



Bay Area Metro Center  
375 Beale Street  
San Francisco, CA 94105

## Meeting Agenda

### Regional Advisory Working Group

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Thursday, June 7, 2018

9:30 AM

Yerba Buena - 1st Floor

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This meeting is scheduled to be webcast live on the Metropolitan Transportation Commission's Website: <http://mtc.ca.gov/whats-happening/meetings>

This meeting can also be accessed via WebEx:

Launch Link: <https://bamc.webex.com/bamc/j.php?MTID=m5757a67a00df5c76d02654e12746b351>

Dial-in Number: 1 (415) 655-0002

Access Code: 922 789 704

#### 9:30 a.m.

1. [18-0360](#) Welcome, Introductions

**Presenter:** Ken Kirkey

#### 9:35 a.m.

2. [18-0363](#) Applying Guiding Principles to Project Performance, Futures, and Perspective Papers

Information and discussion on the application of guiding principles for Horizon/Plan Bay Area 2050.

**Action:** Information

**Presenter:** Dave Vautin

**Attachments:** [2\\_Applying Guiding Principles.pdf](#)

#### 10:10 a.m.

3. [18-0361](#) Horizon: Futures Shortlist

Preview of the proposed shortlist of futures to be analyzed in the Horizon process, guided by stakeholder input and technical analysis over the past month.

**Action:** Information

**Presenter:** Dave Vautin

**Attachments:** [3\\_Horizon-Futures Shortlist.pdf](#)

**10:30 a.m.**

**4.     [18-0362](#)     Perspective Paper #1 Preview - Autonomous Vehicles**

Preview of Horizon Perspective Paper #1, focused on strategies and policies to prepare the region for autonomous vehicles.

**Action:**             Information

**Presenter:**       Adam Noelting

**Attachments:**     [4\\_Perspective Paper 1 Preview-AV.pdf](#)

**11:00 a.m.**

**5. Next Steps / Other Business / Public Comments**

**11:05 a.m.**

**6. Adjournment / Next Meeting**

**The next meeting of the Regional Advisory Working Group will be Tuesday, August 7, 2018 at 9:30 a.m. at the Bay Area Metro Center, 375 Beale Street, San Francisco, CA.**

**Public Comment:** The public is encouraged to comment on agenda items at Committee meetings by completing a request-to-speak card (available from staff) and passing it to the Committee secretary. Public comment may be limited by any of the procedures set forth in Section 3.09 of MTC's Procedures Manual (Resolution No. 1058, Revised) if, in the chair's judgment, it is necessary to maintain the orderly flow of business.

**Meeting Conduct:** If this meeting is willfully interrupted or disrupted by one or more persons rendering orderly conduct of the meeting unfeasible, the Chair may order the removal of individuals who are willfully disrupting the meeting. Such individuals may be arrested. If order cannot be restored by such removal, the members of the Committee may direct that the meeting room be cleared (except for representatives of the press or other news media not participating in the disturbance), and the session may continue.

**Record of Meeting:** Committee meetings are recorded. Copies of recordings are available at a nominal charge, or recordings may be listened to at MTC offices by appointment. Audiocasts are maintained on MTC's Web site ([mtc.ca.gov](http://mtc.ca.gov)) for public review for at least one year.

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Attachments are sent to Committee members, key staff and others as appropriate. Copies will be available at the meeting.

All items on the agenda are subject to action and/or change by the Committee. Actions recommended by staff are subject to change by the Committee.



# Metropolitan Transportation Commission

375 Beale Street, Suite 800  
San Francisco, CA 94105

## Legislation Details (With Text)

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**File #:** 18-0360      **Version:** 1      **Name:**

**Type:** Report      **Status:** Informational

**File created:** 5/4/2018      **In control:** Regional Advisory Working Group

**On agenda:** 6/5/2018      **Final action:**

**Title:** Welcome, Introductions

**Sponsors:**

**Indexes:**

**Code sections:**

**Attachments:**

Date	Ver.	Action By	Action	Result
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**Subject:**  
Welcome, Introductions

**Presenter:**  
Ken Kirkey





# Metropolitan Transportation Commission

375 Beale Street, Suite 800  
San Francisco, CA 94105

## Legislation Details (With Text)

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**File #:** 18-0363      **Version:** 1      **Name:**

**Type:** Report      **Status:** Informational

**File created:** 5/4/2018      **In control:** Regional Advisory Working Group

**On agenda:** 6/5/2018      **Final action:**

**Title:** Applying Guiding Principles to Project Performance, Futures, and Perspective Papers

Information and discussion on the application of guiding principles for Horizon/Plan Bay Area 2050.

**Sponsors:**

**Indexes:**

**Code sections:**

**Attachments:** [2 Applying Guiding Principles.pdf](#)

Date	Ver.	Action By	Action	Result
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**Subject:**

Applying Guiding Principles to Project Performance, Futures, and Perspective Papers

Information and discussion on the application of guiding principles for Horizon/Plan Bay Area 2050.

**Presenter:**

Dave Vautin

**Recommended Action:**

Information

**Attachments:**



## M E M O R A N D U M

TO: Regional Advisory Working Group  
FR: Dave Vautin, Adam Noelting, and Michael Germeraad  
RE: Applying Guiding Principles to Project Performance, Futures, and Perspective Papers

### Summary

Over the past few months – based on a combination of public and stakeholder input – staff has developed a set of Guiding Principles for use in the *Horizon* initiative. These Principles reflect the core aspirations for the Bay Area through 2050 – to create a region that is affordable, connected, diverse, healthy, and vibrant. The Principles are intended to inform each of the key elements of *Horizon*, including analysis of projects in the Project Performance Assessment, the prioritization of policies in the Perspective Papers, and the selection of metrics & strategies for each future evaluated through the process. Staff is looking for input – particularly on the inclusion of the Guiding Principles Assessment in project performance – at this month’s RAWG meeting.

### Background on Guiding Principles

Staff finalized the Guiding Principles in late May, concluding four months of public and stakeholder engagement to craft the Principles. Thousands of Bay Area residents were engaged through pop-up outreach events and online surveys in February and March; staff also sought feedback on the Principles from the Regional Advisory Working Group, the MTC Policy Advisory Council, and the Joint MTC Planning and ABAG Administrative Committee.

The Guiding Principles are intended to reflect the aspirations of the region through 2050 which we should strive for across our long-range planning work. When prioritizing strategies or investments, we should look to align policies with these core values. Ultimately, five Principles were selected for use in *Horizon*: **Affordable, Connected, Diverse, Healthy, and Vibrant**. The finalized language for the Guiding Principles can be found in the attached slides; staff also finalized the associated outreach summary during the month of May, which can be made available upon request.

### Application of Principles in Project Performance

As discussed at last month’s RAWG meeting, staff proposes to conduct a project performance assessment on major transportation investments with costs greater than \$250 million; this assessment would span both *Horizon* and *Plan Bay Area 2050*. Central to the project performance assessment would be a benefit-cost analysis of each project using Travel Model Two, calculating benefit-cost ratios for the suite of futures ultimately selected for *Horizon*. Building upon past cycle of benefit-cost analysis, this evaluation captures a spectrum of benefits and disbenefits – including travel time, travel costs, safety, emissions, health, and noise.

Given the relatively robust nature of the benefit-cost analysis, the Guiding Principles will be integrated as a secondary assessment using qualitative criteria. Unlike past long-range planning cycles, the qualitative assessment would be used solely to flag projects that do not support one or more of the Principles. The MTC Planning Committee could choose to use this secondary analysis

in mid-2019 to define high-, medium-, and low-performing projects; projects that do not support one or more Principles could be identified as low-performing regardless of their cost-effectiveness.

As such, staff proposes that the criteria for the proposed Guiding Principles Assessment be narrowly defined to focus on significant negative impacts associated with the project itself, rather than the performance of the jurisdiction(s) where the project may be located. As shown in **Table 1**, each Guiding Principle would be aligned with a simple question that would determine if the project has a direct negative impact on affordability, connectedness, diversity, health, and vibrancy.

Ultimately, a project would receive one of two scores: **Supports Guiding Principles** or **Does Not Support Guiding Principle(s)**. A project would be flagged if it does not support one or more Principle(s) using the questions in **Table 1**.

