HORIZON

Autonomous Vehicles Perspective Paper

Strategies for the Bay Area

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1) Welcome (5:30)
2) Introduction to Horizon (5:35)
3) Presentation – (5:40)
4) Panel Introduction & Remarks – (6:00)
5) Audience Q&A – (6:25)
6) Next Steps – (6:55)

Horizon is exploring how **economic, environmental, technological, and political uncertainties** may create new challenges – or exacerbate existing ones – for the Bay Area over the coming decades.

For more information, go to:

mtc.ca.gov/horizon

Source: https://www.flickr.com/photos/kitkit201/33692723984/

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Futures Planning

Perspective Papers

Project Performance

PLAN BAY AREA 2050

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Overview

- **Autonomous Vehicles 101**
- **Implications and Strategies**
  - Horizon Guiding Principles
  - Opportunities and Risks
  - “Big Ideas” and Applications for the Bay Area

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Autonomous Vehicles 101

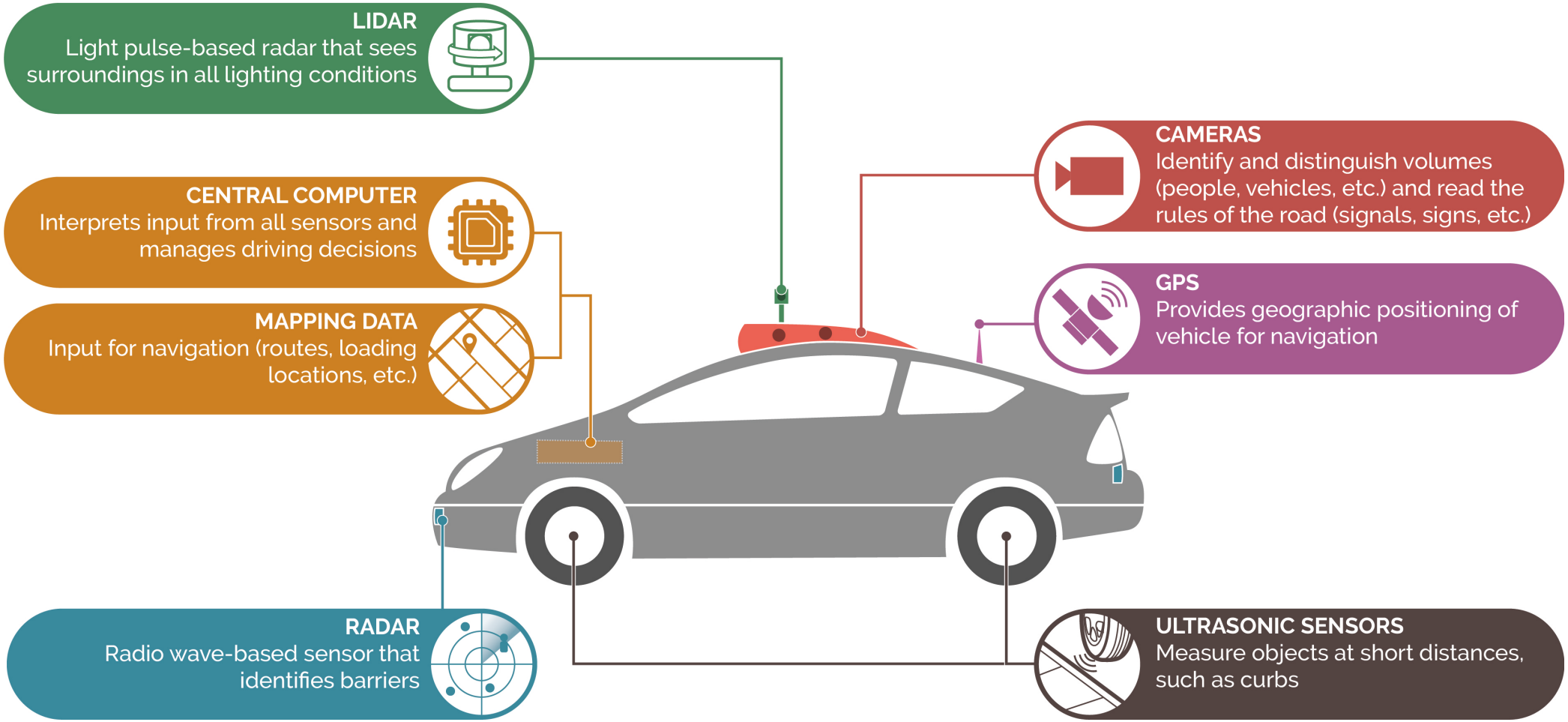
"Automated" versus "Connected"

AUTOMATED The increasing ability to drive without human assistance.

