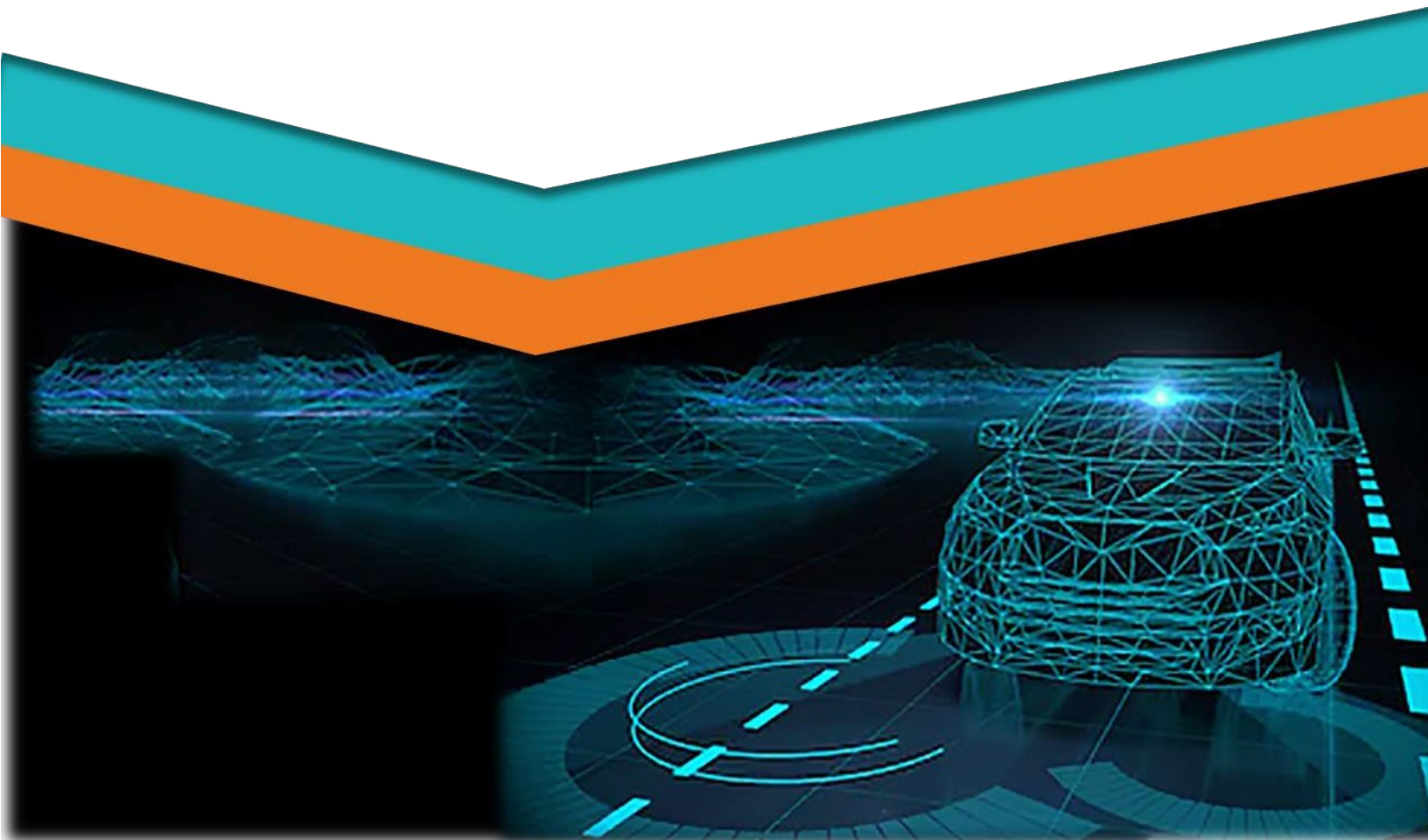


**Driving the Future:**  
**Autonomous Vehicles Strategic Framework**  
*Vision and Guiding Principles*

**State of California**  
**August 2022**



The California Vehicle Code defines an “autonomous vehicle” as any vehicle equipped with autonomous technology that has been integrated into the vehicle. “Autonomous technology” is technology that has the capability to drive a vehicle without the active physical control or monitoring by a human driver. These definitions apply to [levels 3, 4, and 5 technology, as defined](#) by SAE International.