**Table 1: Proposed Framework for Guiding Principles Assessment** (*Project Performance*)

<b>Guiding Principle</b>	<b>Evaluation Question</b> <i>If yes, the project is not supportive of the Guiding Principle</i>	<b>Application of Evaluation Question</b> <i>For a project to be flagged as not supportive of the Guiding Principle...</i>
<b>Affordable</b>	<b>Does the project increase travel costs for lower-income residents?</b>	<ul style="list-style-type: none"> <li>The project would have to actively eliminate a lower-cost travel alternative, rather than just offering a new travel option.</li> </ul>
<b>Connected</b>	<b>Does the project increase travel times or eliminate travel options?</b>	<ul style="list-style-type: none"> <li>The project would have to increase travel time for one mode, without decreasing it for another mode</li> <li>The project would have to eliminate a modal option from a travel corridor.</li> </ul>
<b>Diverse</b>	<b>Does the project displace lower-income residents or divide communities?</b>	<ul style="list-style-type: none"> <li>The project would have to directly displace lower-income households through site acquisition.</li> <li>The project would have to build an elevated structure through an existing neighborhood.</li> </ul>
<b>Healthy</b>	<b>Does the project increase emissions or consume open space?</b>	<ul style="list-style-type: none"> <li>The project would have to yield a long-term net increase in emissions.</li> <li>The project would have to directly acquire and develop open space or agricultural lands.</li> </ul>
<b>Vibrant</b>	<b>Does the project eliminate jobs?</b>	<ul style="list-style-type: none"> <li>The project would have to directly result in a net reduction of jobs.</li> </ul>

Staff is looking for feedback from the RAWG on the overall framework for the Guiding Principles Assessment, as well as the specific evaluation approach shown above. Your input will help staff make revisions this summer in advance of project scoring later this year.

### Application of the Guiding Principles in Futures Planning

The development of divergent futures (i.e., scenarios) is a central element of the *Horizon* initiative. To help illustrate the opportunities and challenges that exist in each future, staff plans to provide data for a set of metrics in the early fall. These metrics are intended to describe regional conditions associated with each Guiding Principle. General priorities when selecting metrics include simplicity for a public audience, linkage with historical trendlines, and clear differences in performance across the futures.

Therefore, staff is planning on building upon the performance framework established in *Vital Signs*, the regional performance monitoring initiative (<http://vitalsigns.mtc.ca.gov>). One or two representative metrics per Principle – from the suite of 40+ indicators – will be selected to describe conditions. Staff will select those metrics after the completion of the “status quo” analysis this fall, to ensure that the metrics highlight the most important differences between futures. Potential metrics could include:

- Housing + transportation costs as a measure of the **Affordable** Guiding Principle
- Commute times by mode as a measure of the **Connected** Guiding Principle
- Displacement risk as a measure of the **Diverse** Guiding Principle
- Greenhouse gas emissions as a measure of the **Healthy** Guiding Principle
- Job creation by industry as a measure of the **Vibrant** Guiding Principle

Perhaps more importantly, the Guiding Principles will also be integrated in public and stakeholder engagement this fall, as the region collaboratively identifies strategies to overcome challenges presented by each future while aligning with the consistent vision. Adoption of goals and targets for *Plan Bay Area 2050* will occur in summer 2019 and may potentially build upon the metrics selected for *Horizon*.

### Application of the Guiding Principles in Perspective Papers

At least five of the seven Perspective Papers are already under development, and each Perspective Paper will incorporate the Guiding Principles. In short, the Principles will be used to ensure that the set of strategies put forth in the paper align with a consistent cross-cutting regional vision. This is critical to make sure that a paper – for example, on the future of jobs – considers the full suite of opportunities and impacts rather than focusing on a single Principle.

Because each Perspective Paper focuses on a unique topic, the exact application of this requirement will vary from paper to paper, depending on the document structure and flow. However, all papers will include some type of discussion or tabulation showing their alignment with the Guiding Principles.

### Next Steps

- **Ongoing:** Perspective Paper Releases (*with Guiding Principles integrated in reports*)
- **August:** Project Performance Assessment – Draft Benefit-Cost Assessment Methodology & Supplemental Assessment Methodologies (Equity & Confidence)
- **Fall:** Results from “Status Quo” Futures Analysis (*including performance data associated with each Guiding Principle*)





HORIZON

SAN RAFAEL

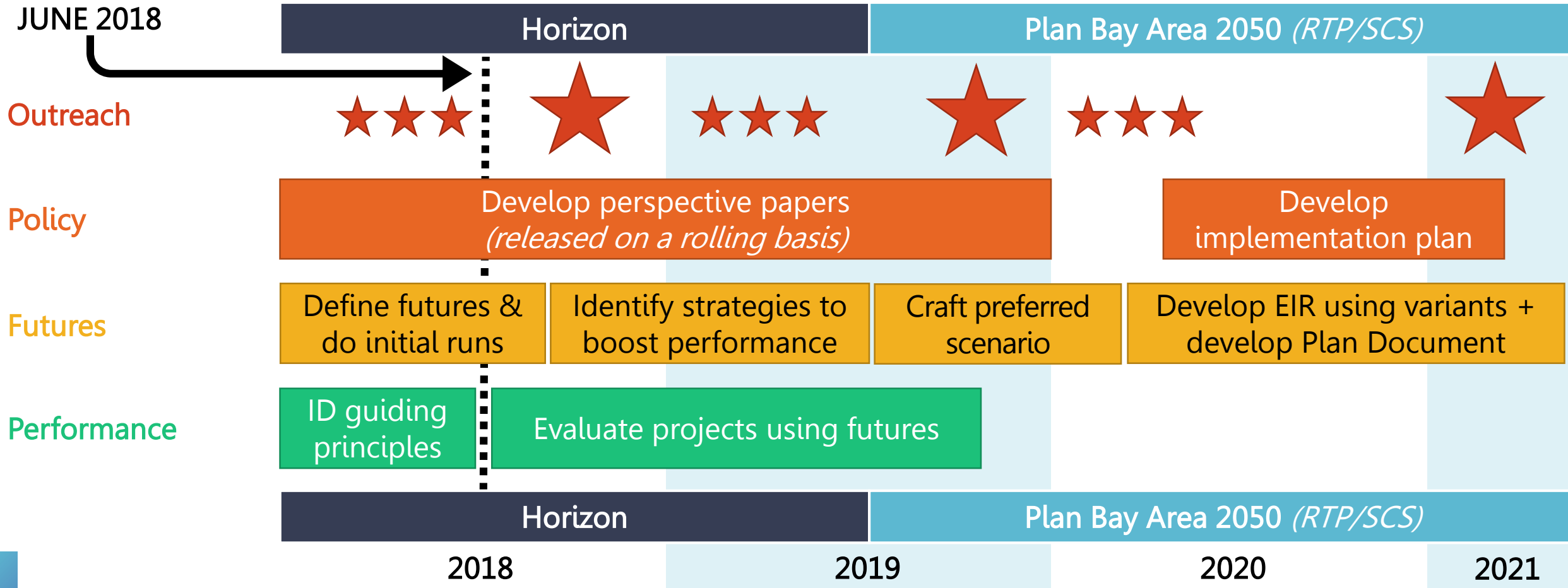
# Applying Guiding Principles

Project Performance, Futures, and Perspective Papers

Dave Vautin, MTC/ABAG -- June 7, 2018



# Horizon + Plan Bay Area 2050 Overview





# How will Guiding Principles be integrated into each part of *Horizon*?

Project  
Performance

Guiding Principles  
Assessment will be  
used to screen projects

Futures  
Planning

*Vital Signs* metrics  
aligned with Principles  
will highlight  
differences between  
futures

Perspective  
Papers

Guiding Principles will  
be used to review &  
select appropriate  
strategies



# Project Performance – Applying Principles

Benefit-Cost  
Assessment

Targets  
Assessment

Supplemental  
Assessments

Plan Bay Area 2040

Benefit-Cost  
Assessment

Guiding Principles  
Assessment ★

Supplemental  
Assessments

Horizon +  
Plan Bay Area 2050



# Proposed Approach for This Cycle

## Benefit-Cost Assessment

- Propose analyzing cost-effectiveness in **each future**
- Update technical methodology to reflect current best practices & leverage new Travel Model Two features

## Guiding Principles Assessment

- Use Final Guiding Principles as screening criteria to flag projects that do not support one or more principles



## Supplemental Assessments

- Equity Assessment – similar to Plan Bay Area 2040
- Confidence Assessment – similar to Plan Bay Area 2040

# Thresholds & Project Types



Cost Threshold for  
Evaluation

>\$100 million

Project Types  
to be Evaluated

Uncommitted  
Capacity-  
Increasing  
Projects Only

Opportunities for  
Project Submission

CMA & Major  
Operator  
Submissions Only



>\$1 billion  
for Horizon

>\$250 million  
for Plan Bay Area 2050

Uncommitted  
Projects:

- Capacity-Increasing
- Operations
- Resilience

Submissions from:

- CMAs & Operators
- Other Public Agencies
- NGOs
- Public at Large

# Benefit-Cost Assessment (*draft*)

## Benefits – for travelers & society



Travel Time



Noise



Travel Costs



Health



Safety



*Other  
Potential  
Benefits?*



Emissions

*Incorporates benefits for all  
modes: autos, trucks, transit,  
walking, biking*

## Costs – for public sector



Capital Costs



Net Operating &  
Maintenance Costs

$$\text{Benefit-Cost Ratio} = \frac{\text{Benefits}}{\text{Costs}}$$

# 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.

# Guiding Principles Assessment *(draft)*

A project would be flagged if it does not support one or more Principle(s) using the questions below. The proposed questions focus on the project's impacts, rather than characteristics of the city/county.