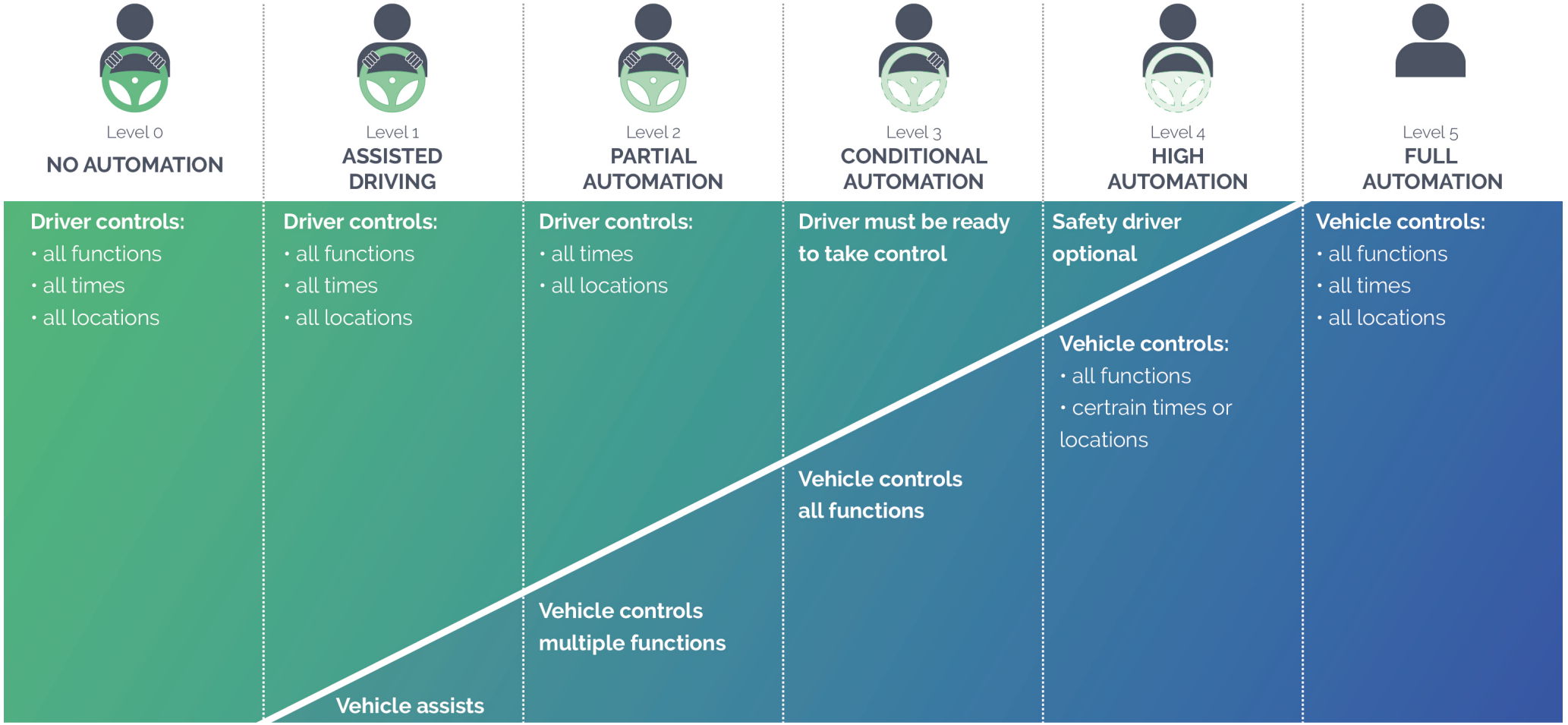
CONNECTED The increasing ability to share mobility or safety information among other vehicles, infrastructure, systems, etc.

None of the automation technologies require a vehicle to be connected.

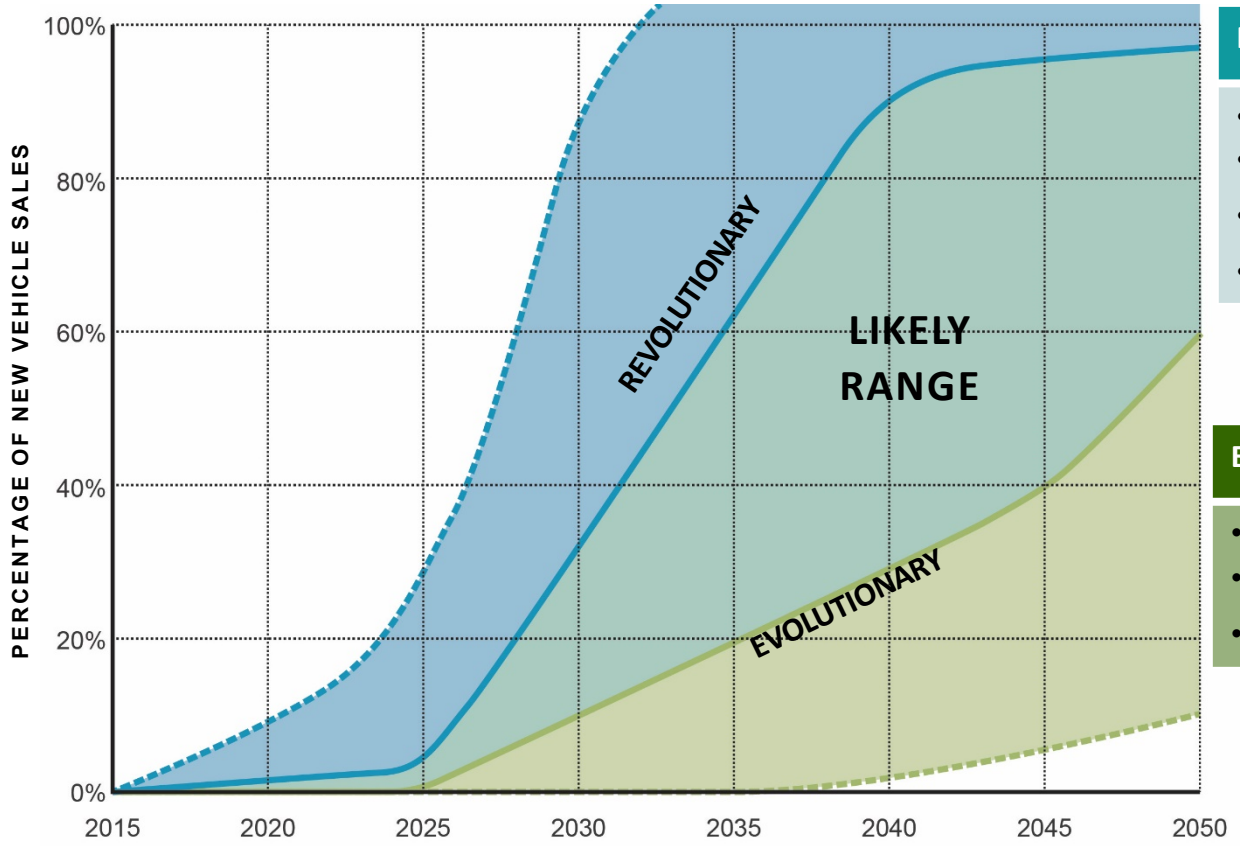
Autonomous Vehicles Components



Levels of Automation



When do AVs become commonplace?



Fully Autonomous Vehicle (L4/5) uptake predictions based on high disruption scenarios, indicates possible percentage of new car sales 2016 to 2050.

