VERRA MOBILITY™

URBAN MOBILITY TECHNOLOGY SURVEY 2024

City technology leaders weigh in on how they are navigating revolutionary transportation technology trends, such as autonomous vehicles, AI, electric vehicles, and vehicle connectivity, while addressing road safety challenges for their communities.

OVERVIEW

The ways in which we get from point A to point B today are undergoing the most profound transformation since the dawn of the automobile more than a century ago.

Driverless taxis are picking up passengers in multiple U.S. cities, electric vehicles now make up a sizeable portion of new cars sold, and sensors and software play a vital role in operating many new vehicles manufactured today. Within cities, people have more mobility options than ever before – from e-bikes and e-scooters to ride-sharing apps.

While all of these new technologies are rapidly progressing, roads are more dangerous than they have been in nearly two decades. More than 40,000 people have lost their lives on U.S. roadways each year.

To understand the impacts of these technological shifts and the promise they hold, Verra Mobility queried the people responsible for addressing transportation challenges and planning for the future of mobility.

The Verra Mobility study, conducted by Wakefield Research, surveyed 100 municipal CIOs and Deputy CIOs from cities across the United States on how they are navigating top mobility trends and technology disruptions such as autonomous, connected, electric and shared (ACES) vehicles. The findings are outlined in this report.

"While survey respondents indicated the urgency in preparing for AVs, the reality is there will be human-driven vehicles on our roads for decades to come," said David Roberts, president and CEO, Verra Mobility ***"And even as autonomous vehicles become a more common fixture on our roads, we'll discover new safety challenges as human drivers interact with advanced machines. Our survey findings emphasize the need for city leaders, automotive manufacturers, technology providers and safety advocates to come together to find ways to make transportation easier, more efficient and much safer than it is today."***

AUTONOMOUS VEHICLES

Residents of cities like Phoenix and San Francisco have already seen driverless vehicles on their roads. While the AV revolution hasn't taken off the way many predicted in the late 2010s, automotive and technology companies have made significant strides in making AVs a reality.

- Nearly all municipalities **(93%)** anticipate they'll need to be ready for AVs on their streets within five years.
- And more than a third **(37%)** said they need to be prepared to accommodate driverless vehicles in the next two years.

ARTIFICIAL INTELLIGENCE AND DATA

Perhaps no other emerging technology holds more promise than artificial intelligence (AI).

More than half **(52%)** of survey respondents put identifying safety needs and high fatality corridors in their top three options for using AI to monitor and enforce traffic, assuming the technology was commercially available.

Efficiency is also on the wish list. Tools to re-route and monitor traffic is the most common number one AI-driven solution of interest, and **45%** of respondents include it in their top three list. In addition, **41%** want AI to predict future traffic patterns.

Which AI-driven options for traffic monitoring and enforcement would you most want for your jurisdiction?

Monitoring and re-routing traffic in real-time	**19%**
Enforcing safety for vulnerable areas (e.g., in school or work zones)	**17%**
Identifying top safety needs/high fatality corridors	**15%**
Reducing transportation-related carbon emissions	**14%**
Predicting future traffic patterns	**12%**
Managing parking more efficiently	**12%**
Setting efficient mass transit routes/schedules	**11%**

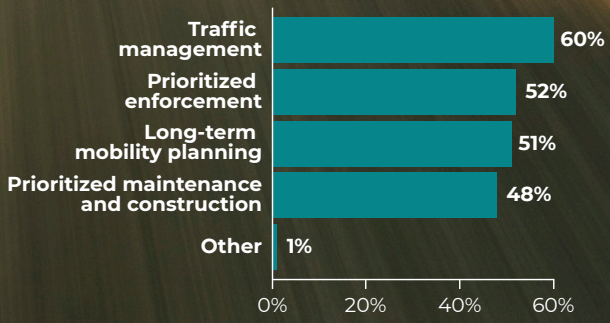
AI requires large amounts of quality data though, and municipalities are struggling to effectively harness the data available to them. When asked about the greatest challenge to their jurisdiction with regards to mobility-related data:

- **37%** cite analysis as the greatest challenge.
- **34%** say turning data into actions as their top challenge.
- **29%** are concerned with the ability to actually capture the data.

Speed and ability are the big shortcomings:

- **39%** have found that analysis takes too long to be useful.
- **31%** report that their data is not available to them in real-time.

When asked,
"In what areas, if any, are you currently using data for planning or implementing initiatives?"
respondents said:



SAFETY

After years of steadily improving road fatalities rates, the U.S. saw a significant and tragic spike in deaths after the COVID-19 pandemic. While there have been incremented improvements – the number of traffic deaths dropped 3.6% in 2023 – nearly 41,000 people were killed on U.S. roadways, according to National Highway Traffic Safety Administration estimates.