<u>Principle</u>	<u>Evaluation Question</u>
AFFORDABLE	Does the project increase travel costs for lower-income residents?
CONNECTED	Does the project increase travel times or eliminate travel options?
DIVERSE	Does the project displace lower-income residents or divide communities?
HEALTHY	Does the project increase emissions or consume open space?
VIBRANT	Does the project eliminate jobs?

<u>Principle</u>	<u>Evaluation Question</u>	<u>Application of the Evaluation Question</u>
<b>AFFORDABLE</b>	Does the project <b>increase travel costs for lower-income residents?</b>	<ul style="list-style-type: none"> <li>• The project would have to <b>actively eliminate a lower-cost travel alternative</b>, rather than just offering a new travel option.</li> </ul>
<b>CONNECTED</b>	Does the project <b>increase travel times or eliminate travel options?</b>	<ul style="list-style-type: none"> <li>• The project would have to <b>increase travel time for one mode, without decreasing it for another mode.</b></li> <li>• The project would have to <b>eliminate a modal option from a travel corridor.</b></li> </ul>
<b>DIVERSE</b>	Does the project <b>displace lower-income residents or divide communities?</b>	<ul style="list-style-type: none"> <li>• The project would have to <b>directly displace lower-income households</b> through site acquisition.</li> <li>• The project would have to <b>build an elevated structure</b> through an existing neighborhood.</li> </ul>
<b>HEALTHY</b>	Does the project <b>increase emissions or consume open space?</b>	<ul style="list-style-type: none"> <li>• The project would have to <b>yield a long-term net increase in emissions.</b></li> <li>• The project would have to <b>directly acquire and develop open space</b> or agricultural lands.</li> </ul>
<b>VIBRANT</b>	Does the project <b>eliminate jobs?</b>	<ul style="list-style-type: none"> <li>• The project would have to <b>directly result in a net reduction of jobs.</b></li> </ul>



Reminder: the transformative projects submission window is now open through early September.



# Futures Planning – Applying Principles

Vital Signs provides an opportunity to **leverage existing metrics** and **link historical trends with future forecasts** – learn more about the current set of indicators on [vitalsigns.mtc.ca.gov](http://vitalsigns.mtc.ca.gov).



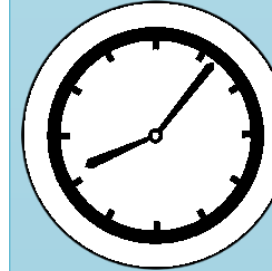


# Example Metrics for Futures

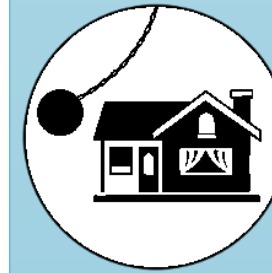
- Goals & targets will be selected and adopted in summer 2019 for **Plan Bay Area 2050**, potentially building on Guiding Principles. As such, these will not be available for **Horizon**.
- Instead, staff will identify **one or two representative metrics** for each **Guiding Principle** to help illustrate differences between the futures.
- Until initial analyses on the futures are complete in the fall, no decisions will be made on the metrics used to illustrate differences in performance.
- To illustrate the types of measures that could be chosen, an **example metric for each Guiding Principle** is shown to the right.
- A subset of metrics selected will be **disaggregated by income** to explore impacts related to social equity.



Affordable  
Housing + Transportation  
Costs



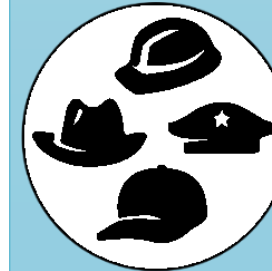
Connected  
Commute Times by Mode



Diverse  
Displacement Risk



Healthy  
Greenhouse Gas  
Emissions



Vibrant  
Jobs by  
Industry

# Perspective Papers – Applying Principles



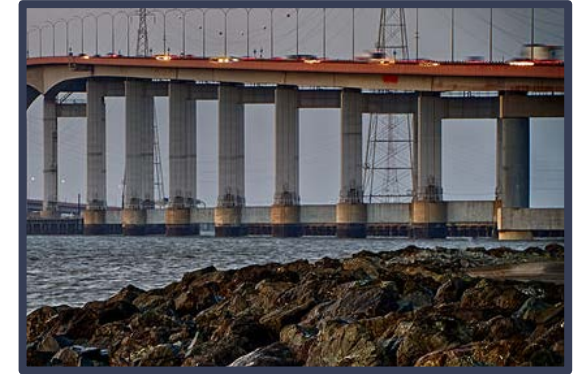
1) Autonomous Vehicles



2) Climate Mitigation



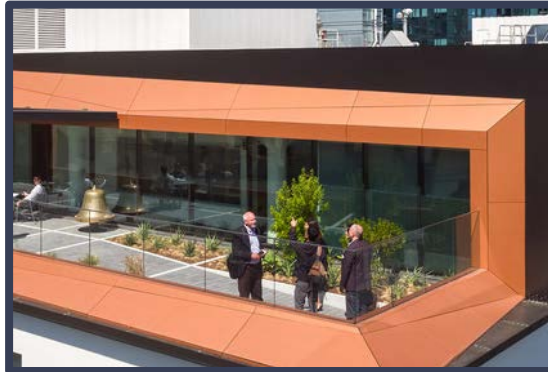
3) Growth Strategies



4) Crossings



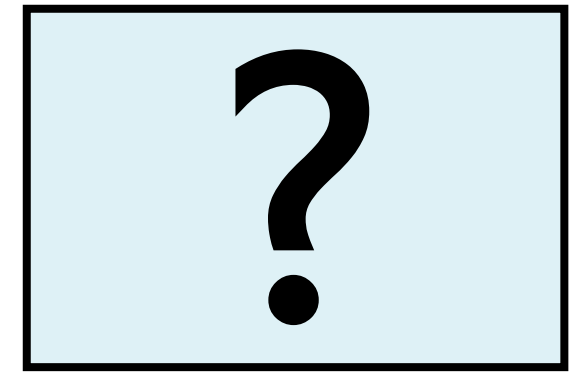
5) Future of Jobs



6) Governance



7) Better Buildings



*More to Come?*





The Guiding Principles will be used to ensure that priority strategies identified in each paper align with a consistent cross-cutting regional vision. However, the specific application will vary between papers based on the topic area(s) being explored.





HORIZON

Questions? Comments?





# Metropolitan Transportation Commission

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## Legislation Details (With Text)

**File #:** 18-0361      **Version:** 1      **Name:**  
**Type:** Report      **Status:** Informational  
**File created:** 5/4/2018      **In control:** Regional Advisory Working Group  
**On agenda:** 6/5/2018      **Final action:**  
**Title:** Horizon: Futures Shortlist

Preview of the proposed shortlist of futures to be analyzed in the Horizon process, guided by stakeholder input and technical analysis over the past month.

**Sponsors:**

**Indexes:**

**Code sections:**

**Attachments:** [3\\_Horizon-Futures Shortlist.pdf](#)

Date	Ver.	Action By	Action	Result
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**Subject:**

Horizon: Futures Shortlist

Preview of the proposed shortlist of futures to be analyzed in the Horizon process, guided by stakeholder input and technical analysis over the past month.

**Presenter:**

Dave Vautin

**Recommended Action:**

Information

**Attachments:**



## MEMORANDUM

TO: Regional Advisory Working Group  
FR: Dave Vautin and Michael Germeraad  
RE: Horizon: Futures Shortlist

DATE: May 31, 2018

### Summary

Leveraging the eleven futures developed by teams of stakeholders at the April *Horizon* Peer Exchange – and stakeholder input on the futures selection process in May – staff has developed a proposed shortlist of three futures to study in the *Horizon* process. These widely-divergent futures are designed to test strategies and investments to identify those that are the most effective in multiple futures. This should help ensure that the decisions we make today are resilient to ever-changing circumstances. Rather than selecting a “preferred scenario” from this process as in past plans, the specific strategies and investments that perform best in multiple futures will be incorporated into *Plan Bay Area 2050*.