Revolutionary

- Technology breakthroughs
- Regulatory resolutions
- Shared model, at much lower cost than ownership
- Rapid adoption

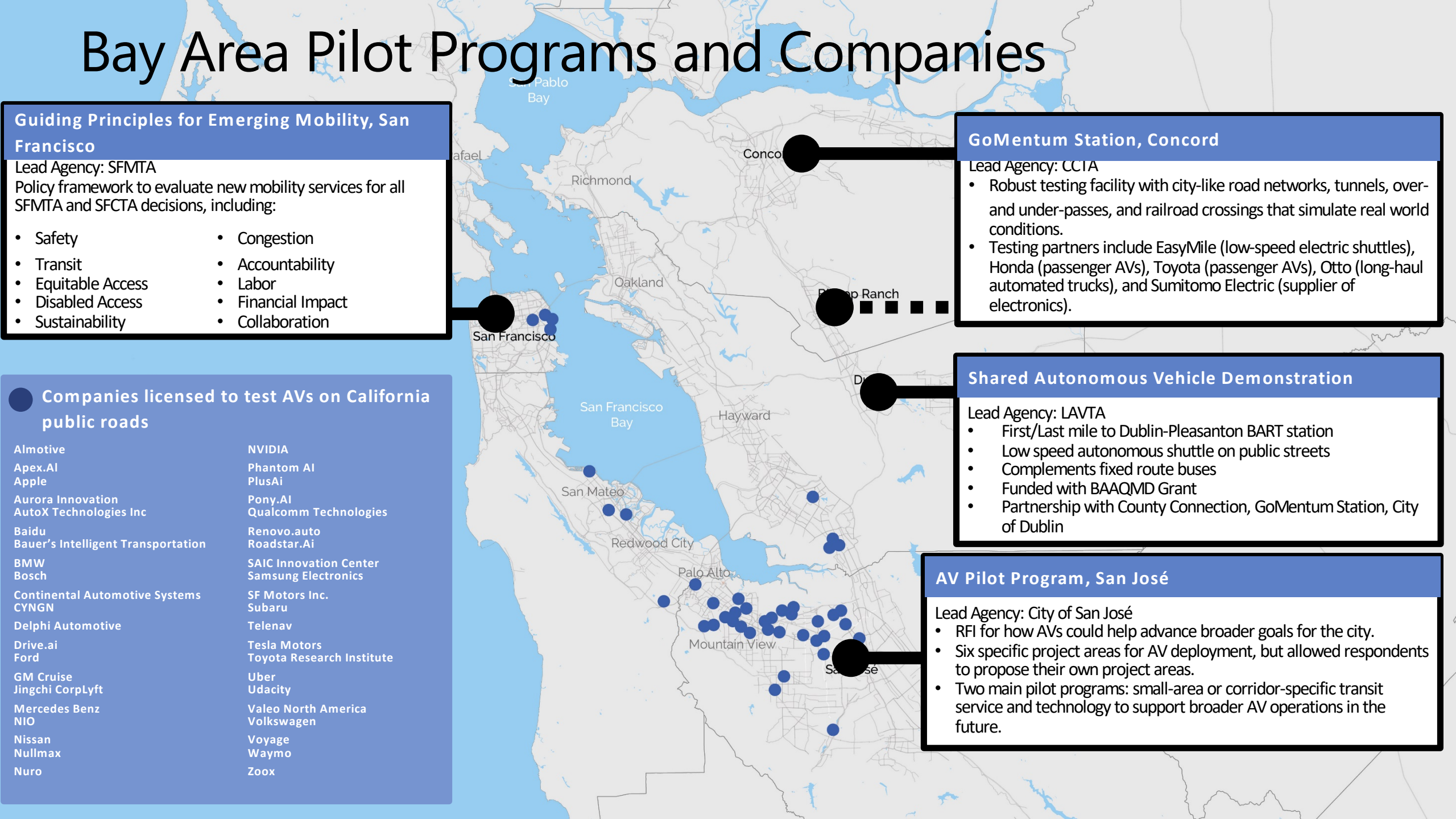
Evolutionary

- Slower technology development and rollout
- Owned AV model with cost premium
- Slower adoption

The future is highly uncertain

TIMING	**3 to 13** years until L5 AVs available for purchase
SAFETY	**+40% to +90%** increase in safety
CAPACITY	**0% to +45%** increase in roadway capacity
DEMAND	**+5% to +40%** increase in VMT
ENERGY/EMISSIONS	**-50% to + 100%** change in GHGs

Bay Area Pilot Programs and Companies



Guiding Principles for Emerging Mobility, San Francisco

Lead Agency: SFMTA

Policy framework to evaluate new mobility services for all SFMTA and SFCTA decisions, including:

- Safety
- Transit
- Equitable Access
- Disabled Access
- Sustainability
- Congestion
- Accountability
- Labor
- Financial Impact
- Collaboration

Companies licensed to test AVs on California public roads

Almotive
Apex.AI
Apple
Aurora Innovation
AutoX Technologies Inc
Baidu
Bauer's Intelligent Transportation
BMW
Bosch
Continental Automotive Systems
CYNGN
Delphi Automotive
Drive.ai
Ford
GM Cruise
Jingchi CorpLyft
Mercedes Benz
NIO
Nissan
Nullmax
Nuro
NVIDIA
Phantom AI
PlusAi
Pony.AI
Qualcomm Technologies
Renovo.auto
Roadstar.Ai
SAIC Innovation Center
Samsung Electronics
SF Motors Inc.
Subaru
Telenav
Tesla Motors
Toyota Research Institute
Uber
Udacity
Valeo North America
Volkswagen
Voyage
Waymo
Zoox

GoMentum Station, Concord

Lead Agency: CCTA

- Robust testing facility with city-like road networks, tunnels, over- and under-passes, and railroad crossings that simulate real world conditions.
- Testing partners include EasyMile (low-speed electric shuttles), Honda (passenger AVs), Toyota (passenger AVs), Otto (long-haul automated trucks), and Sumitomo Electric (supplier of electronics).