## INTRODUCTION

Autonomous vehicles (AVs) have the potential to transform our transportation system and communities by solving individual mobility needs, improving roadway safety, and moving goods throughout the state sustainably and efficiently. The deployment of autonomous vehicles also could transform manufacturing, maintenance, and service business models to create new jobs and industries for the California workforce.

As the fifth-largest economy in the world, California continues to be at the center of many innovations in business and technology. With a focus on maintaining its role as a technological leader, the state can help encourage the development of AV technology and related industries. These efforts to foster innovation must also be balanced with careful attention to the potential impacts on state goals.

In preparing for this emerging technology, California has researched and analyzed possible applications and implications of AVs, created testing and deployment regulations, and developed the [“Automated Vehicle Principles for Healthy and Sustainable Communities.”](#)

Building on those previous efforts, California formed an interagency workgroup to create a statewide vision for how AVs could be best integrated into our daily lives and the transportation ecosystem. These workgroup conversations:

- Considered the direct and indirect impacts of the development and deployment of AVs on our communities and economy.
- Focused on underlying policy objectives to thoughtfully maximize the promised benefits of AVs and mitigate the potential negative effects on the transportation system, jobs, housing, climate, and public health.
- Recognized that AVs are one potential tool – among other transportation developments – to help achieve broader goals related to safety, mobility, job quality, equity, health, environment, land use, and quality of life.

Based on these conversations, the interagency workgroup developed the current AV strategic framework concept – a two-part product that will set overarching goals and strategies to achieve the long-term vision. The framework is intended to be considered as a whole to guide the development of actions by state government entities:

- **Vision and Guiding Principles:** A high-level, aspirational vision of the future where AVs would help the state reach these principles.
- **Action Item List:** A list of near- and mid-term activities to achieve the Vision. These actions will be related to one or more Guiding Principle and will guide AV development and deployment to either help realize the technology’s potential benefits or apply guardrails to mitigate potential negative impacts.

While focused on AVs, this strategic framework is intended to align with and build on other state goals and plans, including: increasing safety, reducing greenhouse gas emissions in transportation, readying the workforce for high-quality jobs of the future, and enhancing mobility and access for all Californians.

#### *Purpose of the Vision and Guiding Principles*

Certain concepts such as mobility, sustainability, equity, and inclusivity and equitable access run as a common thread throughout the overarching principles, which:

- Apply broadly to all types of existing and future AVs, including on-road, off-road, light-duty, heavy-duty, aero, and marine.
- Contemplate a range of deployment models, including individual ownership, fleet operations, passenger service and integration with public transit, and goods movement including ports, agriculture, and last-mile delivery services.
- Recognize that AVs are an emerging technology that may be deployed incrementally, with features, capabilities, and operations evolving over time.
- Focus on the SAE International levels 3, 4, and 5 of autonomy (where the autonomous technology is responsible for the operation of the vehicle) and does not include Advanced Driver Assistance Systems currently available to consumers.

### *Purpose of the Actions*

While many entities are doing work that has the underlying effect of advancing the Vision and Guiding Principles, the Action Item List will focus on targeted AV-related activities that might be wholly or partially controlled by the State and can be completed within five years.

Partnership with other entities, as well as ongoing collaboration and conversation with stakeholders, will also be important to the development of actions.

The actions will complement other state efforts, such as:

- [Future of Work Commission Report](#)
- [California Wellness Plan](#)
- [ZEV Market Development Strategy](#)
- [Climate Action Plan for Transportation Infrastructure](#)
- [Master Plan for Aging](#)

While not specifically focused on AVs, these plans and their associated activities will also have the effect of supporting the Guiding Principles.