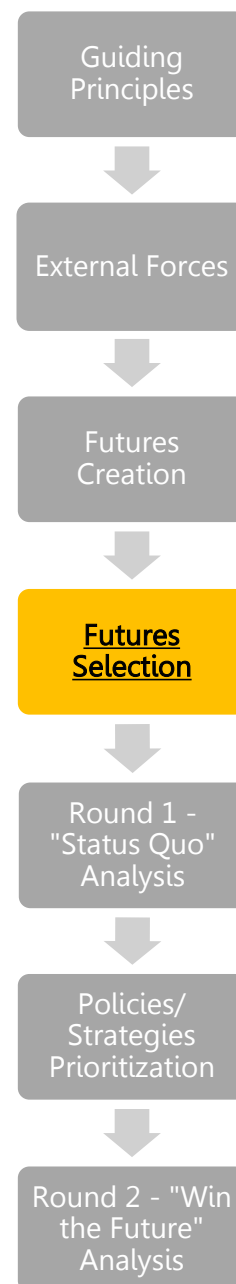
### Draft Shortlist of Futures

Narrowing down the list of futures from eleven to three incorporated a combination of stakeholder input and technical refinements; a brief summary of stakeholder survey responses is included in the presentation attached. In the end, staff believes that the three futures featured in the shortlist each present unique opportunities and challenges for Bay Area planners and stakeholders that merit exploration through June 2019. The futures themselves are clearly divergent, with a broad spectrum of inputs for each external force. Staff anticipates that this will lead to differing outcomes across the four topic areas of *Horizon* – transportation, land use, economic development, and resilience.

The three proposed futures for *Horizon* are listed below, and each can be distilled to a central “what-if” question:

- **Clean and Green**: what if... new technologies and a **national carbon tax** enabled telecommuting and **distributed job centers**?
- **Rising Tides, Falling Fortunes**: what if... the federal government **cuts spending and reduces regulations**, leaving decisions to states and regions?
- **Back to the Future**: what if... an **economic boom** and new transportation options spur a **new wave of development**?

Attachments to this cover memo include the descriptions of each future as well as a preliminary table comparing the external forces included in each future. Staff is looking for your input today on whether these three futures are the most appropriate to select to achieve the goals of the *Horizon* process, and if any changes should be made to the futures before they are finalized in early July.



**Figure 1:** Primary steps of the Futures element of *Horizon*.

### Next Steps

In lieu of a July RAWG, staff will hold a webinar in advance of the Joint MTC Planning/ABAG Administrative Committee presentation on the Futures Shortlist. This webinar will highlight preliminary regional forecasts for each future, including population trends, employment trends, demographic trends, and revenue impacts associated with each.

After getting feedback from the Joint Committees, staff will commence round 1 of travel & land use modeling for the futures, exploring what would happen to the Bay Area if “status quo” policies continue – despite the unique external forces incorporated in each. This will allow for a robust policy discussion in the fall. The public, stakeholders, elected officials, and staff will work to brainstorm solutions to better align outcomes with the Final Guiding Principles (and ideally, “win the future”).

### Attachments

- Presentation (*including high-level survey findings*)
- Attachment A: Futures: Summary Table & Descriptions
- Attachment B: Futures Shortlist: Preliminary Summary of Model Inputs