Shared Autonomous Vehicle Demonstration

Lead Agency: LAVTA

- First/Last mile to Dublin-Pleasanton BART station
- Low speed autonomous shuttle on public streets
- Complements fixed route buses
- Funded with BAAQMD Grant
- Partnership with County Connection, GoMentum Station, City of Dublin

AV Pilot Program, San José

Lead Agency: City of San José

- RFI for how AVs could help advance broader goals for the city.
- Six specific project areas for AV deployment, but allowed respondents to propose their own project areas.
- Two main pilot programs: small-area or corridor-specific transit service and technology to support broader AV operations in the future.

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Implications and Strategies

The San Francisco Bay Area Aspires To Be:

AFFORDABLE

All Bay Area residents and workers have sufficient housing options they can afford – households are economically secure.

CONNECTED

An expanded, well-functioning transportation system connects the Bay Area – fast, frequent and efficient intercity trips are complemented by a suite of local transportation options, connecting communities and creating a cohesive region.

DIVERSE

The Bay Area is an inclusive region where people from all backgrounds, abilities, and ages can remain in place – with access to the region's assets and resources.

HEALTHY

The region's natural resources, open space, clean water and clean air are conserved – the region actively reduces its environmental footprint and protects residents from environmental impacts.

VIBRANT

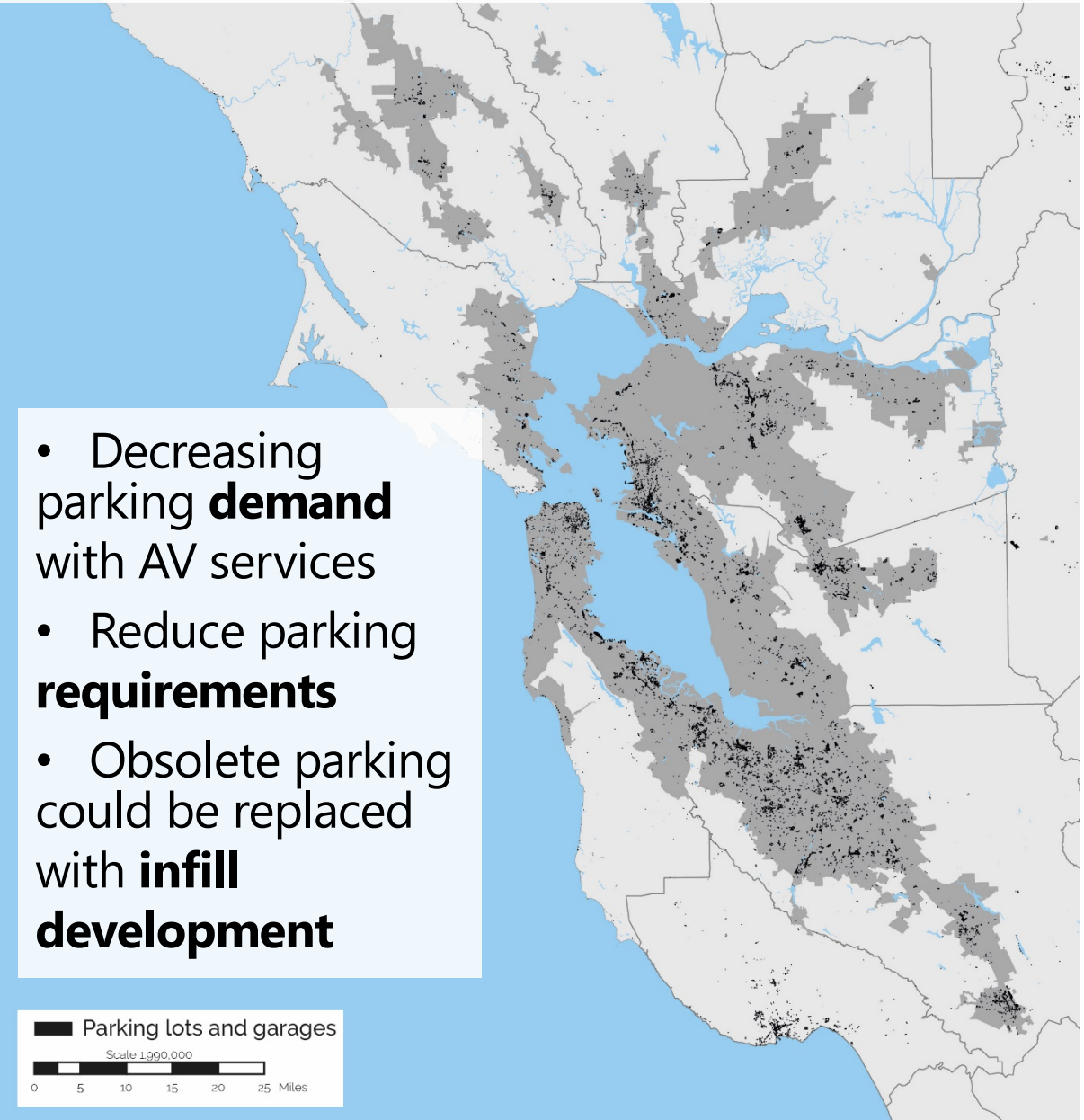
The Bay Area region is an innovation leader, creating quality job opportunities for all and ample fiscal resources for communities.

Icons Credit: The Noun Project

AFFORDABLE

Horizon Guiding Principle – All Bay Area residents and workers have sufficient housing options they can afford – households are economically secure.