Once initially established, the Action Item List will be periodically reviewed and updated to account for completed activities, technological innovations, and new opportunities or challenges that might arise.

## VISION



The State of California will leverage innovation to safely deploy and maximize the potential public benefits of zero-emission autonomous vehicles for mobility, safety, job quality, equity, health, environment, land use, and quality of life.

## GUIDING PRINCIPLES



**ENVIRONMENT:** Deploy zero-emission AVs in a manner that minimizes emissions and vehicle miles traveled, promotes smart growth, and maintains natural and working lands.

The transportation sector accounts for roughly half of the greenhouse gas (GHG) emissions in California, and air quality continues to be a challenge in large portions of the state. Reducing toxic tail-pipe emissions and overall vehicle miles traveled (VMT) are both essential to meeting our climate and health-based air quality mandates.

Creating policies that encourage the deployment of zero-emission autonomous vehicles –as part of shared, right-sized fleets that encourage pooling and complement but do not replace existing transit systems – as well as expanding the related charging and refueling infrastructure network – is important to reduce VMT and encourage cleaner vehicles. It will be critical to encourage broader land use strategies that support healthy natural and working lands, and efficient land use and housing that includes housing near transit hubs, as well as addressing the unique transportation needs of rural communities in a manner that improves access to destinations and goods without inducing sprawl.



**EQUITY:** Improve affordable and convenient access to destinations, goods, and services through AV deployment, particularly to reduce or eliminate systemic inequities for all communities throughout California.

Historically, transportation improvements have disproportionately benefitted certain segments of the population. Far too often, past transportation decisions literally erected barriers, divided communities, and amplified racial and socioeconomic inequalities, particularly in our Black and Brown neighborhoods and tribal communities, as well as for people with disabilities and older adults.

As California prepares for the greater deployment of AVs, it must strive to create policies and plans that maximize the ability of the transportation system as a whole to provide safe and convenient access to opportunities, prioritize and protect Californians facing the greatest inequities including basic access to transportation services, engage communities during the planning and decision-making process, and minimize environmental impact – while also reducing burdens related to transportation access and cost for disadvantaged and/or low-income populations, older adults, people with disabilities, tribal communities, and people of color.



**HIGH-QUALITY JOBS:** Require jobs created in the transition to AVs be high-quality jobs that support California workers with good wages and benefits and improve the competitiveness of California's employers.

AVs have the potential to bring about many personal and societal benefits, including the expansion or creation of high-quality jobs in zero-emission AV-related industries and services. High-quality jobs are those that pay family-sustaining wages, offer comprehensive employer-provided benefits, and value worker voice and wisdom, as well as providing job security, fair scheduling, a safe and healthy work environment, and pathways for career advancement. In addition, AVs may be deployed gradually, which could lead to the incremental modification or elimination of existing jobs and potentially displace a portion of California's workforce. The state should proactively examine ways to encourage inclusive hiring practices and ensure displaced workers are supported in their transition, either within or adjacent to the AV sector, through training and creating a safety net for those who are delayed in finding new opportunities.



**INCLUSIVITY AND EQUITABLE ACCESS: Increase AVs' benefits for all road users in California through universal design and routes.**

AVs could transform personal mobility and provide expanded access to transportation for individuals who cannot drive or face barriers to driving. Enabling the widest range of potential users, including older adults and people with disabilities, to benefit from this technology will require an inclusive approach to AV planning and design. These conversations should extend beyond the design of the vehicle itself to address access to physical and digital infrastructure during a passenger's "door-to-door" trip. Additionally, the state should support strategies to address potential barriers to accessing AVs and services, including language access, technology, or payment methods.



**PARTNERSHIPS: Integrate AVs into California's economy through active collaboration, joint investment, and shared responsibility among all stakeholders in the public and private sectors.**

Successful economic integration of AVs will require collaboration between innovators, investors, federal, state, county, and city governments, tribal governments, industry leaders, labor and community stakeholders, and other interested groups. Continued conversations among partners, as well as robust, meaningful, and authentic community engagement surrounding the technological potential, societal needs, and deployment decisions of AVs, will be imperative to making a positive impact on all communities.