DV

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HORIZON

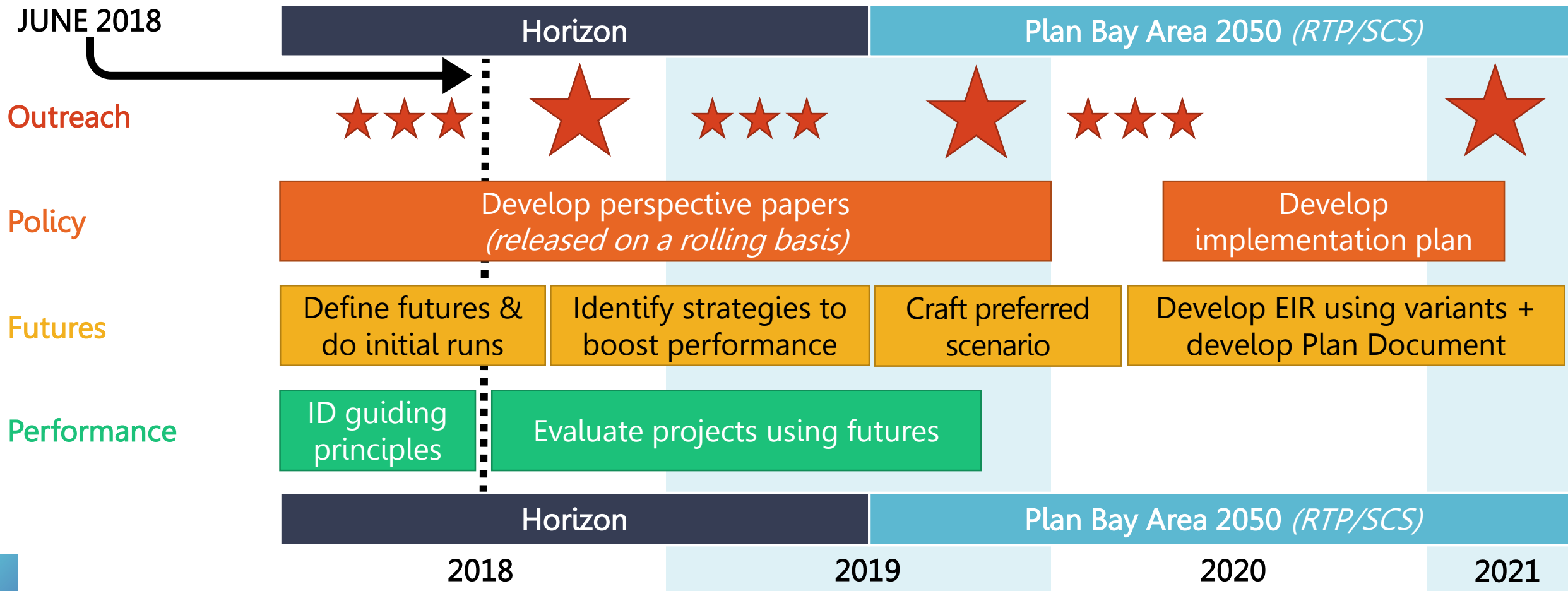
# Futures Shortlist

Dave Vautin, MTC/ABAG

Regional Advisory Working Group -- June 7, 2018



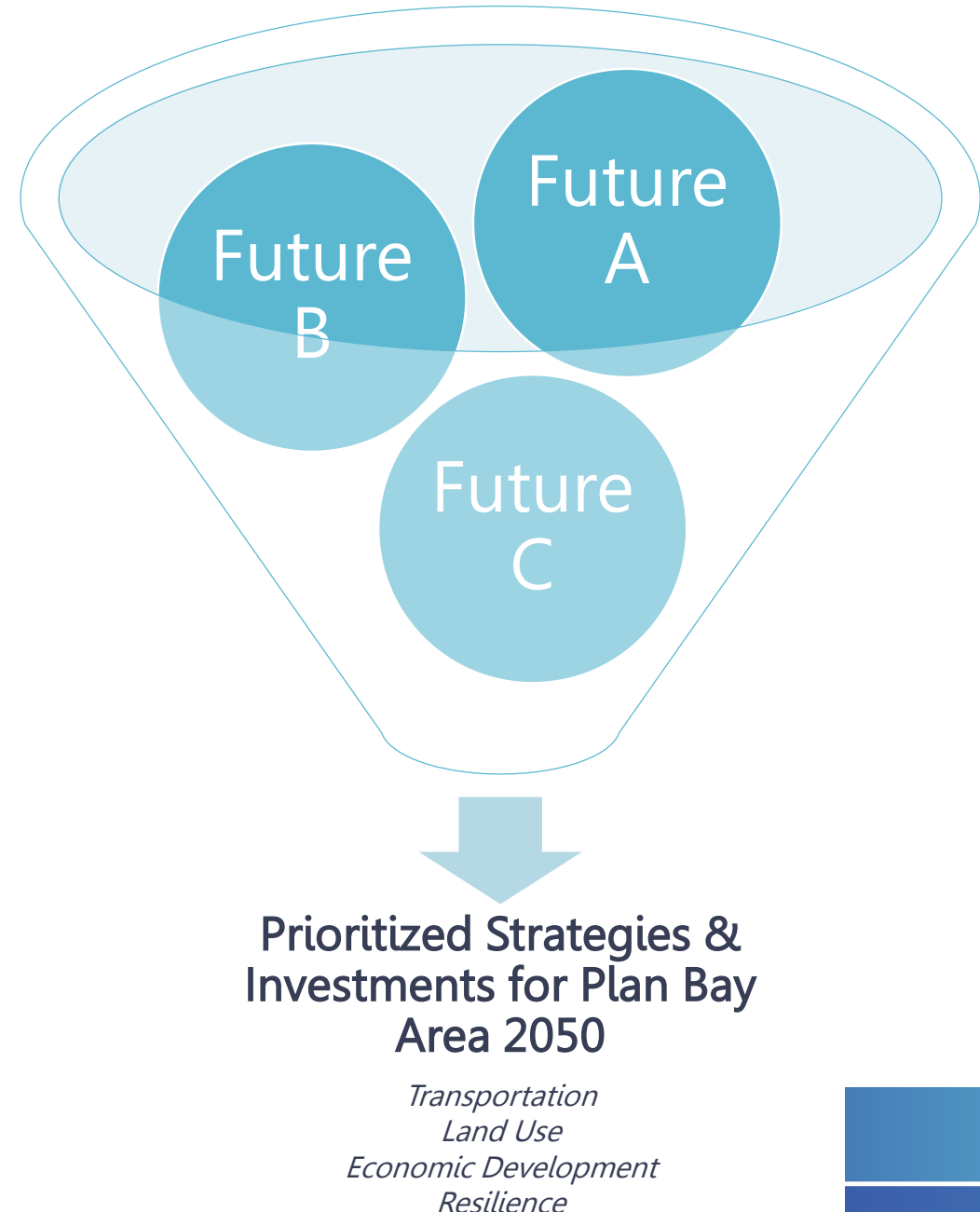
# Horizon + Plan Bay Area 2050 Overview



# Why Are We Creating Futures?

Creating a range of divergent futures will allow us to envision how the San Francisco Bay Area would respond to a wide range of external forces. Each future should create unique opportunities and challenges for the public, stakeholders, elected officials, and staff to explore.

However, this is not a traditional scenario planning process – none of the futures is likely to be selected as a “preferred”. Instead, the process is designed to test the resilience of policies and projects to determine which should be considered for inclusion in Plan Bay Area 2050.



# How Were Futures Created?

3-Minute Video –  
Summary of April 23<sup>rd</sup>  
Horizon Peer Exchange

<https://youtu.be/1rDmygU5yn0>





Futures were developed based on external forces beyond the region's control. For the shortlisted futures, preliminary socioeconomic forecasts for the Bay Area should be ready in July (e.g., forecasted income distribution).



# Feedback from Stakeholder Outreach

**53**  
responses

Likelihood	
Rapidly Rising Tides	<b>2.4</b>
Shake and Remake	<b>2.3</b>
Rise of the Region	<b>2.1</b>
Freedom to Roam	<b>2.1</b>
Sustainable Downsizing	<b>2.0</b>
Clean and Green	<b>1.8</b>
Back to the Future	<b>1.8</b>
American Dream	<b>1.7</b>

(Adverse) Impact on Region	
Rapidly Rising Tides	<b>2.9</b>
Shake and Remake	<b>2.9</b>
Rise of the Region	<b>2.8</b>
Freedom to Roam	<b>2.5</b>
Sustainable Downsizing	<b>2.5</b>
American Dream	<b>2.5</b>
Back to the Future	<b>2.4</b>
Clean and Green	<b>2.2</b>

Ability to Respond to Impacts	
Clean and Green	<b>2.6</b>
Freedom to Roam	<b>2.2</b>
American Dream	<b>2.0</b>
Sustainable Downsizing	<b>1.9</b>
Rise of the Region	<b>1.9</b>
Rapidly Rising Tides	<b>1.8</b>
Shake and Remake	<b>1.8</b>
Back to the Future	<b>1.8</b>

# Feedback from Stakeholder Outreach

Likelihood	
Rapidly Rising Tides	2.4
Shake and Remake	2.3
Rise of the Region	2.1
Freedom to Roam	2.1
Sustainable Downsizing	2.0
Clean and Green	1.8
Back to the Future	1.8
American Dream	1.7

(Adverse) Impact on Region	
Rapidly Rising Tides	2.9
Shake and Remake	2.9
Rise of the Region	2.8
Freedom to Roam	2.5
Sustainable Downsizing	2.5
American Dream	2.5
Back to the Future	2.4
Clean and Green	2.2

Ability to Respond to Impacts	
Clean and Green	2.6
Freedom to Roam	2.2
American Dream	2.0
Sustainable Downsizing	1.9
Rise of the Region	1.9
Rapidly Rising Tides	1.8
Shake and Remake	1.8
Back to the Future	1.8

# Feedback from Stakeholder Outreach

Likelihood	
Rapidly Rising Tides	2.4
Shake and Remake	2.3
Rise of the Region	2.1
Freedom to Roam	2.1
Sustainable Downsizing	2.0
<b>Clean and Green</b>	<b>1.8</b>
Back to the Future	1.8
<b>American Dream</b>	<b>1.7</b>

(Adverse) Impact on Region	
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Sustainable Downsizing	2.5
<b>American Dream</b>	<b>2.5</b>
Back to the Future	2.4
<b>Clean and Green</b>	<b>2.2</b>

Ability to Respond to Impacts	
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Sustainable Downsizing	1.9
Rise of the Region	1.9
Rapidly Rising Tides	1.8
Shake and Remake	1.8
Back to the Future	1.8

# Highlighted Comments on Each Future

#	Future		Highlighted Comments
1+6	Sustainable Downsizing		"Description of elements within the scenario is contradictory and <b>likely to increase angst and dysfunction.</b> "
2	Clean and Green	★	"I agree with the initial elements of this scenario, but <b>any sentence that combines "federal government" with "ambitious" seems unlikely.</b> "
3	Rapidly Rising Tides	★	"After decades of warnings, humans finally respond once problems are impossible to ignore - <b>sounds like a believable headline.</b> "
4	Freedom to Roam		"This is a <b>realistic short-term future</b> , which I don't think is sustainable in the long term due to the economic disparity that is amplified by technology."
5+11	Rise of the Region	★	"Reduced federal funding is <b>likely</b> and should be studied."
8	American Dream	★	"This would likely be the <b>"American Dream"</b> for only some people."
9	Shake and Remake	★	"I don't [think] this scenario would provide much opportunity to reconfigure dramatically the Bay Area."
10	Back to the Future		" <b>Another unlikely combo</b> - everything seems plausible except setting back self-driving cars for decades."



# How Was the Shortlist Created?

1. Merged three sets of similar futures together
  - a. **New Clean and Green**
    - a. Includes “status quo” growth rate from **Freedom to Roam**
    - b. Includes carbon tax structure from **Clean and Green**
  - b. **New Back to the Future**
    - a. Includes most assumptions from **American Dream**
    - b. Includes future name from **Back to the Future**
  - c. **Rising Tides, Falling Fortunes**
    - a. Includes reduction in environmental regulations from **Rapidly Rising Tides**
    - b. Includes populist policies and devolution to states & regions from **Rise of the Region**

---

5 FUTURES  
REMAIN
2. Considered feedback from survey and made revisions accordingly
  - a. **Sustainable Downsizing** eliminated from consideration due to perceived internal inconsistencies
  - b. **Shake and Remake** eliminated based on internal decision to include *Haywired* in all futures on the shortlist

3 PROPOSED  
FUTURES

# Three Potential Futures – “What If?” Scenarios



**Clean  
and Green**

**What if...** new technologies and a national carbon tax enabled telecommuting and distributed job centers?



**Rising Tides,  
Falling  
Fortunes**

**What if...** the federal government cuts spending and reduces regulations, leaving decisions to states & regions?



**Back to  
the Future**

**What if...** an economic boom and new transportation options spur a new wave of development?



Recognizing the growing impacts of climate change, the federal government significantly tightens environmental regulations and implements an **ambitious, nationwide carbon tax**. New technologies thrive, with **virtual reality** enabling telecommuting and **smaller-scale workplaces** distributed across town centers. While high-tech manufacturing thrives in the United States, **economic growth slows for other more energy-intensive sectors**.





### Potential Opportunities:

- Regional economy well-positioned to succeed in this future
- Reduced funding needs for transport & SLR infrastructure

### Potential Challenges:

- Significant economic impacts on certain sectors
- Increased divisions between rich and poor communities





## Rising Tides, Falling Fortunes

Nationwide tax cuts and spending caps result a significant reduction in federal infrastructure funding. Combined with autonomous vehicles failing to live up to the hype, **cities, regions, and states are forced to pay for much-needed traditional infrastructure** projects themselves. Lack of regulatory action on climate change worldwide results in **sea levels rising by three feet by 2050** – creating a new set of infrastructure needs in an era of slow growth.



Rising Tides,  
Falling  
Fortunes

### Potential Opportunities:

- Greater independence to set regional policies & funding framework
- Reduced pressures from growth, including lower risk of displacement

### Potential Challenges:

- Sea level rise impacts & lack of funding to address them
- Lower incomes for all and reduced economic opportunity





The U.S. experiences **continued prosperity** and renewed respect on the world stage, thanks to smart and strategic policy decisions on the national level. **Rapid job growth** means more people want to move to the U.S., and **increased public investment in infrastructure** makes the nation more attractive for businesses. **Silicon Valley technologies** are dominant **worldwide** in everything from cars to e-commerce. Wealthy Americans seek larger suburban homes and **many depend on new technologies (such as high-speed rail)** to access urban job centers.