Housing Opportunity Sites in an Autonomous Future



- Decreasing parking **demand** with AV services
- Reduce parking **requirements**
- Obsolete parking could be replaced with **infill development**

AFFORDABLE

Priority Strategies

Repurpose off-street parking for **infill development**

Institute **parking maximums** for both on- and off-street parking supply

Retain or strengthen urban growth boundaries to **control greenfield development**

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CONNECTED

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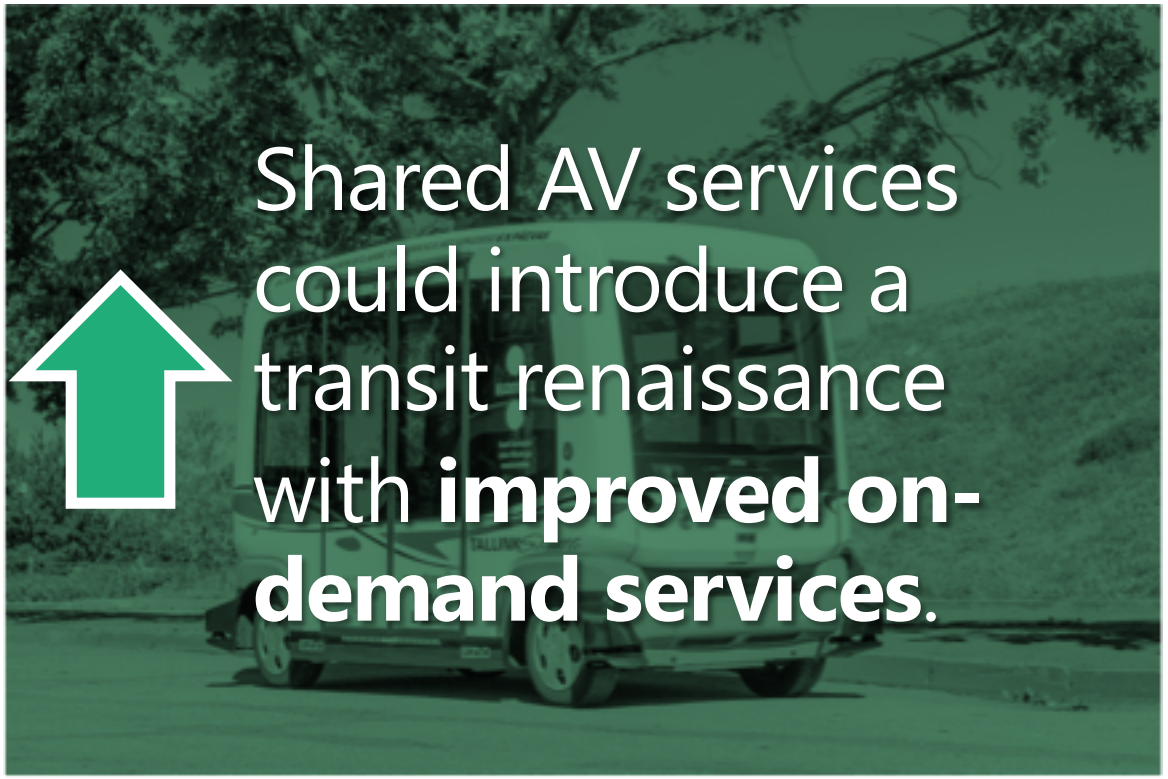
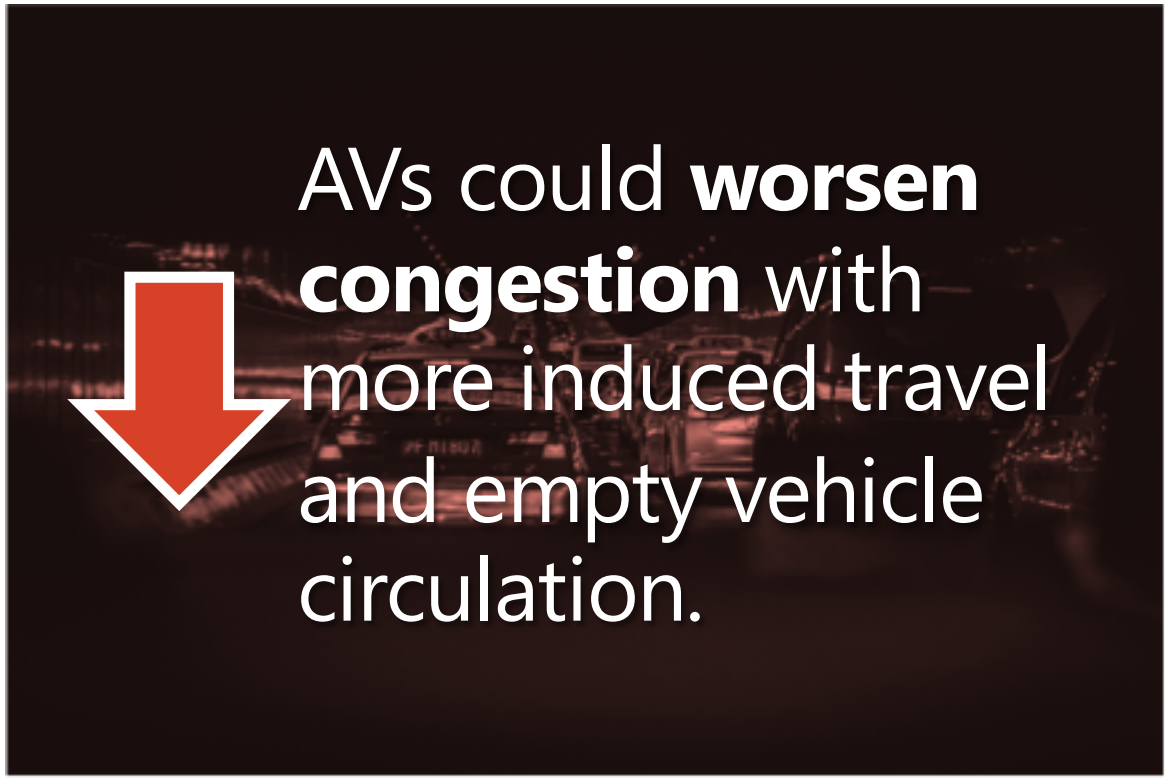
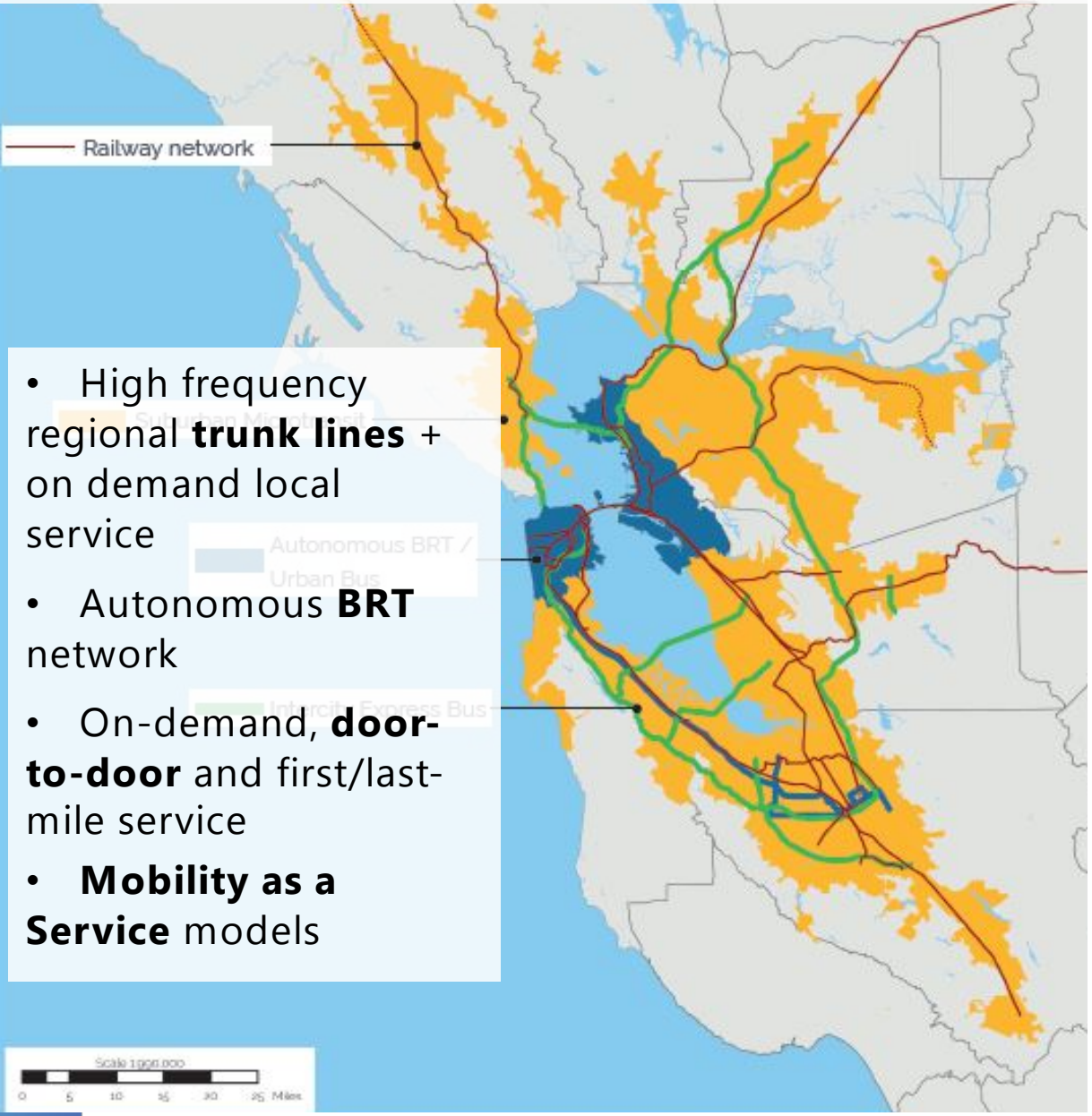