**PUBLIC HEALTH AND LIVABILITY: Ensure AVs operate as an integrated part of a multimodal system that prioritizes people and their health over vehicles to improve public health.**

Healthy communities integrate active and multimodal transportation options to enhance livability, public health, and safety. AVs could become a part of an array of transportation mode options that lead to increased mobility. However, they also could induce longer trips that promote sprawl and sedentary behavior; could replace walking, cycling, and transit trips; and could exacerbate social inequities. California must develop policies that ensure AVs and supporting infrastructure further the comfort, physical activity, and safety of those walking, biking, and riding transit.



**SAFETY: Increase the safety of all road users and the underlying transportation system through AV operation, design, and infrastructure investments.**

California is deploying strategies that enhance roadway safety and move the state toward an overall goal of eliminating traffic fatalities and serious injuries. In support of this goal, it is essential that AVs operate in a manner that makes roads safer (and feel safer) for other motorists, AV passengers, pedestrians, cyclists, and other vulnerable road users.

The state will explore infrastructure investments that enhance the safety and usability of, and access to, the current transportation system and lay the groundwork for future AV operations. This planning should build on existing work related to cybersecurity by the federal government as well as standards organizations, and also consider the potential for AVs to assist in emergency and disaster response and recovery activities.

California will also consider the implications for insurance, as vehicles are operated by the autonomous system “driver” as well as a human driver. This insurance should be available and accessible to all to help protect all lives and property from financial risk.

Consumer and public education on the appropriate uses, capabilities, and limitations of autonomous technology will also play a key role in encouraging the safe integration of AVs. Both educational and enforcement efforts will have to be re-evaluated as AVs and traditional vehicles initially share the roads for years to come.



**SHARED ECONOMIC BENEFIT: Create an inclusive economic future that maximizes opportunities and benefits and limits negative impacts for both California’s workers and the state economy due to the transition and growth of the AV industry.**

California should build its AV future on the high road. That means that any decision regarding the integration of AVs into our neighborhoods and economy should aim to simultaneously benefit California’s workers, businesses, and communities.



## CONCLUSION



This strategic framework represents an important step in California's efforts to best position our state and residents to realize the potential benefits of this emerging technology. AVs hold the promise to be an important part of our mobility future, but they are just one part of a broader set of solutions to increase road safety, promote equity and economic opportunity, and meet public health and environmental objectives.

## AV STRATEGIC FRAMEWORK GLOSSARY

*Please reference the following definitions for how these terms are used in the context of this document.*

**Advanced Driver-Assistance Systems (ADAS):** Vehicle technology and systems that assist human drivers with driving and parking tasks. ADAS requires the continuous monitoring of a human driver, and the driver must perform the rest of the driving task. Examples of ADAS features currently in vehicles include adaptive cruise control, automatic emergency braking, driver alerts, lane centering, and road departure warnings, among others.

**Autonomous Technology:** Technology that has the capability to drive a vehicle without the active physical control or monitoring by a human driver.

**Autonomous Vehicle:** Any vehicle equipped with autonomous technology that has been integrated into that vehicle.\*

*\* In this document, “autonomous vehicle” applies to levels 3, 4, and 5 as defined by the SAE International.*

**High-Quality Jobs:** Jobs that pay family-sustaining wages, offer comprehensive employer-provided benefits, and value worker voice and wisdom, as well as providing job security, fair scheduling, a safe and healthy work environment, and pathways for career advancement.

**Inclusivity and Equitable Access:** Providing equal access to the transportation system for people who might otherwise be excluded or marginalized, such as people with disabilities, older Californians, the unbanked and underbanked, those for whom English is a second language, and others.

**Mobility:** The ability for people and goods to move freely throughout society to reach desired destinations.

**Multimodal trips:** Trips where a person uses a combination of transportation modes, such as biking, walking, driving, or taking public transit, to get to their destination.

**Shared Economic Benefit:** The concept that investments in the workforce can simultaneously benefit both workers and companies and vice versa.