dialogues of this CC that these changes will oppose challenges for the future, a demand that will need a supply, an adaptive supply, and making sure that while bringing up that supply, we are making sure that we give everyone the fair chance.

Some of the main takeaways that we can say from each of these dialogues are:

1. The transportation industry will need talent

Exactly as it was mentioned, youth at some point needs to replace the experienced workers who are retiring. These couple of years are especially important because the amount of people retiring is going to be far greater than the amount of new workforce coming in, so the gaps that are not filled by people are going to have to be filled by upcoming technologies.

2. People will have to adapt to the new technologies

People in the near future will have to adapt to these new technologies. Using machines like the “cobot” and working aside it will be a regular thing. New models of work will also be introduced, like the engineer consultants that will help city planners do their job, it’s going to be a different work landscape to be on, but at the same time it will require less physical labor and more technical skills.

3. Jobs will be automatized but new jobs will also arise

In SoCal there is programs that are already training children since middle school and attracting adolescents in college to the transportation industry, as they do so they are teaching them how to adapt to the new machines. This just leaves us the conclusion that as the machines take over repetitive jobs, the humans will play a role in more sophisticated type of jobs, so, yes jobs will be lost to machines, but new jobs will arise and will make a new landscape for the upcoming workforce. All we need to do is make sure that they are ready.

About Leonard Transportation Center

The Leonard Transportation Center (LTC) at California State University, San Bernardino opened in 2006 with a focus on regional transportation needs. The vision of Bill and Barbara Leonard was to create a center that focuses on the unique transportation opportunities and challenges the Inland Empire faces. Today, the LTC is working to expand its research and student engagement programs. Focal points include transportation management and governance issues, development of new technologies, and transnational studies. Their vision is to work collaboratively to seek solutions to assist residents, businesses, government and nonprofit agencies, and international partners to work together on improving sustainability and quality of life in the Inland Empire. For more information, visit www.csusb.edu/ltc

About APTA

The American Public Transportation Association (APTA) is a nonprofit international association of more than 1,500 public and private sector member organizations. Benefits to our members include advocacy for federal funding and policies, research, technical expertise and consulting services, workforce development programs, educational conferences and seminars, and 135 subject-matter working committees. For more information, visit <https://www.apta.com/>

About HNTB

HNTB Corporation is an employee-owned infrastructure solutions firm serving public and private owners and contractors. HNTB's work in California dates back to its founding in 1914. Today, HNTB continues to grow in size and service offerings to clients in California from seven office locations, currently employing more than 350 full-time professionals. With more than a century of service, HNTB understands the life cycle of infrastructure and addresses clients' most complex technical, financial and operational challenges. Professionals nationwide deliver a full range of infrastructure-related services, including award-winning planning, design, program management and construction management. For more information, visit www.hntb.com

About COE

The Centers of Excellence for Labor Market Research are part of the Workforce and Economic Development Division. As grant-funded technical assistance providers, the nine Centers are located strategically across the state to study California's regional economies. Our work supports the community colleges by providing customized data on high growth, emerging, and economically-critical industries and occupations. For more information, visit <https://coeccc.net/>



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