### Potential Opportunities:




- Rising wages and low unemployment
- Significantly more **funding available** to address transportation & resilience needs

### Potential Challenges:

- Risk of **urban sprawl** and associated environmental impacts
- **Extreme transit crowding** and traffic congestion



# Summary of Proposed Futures

#	FUTURE NAME	IMMIGRATION AND TRADE	NATIONAL TAXES AND FUNDING	NATIONAL GROWTH	LAND USE PREFERENCES	NATIONAL ENVIRONMENTAL POLICY	NEW TECHNOLOGIES
2+4	 <b>Clean and Green</b>	Similar to today	<b>Higher funding</b> via carbon tax	Similar to today	Housing: more <b>urban</b>	<b>Stricter regulations</b> (1' SLR)	<b>Widespread</b>
					Jobs: more <b>dispersed</b>		
3+5+11	 <b>Rising Tides, Falling Fortunes</b>	<b>Reduced</b>	<b>Lower funding</b> due to tax cuts	<b>Limited</b>	Housing: more <b>urban</b>	<b>Relaxed regulations</b> (3' SLR)	More <b>limited</b>
					Similar to today		
8+10	 <b>Back to the Future</b>	<b>Increased</b>	Similar to today	<b>Rapid</b>	Housing: more <b>dispersed</b>	Similar to today (2' SLR)	<b>Widespread</b>
					Jobs: more <b>urban</b>		

One final reminder: it is important to have a range of divergent futures with unique challenges – rather than reflecting “the world as we would like it to be”. **None of the futures is likely to be selected as the “preferred” for Plan Bay Area 2050.**



# 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

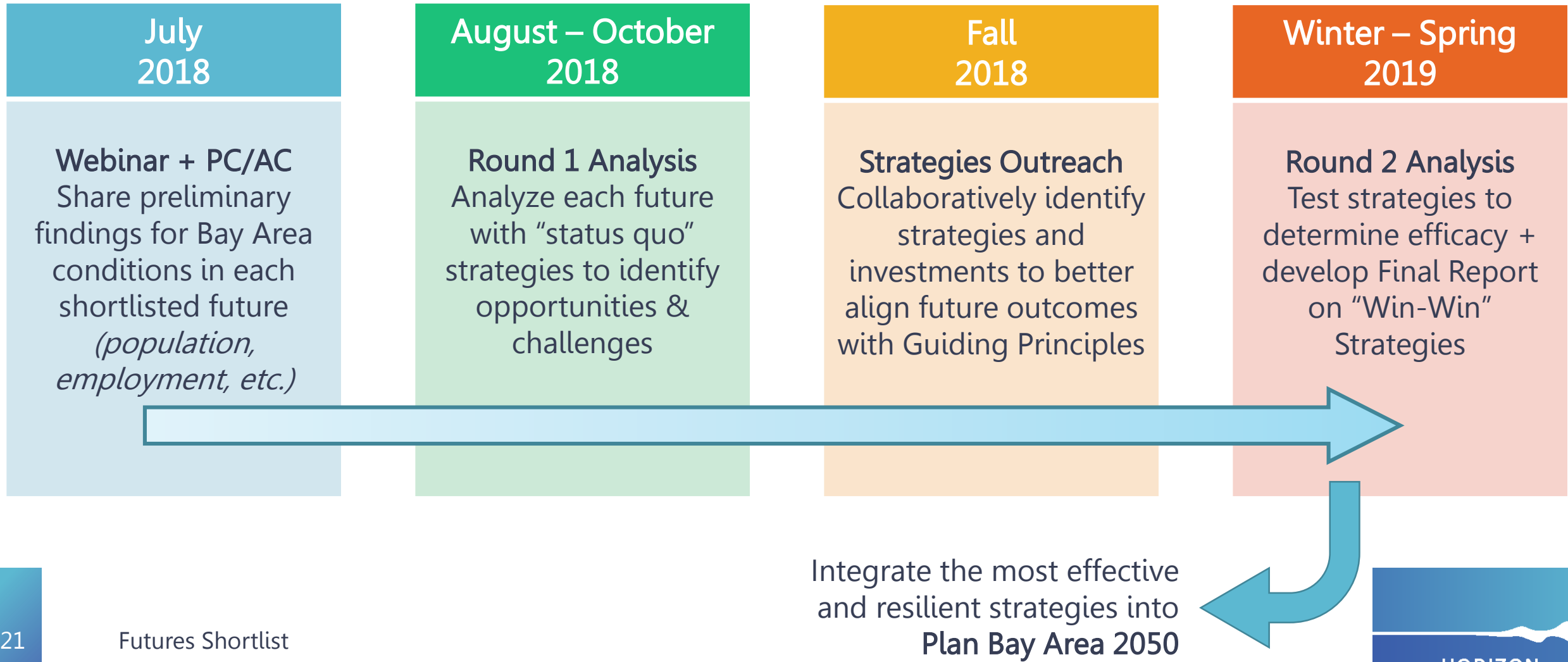
The region's natural resources, open space, clean water and clean air are conserved – the region actively reduces its environmental footprint and protects residents from environmental impacts.






## VIBRANT

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



# What's Next for the Futures in Horizon



## Proposed Shortlist






#	FUTURE NAME	IMMIGRATION AND TRADE	NATIONAL TAXES AND FUNDING	NATIONAL GROWTH	LAND USE PREFERENCES	NATIONAL ENVIRONMENTAL POLICY	NEW TECHNOLOGIES	NATURAL DISASTERS
2+4	 <b>Clean and Green</b>	Similar to today	<b>Higher funding</b> via carbon tax	Similar to today	Housing: more <b>urban</b>	<b>Stricter regulations</b> (1' SLR)	<b>Widespread</b>	Magnitude 7.0 Hayward Fault earthquake
					Jobs: more <b>dispersed</b>			
3+5 +11	 <b>Rising Tides, Falling Fortunes</b>	<b>Reduced</b>	<b>Lower funding</b> due to tax cuts	<b>Limited</b>	Housing: more <b>urban</b>	<b>Relaxed regulations</b> (3' SLR)	<b>More limited</b>	Magnitude 7.0 Hayward Fault earthquake
					Similar to today			
8+10	 <b>Back to the Future</b>	<b>Increased</b>	Similar to today	<b>Rapid</b>	Housing: more <b>dispersed</b>	Similar to today (2' SLR)	<b>Widespread</b>	Magnitude 7.0 Hayward Fault earthquake
					Jobs: more <b>urban</b>			

## Other Futures Considered

1+6	 <b>Sustainable Downsizing</b>	<b>Reduced</b>	<b>Higher funding</b> via income tax	<b>Limited</b>	Housing: more <b>urban</b>	<b>Stricter regulations</b> (1' SLR)	<b>Widespread</b>	Magnitude 7.0 Hayward Fault earthquake
					Similar to today			
9	 <b>Shake and Remake</b>	Similar to today	<b>Higher funding</b> via income tax	Similar to today	Housing: more <b>urban</b>	<b>Stricter regulations</b> (1' SLR)	<b>Widespread</b>	<b>Series of Magnitude 7.0 earthquakes</b>
					Jobs: more <b>urban</b>			

**Future #7:** America Divided has been deprioritized from further consideration, given that the Bay Area would not be well-positioned to mitigate the impacts from a national shift to plutocratic government. Slight modifications to the other futures under consideration have been made to improve their internal consistency.



#	FUTURE NAME	FUTURE DESCRIPTION
1 + 6	 <b>Sustainable Downsizing</b>	Economic growth has significantly slowed due to strict caps on immigration, hefty tariffs, and rising tax rates required to pay for the needs of an aging population. Still, the private sector powers forward with widespread adoption of autonomous vehicles and online shopping eclipsing traditional retail stores. A combination of federal incentives and shifting consumer preferences result in growing popularity for clean-fuel vehicles and an increased preference for smaller housing units in walkable locations.
2 + 4	 <b>Clean and Green</b>	Recognizing the growing impacts of climate change, the federal government significantly tightens environmental regulations and implements an ambitious, nationwide carbon tax. New technologies thrive, with virtual reality enabling telecommuting and smaller-scale workplaces distributed across town centers. While high-tech manufacturing thrives in the United States, economic growth slows for other more energy-intensive sectors.
3 + 5 + 11	 <b>Rising Tides, Falling Fortunes</b>	Nationwide tax cuts and spending caps result in a significant reduction in federal infrastructure funding. Combined with autonomous vehicles failing to live up to the hype, cities, regions, and states are forced to pay for much-needed traditional infrastructure projects themselves. Lack of regulatory action on climate change worldwide results in sea levels rising by three feet by 2050 – creating a new set of infrastructure needs in an era of slow growth.
8 + 10	 <b>Back to the Future</b>	The U.S. experiences continued prosperity and renewed respect on the world stage, thanks to smart and strategic policy decisions on the national level. Rapid job growth means more people want to move to the U.S., and increased public investment in infrastructure makes the nation more attractive for businesses. Silicon Valley technologies are dominant worldwide in everything from cars to e-commerce. Wealthy Americans seek larger suburban homes and many depend on new technologies (such as high-speed rail) to access urban job centers.
9	 <b>Shake and Remake</b>	Earthquakes transform the Bay Area, with magnitude 7.0 events striking the Hayward, San Andreas, and Great Valley faults in sequence between 2025 and 2035. The resulting damage hobbles regional growth. Fortunately, new technologies – especially those developed by the private sector – create opportunities to rebuild the region in a markedly different form.