In the survey, **more than half** of municipal tech leaders **(55%)** have reducing road safety incidents as a top 3 priority for tech-based solutions.

Fatalities tell just one part of the story, but there are many factors contributing to road safety issues.

Technology can provide cities, municipalities and drivers with significant safety improvements. This includes automated photo enforcement solutions, intelligent transportation systems, traffic management systems and advanced telematics.

We identified the top 5 measurements municipal CIOs and deputy CIOs look at to determine the effectiveness of traffic and road safety efforts.

Number of speeding tickets	**59%**
Fewer crashes	**48%**
Lower average monitored speed	**48%**
Fewer traffic-related fatalities	**46%**
Fewer speeding tickets	**45%**

When asked to rank safety focus areas, more than half of municipal CIOs and deputy CIOs **(53%)** said bike lanes were a problem area where their jurisdiction could **most benefit** from tech-based safety solutions. This was followed closely by school zones **(50%)** and temporary traffic obstructions, such as delivery drivers **(49%)**.

One particular technology that has been demonstrated to be successful at improving safety is the use of camera-based technology. This automated photo enforcement technology is deployed in cities across the country, with New York City being the most prominent champion as part of its Vision Zero efforts.

When asked where they would want to deploy these automated safety solutions to enforce road rules, survey respondents ranked the following as their top choices:

#1 Bike lanes
#2 Speeding
#3 Intersections or crosswalks

When asked to rank the top three mobility-related concerns that are most important for addressing using technology-based solutions in the next few years, respondents said:

Reducing road safety incidents	**55%**
Addressing traffic congestion	**54%**
Increasing the use of mass transit	**50%**
Enhancing bike and pedestrian safety	**49%**
Supporting EV adoption	**46%**
Reducing environmental impacts of emissions	**46%**

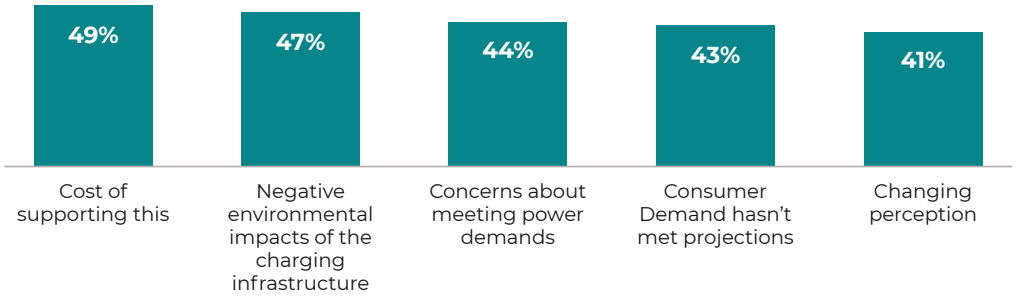
ELECTRIC VEHICLES

While the EV momentum seems to have slowed in 2024, consumers are investing in EVs and this will have a direct impact on the cities in which they live or visit. EV sales grew by 81% in 2022, according to Kelley Blue Book and Cox Automotive, and 1.2 million electric vehicles were put into service in the U.S. in 2023.

Heavy investments in EV infrastructure, both monetarily and environmentally, may not have the reception many expected, making the costly upgrades even less urgent to their cities and towns. **For more than 2 in 5 municipal tech leaders (43%), their jurisdiction has deprioritized support for EV infrastructure because consumer demand for the technology hasn't kept up with predictions.**

Charging stations have proved to be a particular challenge for municipalities. More than a third of tech leaders **(38%)** note their jurisdiction deprioritized EV infrastructure because it has struggled to provide the facilities. Even if charging stations could be placed with minimal concerns, **49%** worry supporting them through the power grid would ultimately be a challenge.