Regional Autonomous Demand-Responsive Transit



- High frequency regional **trunk lines** + on demand local service
- Autonomous **BRT** network
- On-demand, **door-to-door** and first/last-mile service
- **Mobility as a Service** models

CONNECTED

Priority Strategies

Double down on **high-capacity bus and rail corridors**

Innovate suburban transit with autonomous, **demand-responsive microtransit**

Develop a **mobility as a service** platform to provide a unified and equitable gateway to services and information

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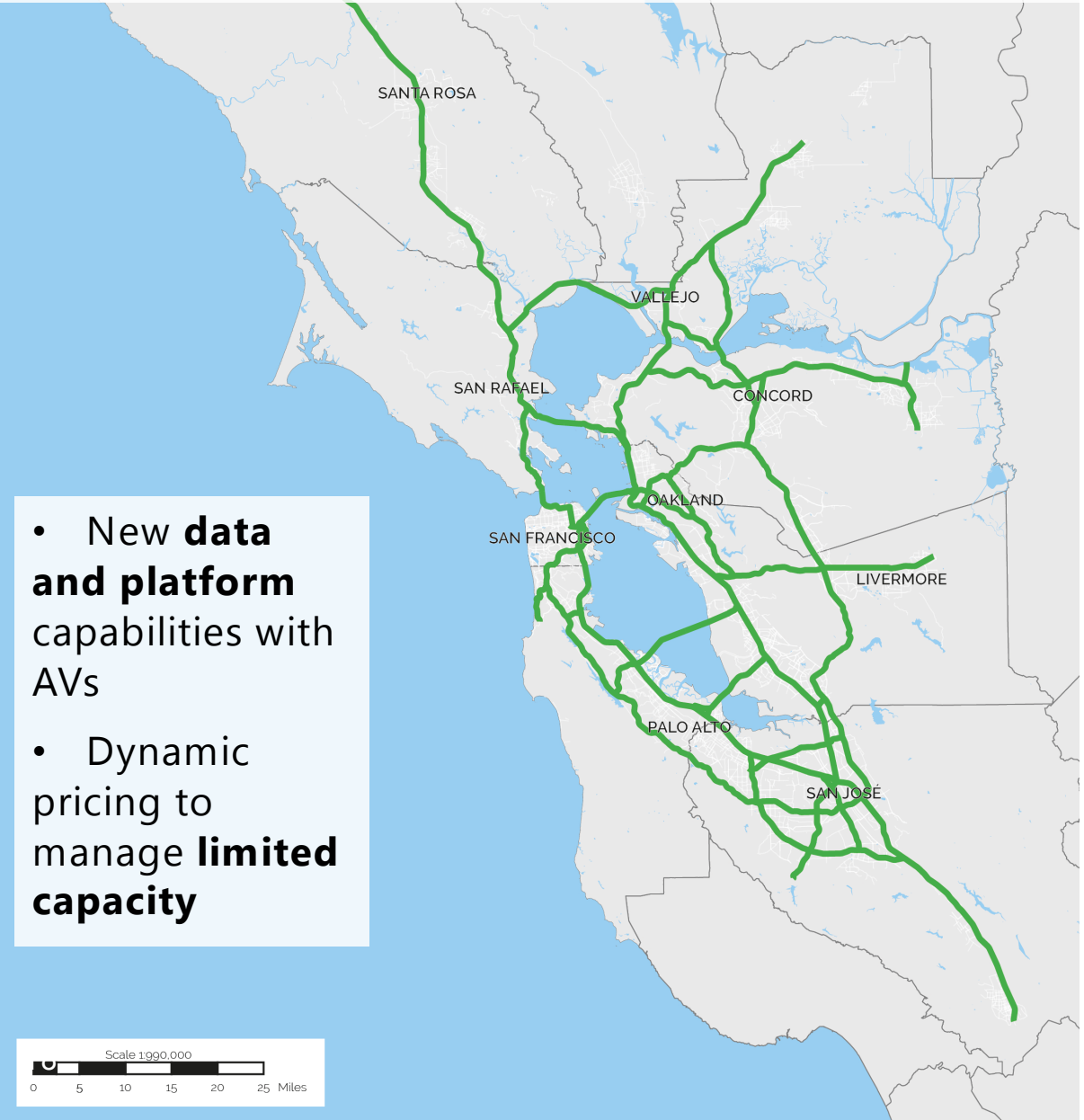
Dynamic Pricing Opportunities in an AV Future