			2 + 4	3 + 5 + 11	8 + 10
External Forces			Clean and Green	Rising Tides, Falling Fortunes	Back to the Future
Environmental	1	Sea Level Rise	1 Foot	3 Feet	2 Feet
	2	Natural Disasters	2035 Hayward Fault Earthquake (magnitude 7.0)	2035 Hayward Fault Earthquake (magnitude 7.0)	2035 Hayward Fault Earthquake (magnitude 7.0)
Political	3	U.S. Political System	Healthy Democracy	Flawed Democracy	Healthy Democracy
	4	U.S. Standing in the World	Multiple Superpowers	Declining Power	Preeminent Global Power
	5a	U.S. Tax Rates	Higher Tax Rates	Lower Tax Rates	Similar to Today
	5b	U.S. Tax Structure	Carbon Tax	Income Tax (Similar to Today)	Income Tax (Similar to Today)
	6a	U.S. Spending Levels	Higher Expenditures	Lower Expenditures	Similar to Today
	6b	U.S. Spending Distribution	Similar Share to Today	Reduced Share for Metro Areas	Larger Share for Metro Areas
	7	Immigration Policy	80,000 Annual Immigrants (to Bay Area)	20,000 Annual Immigrants (to Bay Area)	240,000 Annual Immigrants (to Bay Area)
	8	Trade Policy	3% Average Tariff Rate	10% Average Tariff Rate	0% Average Tariff Rate
	9	Environmental Policy	Increased Regulations	Reduced Regulations	Similar to Today
Economic	10	U.S. Population Annual Growth Rate	+1.0%	+0.5%	+2.5%
	11	U.S. Jobs Annual Growth Rate	+0.5%	+0.5%	+2.5%
	12	U.S. Jobs Distribution	currently being refined	currently being refined	currently being refined
	13	U.S. Productivity	+4.0%	+2.0%	+2.0%
Land Use	14	Housing Preferences	Greater Preference for Urban Housing	Greater Preference for Urban Housing	Greater Preference for Dispersed Housing
	15	Workplace Preferences	Greater Preference for Dispersed Employment Centers	Similar Preference to Today	Greater Preference for Urban Employment Centers
	16	Telecommute Share	30%	15%	6%
	17	E-Commerce Market Share	50%	20%	50%
	18	Interregional Volumes	Current Growth Rates	Limited Growth Rates	Faster Growth Rates
Transportation	19	Transportation Technologies	High Speed Rail, Autonomous Rail and Buses, Freight Aerial Drones	Autonomous Buses	Hyperloop, Autonomous Rail and Buses, Freight Aerial Drones, Lower-Cost Helicopter Transport
	20	Autonomous Vehicle Market Share	95%	10%	75%
	21	Electric Vehicle Market Share	95%	10%	75%
	22	Sharing Preferences	Greater Preference	Similar Preference to Today	Reduced Preference
	23	Per-Mile Vehicle Operating Cost	\$0.50 per Mile	\$0.30 per Mile	\$0.15 per Mile
	24	Annual Federal Transportation Funding (Bay Area)	\$2.5 Billion	\$0.5 Billion	\$2.5 Billion



# Metropolitan Transportation Commission

375 Beale Street, Suite 800  
San Francisco, CA 94105

## Legislation Details (With Text)

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**File #:** 18-0362      **Version:** 1      **Name:**  
**Type:** Report      **Status:** Informational  
**File created:** 5/4/2018      **In control:** Regional Advisory Working Group  
**On agenda:** 6/5/2018      **Final action:**  
**Title:** Perspective Paper #1 Preview - Autonomous Vehicles

Preview of Horizon Perspective Paper #1, focused on strategies and policies to prepare the region for autonomous vehicles.

**Sponsors:**

**Indexes:**

**Code sections:**

**Attachments:** [4\\_Perspective Paper 1 Preview-AV.pdf](#)

Date	Ver.	Action By	Action	Result
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**Subject:**

Perspective Paper #1 Preview - Autonomous Vehicles

Preview of Horizon Perspective Paper #1, focused on strategies and policies to prepare the region for autonomous vehicles.

**Presenter:**

Adam Noelting

**Recommended Action:**

Information

**Attachments:**





## M E M O R A N D U M

TO: Regional Advisory Working Group  
FR: Adam Noelting  
RE: Perspective Paper #1 Preview - Autonomous Vehicles

DATE: May 31, 2018

### Background

Automated or autonomous vehicles (AVs) may be the most significant change to transportation since Henry Ford first made automobiles accessible to the working class. The technology is likely to have a profound impact on the Bay Area. AVs use an array of technological systems, including GPS, radar, and LIDAR backed by powerful computers and machine learning to navigate complex driving environments. With AV technologies, vehicles will eventually be capable of driving themselves – human operators and occupants optional. This capability could have dramatic implications for personal mobility, public transportation, and the movement of goods.

This report is the first in a series of *Perspective Papers* that will contribute to *Horizon*, a regional initiative exploring a range of external forces that have the potential to fundamentally alter the region's trajectory. The *Autonomous Vehicles Perspective Paper* focuses on priority policy interventions and planning strategies for the Bay Area to seize opportunities and proactively address challenges that AVs are likely to introduce. The strategies advanced via this report will be incorporated across a series of divergent *Futures* (planning scenarios), depending upon a range of assumptions including AV penetration, sharing preferences, and electric vehicle penetration.

### Bay Area AV Pilot Programs and Policy Responses

Many communities in the Bay Area are beginning to proactively explore applications of AV technology. For instance, the City of San Jose has advanced a series of pilot programs to develop communications infrastructure, implement spatial data collection, and provide service with Level 4 (high automation) fleets. GoMentum Station (Concord) is a robust AV testing facility with city-like road networks, tunnels, over- and under-passes, and railroad crossings that accurately simulate real-world conditions. Bishop Ranch (San Ramon) is piloting AV shuttles to transport workers around the office park. The pilot will move into its final phase this year, operating outside of the office park to connect with local transit.

In addition to the explicit AV pilot programs, many other entities are exploring future-facing policies, programs, and regulations. The San Francisco Municipal Transportation Agency (SFMTA) recently developed *Guiding Principles for Emerging Mobility*, a policy framework to evaluate new mobility services for all SFMTA and SFCTA decisions. The Santa Clara Valley Transportation Authority (VTA) is developing an *Automated Driving System Draft Policy*, an effort to address the issues and opportunities AVs present and explore pathways to incrementally introduce automation into VTA's business model and practices. Finally, the California Public Utilities Commission (CPUC) has moved forward on releasing a proposed framework for regulating two AV pilot programs, one with drivers in the vehicle, and one without drivers in the vehicle.

## Opportunities, Risks, and Strategies for the Bay Area

There remains tremendous uncertainty related to the timing and overall market penetration of autonomous vehicles, the extent to which driverless vehicles will be shared rather than owned, and the impacts they could have on labor, public transit, congestion, air quality, safety, and equity. To corral these uncertainties, the *Perspective Paper* relies heavily on the Horizon Guiding Principles— Affordable, Connected, Diverse, Healthy, and Vibrant— to describe the opportunities and risks of an AV future. For example, under the *Connected* principle, the Paper describes the opportunity that shared AV services could introduce a transit renaissance with improved on-demand services. However, there is also a risk that AVs would worsen congestion with more induced travel and empty vehicle circulation.

The Paper then turns to a shortlist of “priority strategies” to seize the opportunities or overcome the risks. Sticking with the *Connected* principle example, the paper describes the importance of pricing mobility fairly, designing smart streets, developing industry-wide data sharing protocols, and re-envisioning investments and innovations in our public transit system. While the presentation today focuses on a “shortlist” of strategies, the final *Perspective Paper* will also include a longer list of potential policy responses to explore, with more detail on feasibility and effectiveness. The Paper will also detail pilot programs and policy responses from across the U.S., and review the best available recent literature on the topic.