Why Municipalities Have Deprioritized EV Infrastructure Over the Past Year*



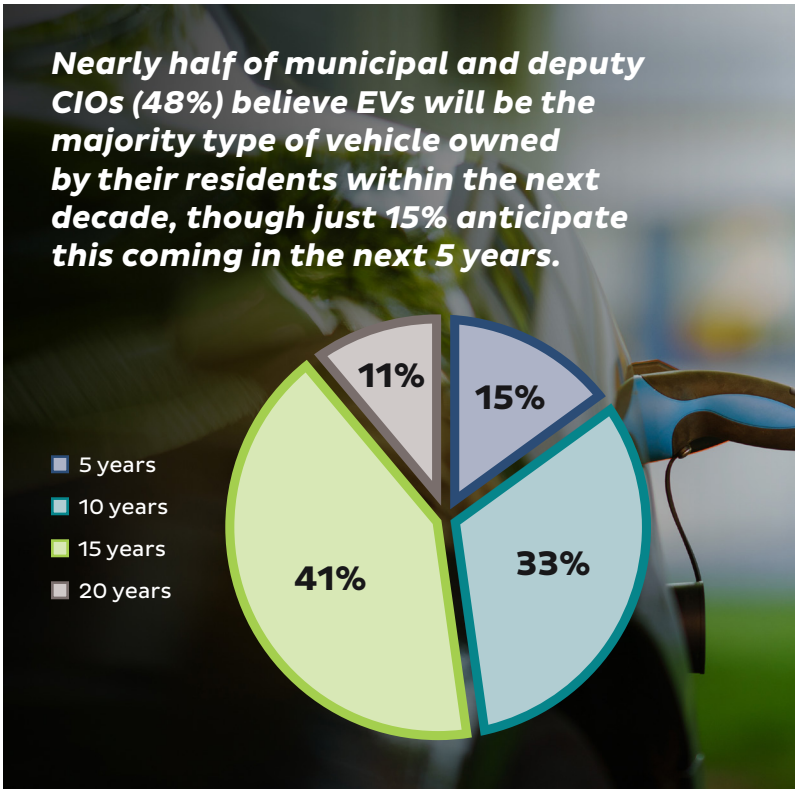
38% haven't figured out how to provide charging facilities.

**Asked among 100 municipal CIOs and deputy CIOs who are familiar with or work on mobility or transportation efforts for their jurisdiction.*

Municipalities are not rushing to meet EV demands for their roads, according to the survey. Just 9% of tech leaders consider EV adoption their biggest tech-based mobility concern for the next few years.

When asked to rank what challenges do you anticipate facing in accommodating your jurisdiction's need for greater EV infrastructure, survey respondents were evenly split:

Placing charging stations	**50%**
Supporting the maintenance of charging stations	**50%**
Monitoring and managing charging stations	**49%**
Supporting these through our power grid	**49%**



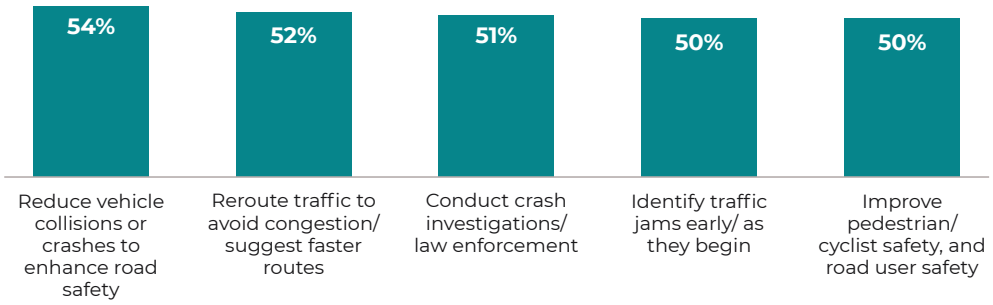
CONNECTED VEHICLES

Of all the major disruptive ACES trends, vehicle connectivity is perhaps the most unknown. While most cars manufactured in recent years offer a vast amount of sensors and connected services, a significant portion of car owners aren't aware of these features or their benefits.

City tech leaders are interested in seeing how vehicle-to-vehicle (V2V) or vehicle-to-everything (V2X) capabilities can improve their roadways.

- **54%** said they want to get connected vehicle tech deployed to reduce collision and crashes.
- In addition, **50%** are eager to deploy it to improve pedestrian and cyclist safety.

What V2X Options Municipal Tech Leaders Most Want in their Jurisdiction*



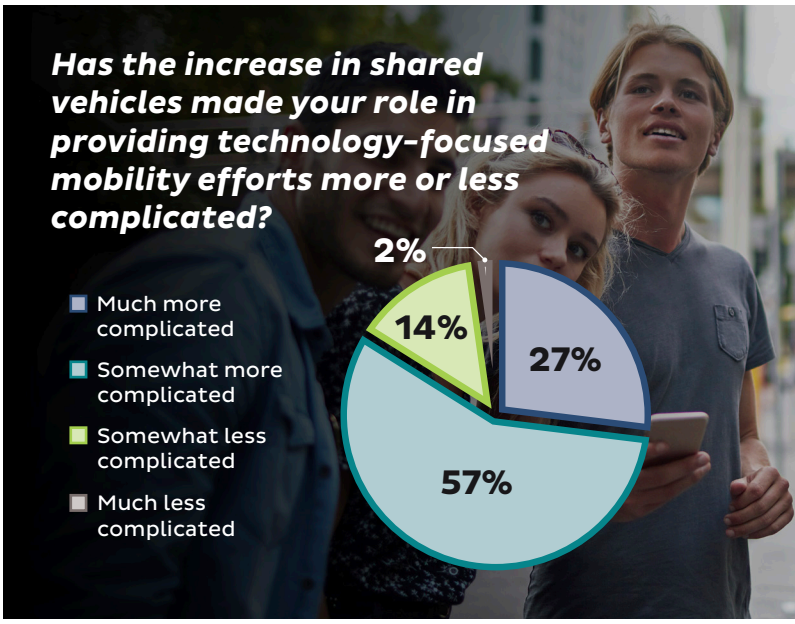
76% want safety-focused V2X options.