- New **data and platform** capabilities with AVs
- Dynamic pricing to manage **limited capacity**

CONNECTED

Priority Strategies

Price mobility fairly through **dynamic road pricing**

Design **smart streets** with dynamic allocation of street and curb space

Develop industry-wide **data sharing protocols** to provide real-time information to connected AVs

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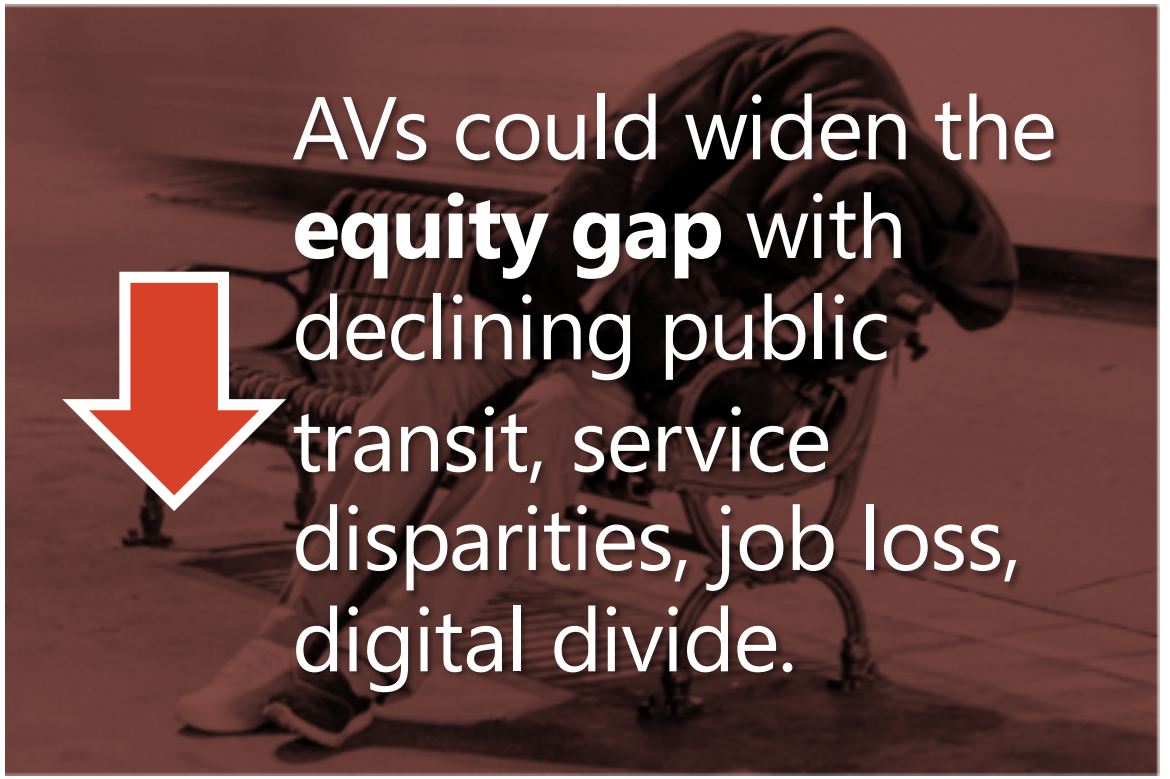
Horizon Guiding Principle – The Bay Area is an inclusive region where people from all backgrounds, abilities, and ages can remain in place – with access to the region's assets and resources.



Equitable AV Services

- **Require accountability**: targets, metrics, monitoring, improvement
- Target strategies for **specific equitable outcomes**.
- Focus all strategies on **inclusive prosperity**.

DIVERSE

Priority Strategies

Mandate **equitable provision** of mobility services with transparent reporting

Subsidize public **transit innovations,** replacing fixed route transit in Communities of Concern

Prioritize **AV mobility services or programs** that serve Communities of Concern

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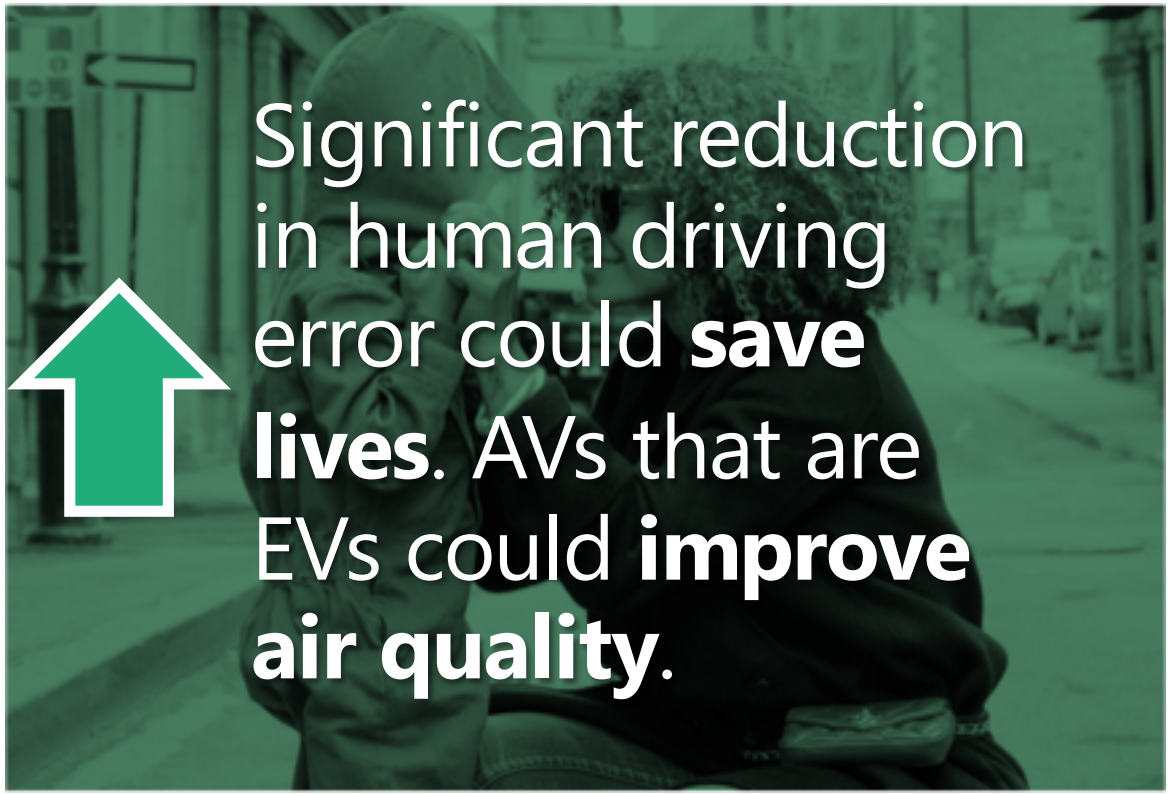

Hacking and cybersecurity could introduce new safety risks. AVs that are not EVs could **worsen air quality**.

Vision Zero 2.0

- **Eliminate** traffic-related deaths
- Nullify **cybersecurity** vulnerabilities
- Improve **air quality**
- Reduce transportation-related **public health** issues

HEALTHY

Priority Strategies

Cap **speed limits** in downtowns and neighborhoods

Mandate that **all AVs are EVs** and invest in the necessary infrastructure

Develop “bounty program” to reduce **hacking vulnerability**

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Horizon Guiding Principle – The Bay Area region is an innovation leader, creating quality job opportunities for all and ample fiscal resources for communities.

AVs have the potential to reduce transportation and logistics **operating costs**.

"New Deal" for Mobility

- Comprehensive program to maximize local **economic benefits** of the AV industry
- **Workforce advancement** programs
- Related **new industries** (manufacturing, data, services, goods, repair, etc.)

VIBRANT

Priority Strategies

Strengthen the capacity of **training programs** to expand opportunities for workers in the AV industry

Target job clusters on **industrially-zoned land** for production, distribution, and repair

Pilot **innovative AV applications** that could spur new job opportunities

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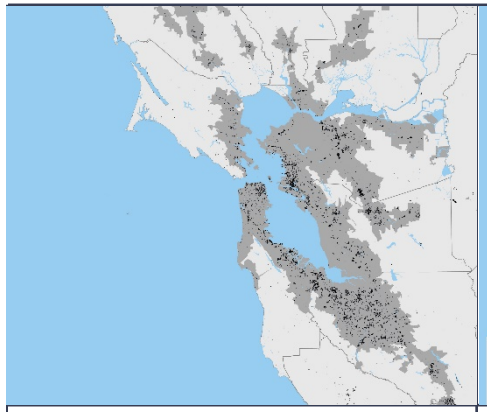
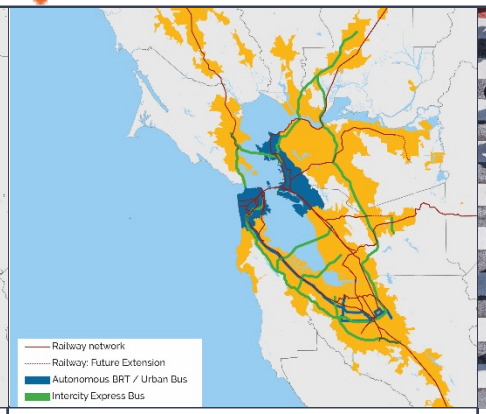
Affordable	Connected	Diverse	Healthy	Vibrant
				
Housing Opportunity Sites	**Fair Pricing & Autonomous Transit**	**Equitable Outcomes**	**Vision Zero 2.0**	**New Deal for Mobility**
Increase affordable housing supply	Expand access to high quality transportation	Ensure universal access to AV services	Save lives and improve air quality	Expand prosperity and access to jobs

mtc.ca.gov/horizon/perspective-papers

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Next Steps

Incorporating Strategies to Inform Horizon and Plan Bay Area 2040

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June 2018	July 2018	Fall 2018	Summer 2019
Release AV Perspective Paper	**Release AV Perspective Paper Addendum**	**Futures Workshops**	**Plan Bay Area 2050 Preferred Scenario**
Identify priority strategies	Describe Bay Area example applications	Put the priority strategies to the test	Recommend effective policies and programs

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Panel Remarks

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Audience Q&A

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Thank you!

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