**Asked among 100 municipal CIOs and deputy CIOs who are familiar with or work on mobility or transportation efforts for their jurisdiction.*

While leaders see plenty of uses for connected vehicle tech, there's a great deal of infrastructure work needed to make this happen. A strong majority **(81%)** anticipate some systems will need to be updated before they're ready to incorporate connected vehicles technology into their mobility initiatives. For nearly a fifth **(18%)**, the preparations are closer to a full overhaul as most of their systems will need an update.

SHARED MOBILITY

Shared vehicles have been a boon to commuters and city residents, but they have also complicated some elements of city management. The influx of e-bikes, scooters, and other shared vehicles has complicated technology-focused mobility efforts for 84% of municipalities.



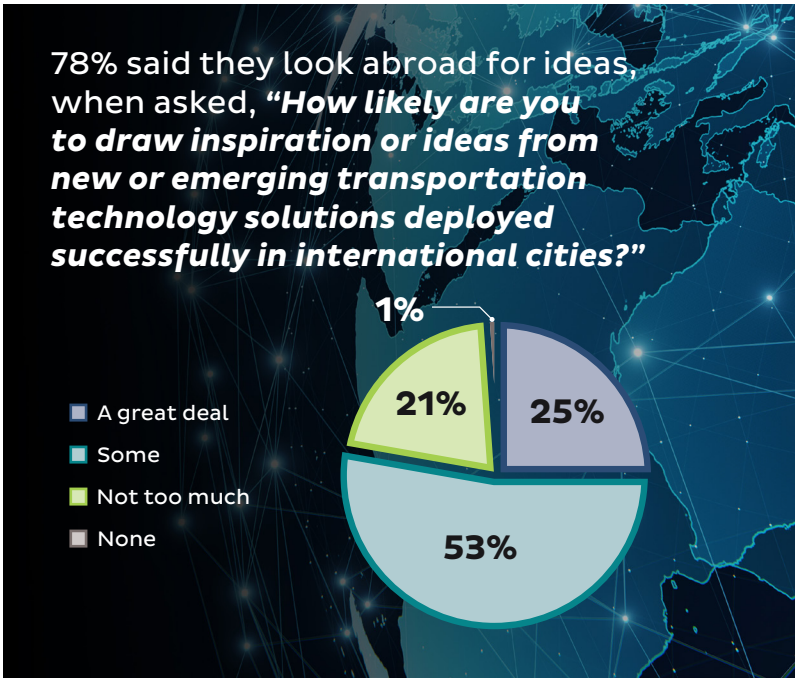
INSPIRATION FROM ABROAD

Many cities in Europe, Asia and Australia have made significant safety and mobility improvements using advanced technology as well as strict standards.

While the fatality rate on U.S. roads has worsened in recent years, Europe achieved a 36% decrease in deaths since 2010 with its efforts to slow speeds and improve safety despite a 21% increase in the number of vehicles on its roadways.

When asked specifically about safety: "How likely are you to draw inspiration or ideas from new or emerging technology-based safety solutions that have been successful in international cities to help solve the road safety challenges your jurisdiction is facing?"

- More than **4 in 5 municipal tech leaders (83%)** are likely to draw inspiration from international cities.
- This includes **26%** of respondents who would draw a great deal of inspiration from abroad.



OBSERVATIONS

"This study confirms that cities are balancing many challenges during this exciting transition period in the transportation industry and technology is at the heart of the solution," said David Roberts, President and CEO, Verra Mobility. ***"Electric, autonomous, and connected vehicles are becoming a reality and while AI shows a lot of promise, our survey revealed cities are still struggling to collect or analyze the data they need to make informed mobility decisions. City technology leaders need to harness these trends at a pivotal time when fatalities on U.S. roads are at a nearly 16-year high."***

METHODOLOGY

The Verra Mobility Survey was conducted by Wakefield Research among 100 Municipal CIOs and Deputy CIOs who are familiar with or work on mobility or transportation related topics, between May 1 and May 8, 2024, using an email invitation and an online survey.

Results of any sample are subject to sampling variation. The magnitude of the variation is measurable and is affected by the number of interviews and the level of the percentages expressing the results. For the interviews conducted in this particular study, the chances are 95 in 100 that a survey result does not vary, plus or minus, by more than 9.8 percentage points from the result that would be obtained if interviews had been conducted with all persons in the universe represented by the sample.

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