## Next Steps

The *Automated Vehicles Perspective Paper* introduces opportunities and risks, while also introducing a set of priority strategies for the region to consider. It is important to emphasize that the paper is intended to serve as an interim deliverable of the overall *Horizon* process. The strategies described in the Paper serve as a starting point for a more robust discussion this fall, when MTC and ABAG staff will engage stakeholders on strategies that can overcome various challenges facing the region across multiple *Futures*. This process will identify a narrowed-down list of strategies most effective in multiple futures to carry forward into Plan Bay Area 2050.

Finally, MTC and ABAG will hold a public event releasing the Autonomous Vehicles Perspective Paper on the evening of Tuesday, June 26, 2018, here at the Bay Area MetroCenter, 375 Beale Street, San Francisco. The event will highlight a similar presentation of the material and engage experts and the audience in a panel discussion about these topics.



HORIZON

# Autonomous Vehicles Perspective Paper

Strategies for the Bay Area



*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.

H O R I Z O N

Futures Planning

Perspective Papers

Project Performance

PLAN BAY AREA 2050

For more information, go to:  
[mtc.ca.gov/horizon](https://mtc.ca.gov/horizon)

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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
- **Next Steps**



HORIZON

# Autonomous Vehicles 101



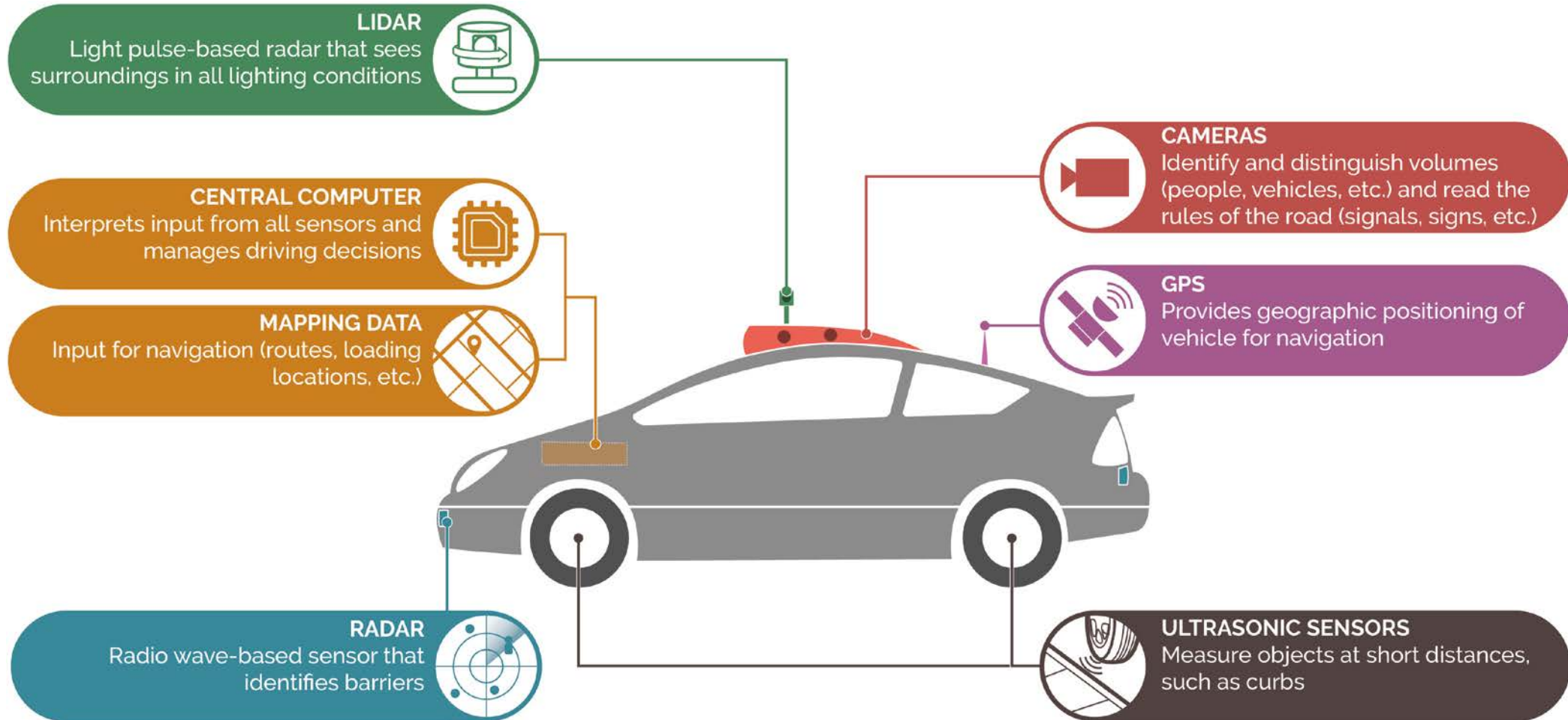
# "Automated" versus "Connected"

**AUTOMATED** The increasing ability to drive without human assistance.

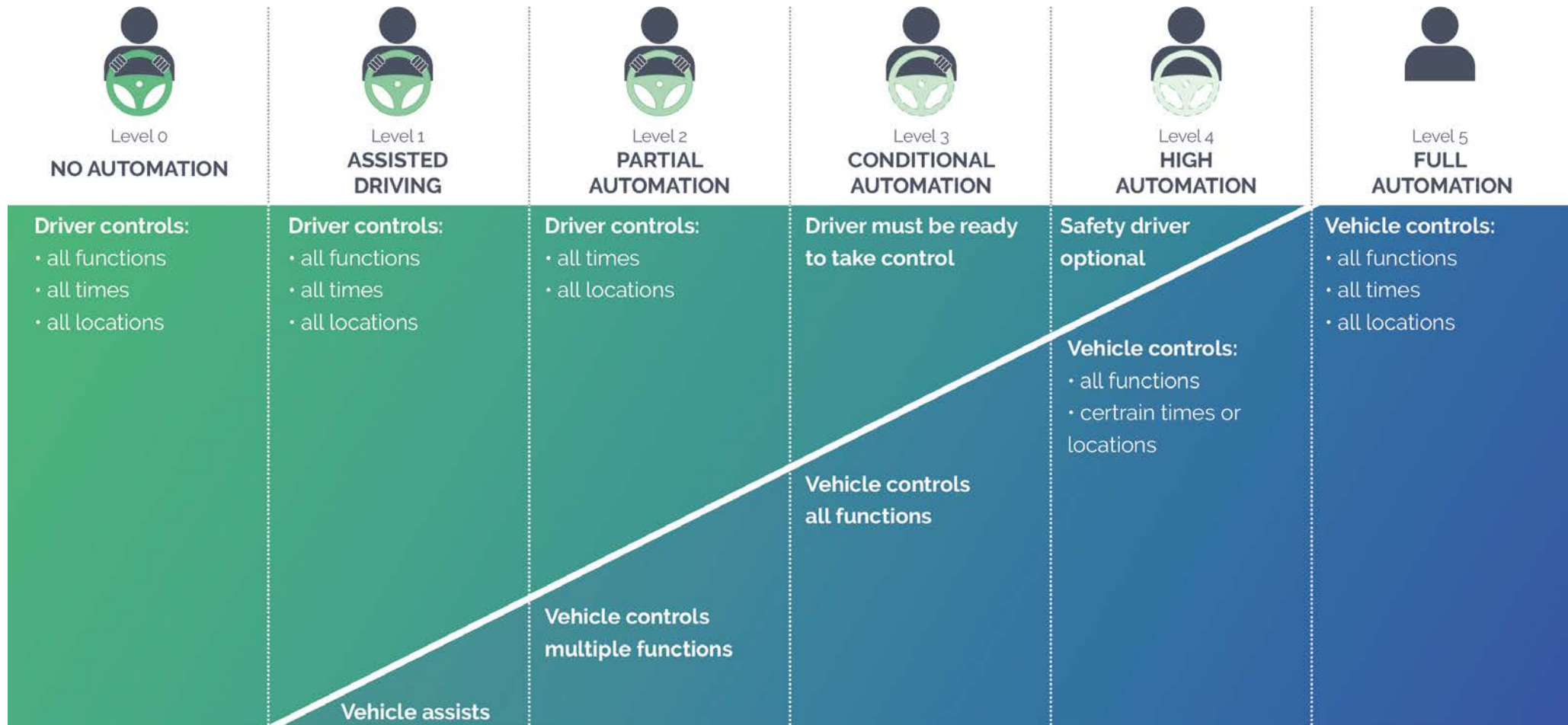
**CONNECTED** The increasing ability to share mobility or safety information among other vehicles, infrastructure, systems, etc.

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

# Autonomous Vehicles Components

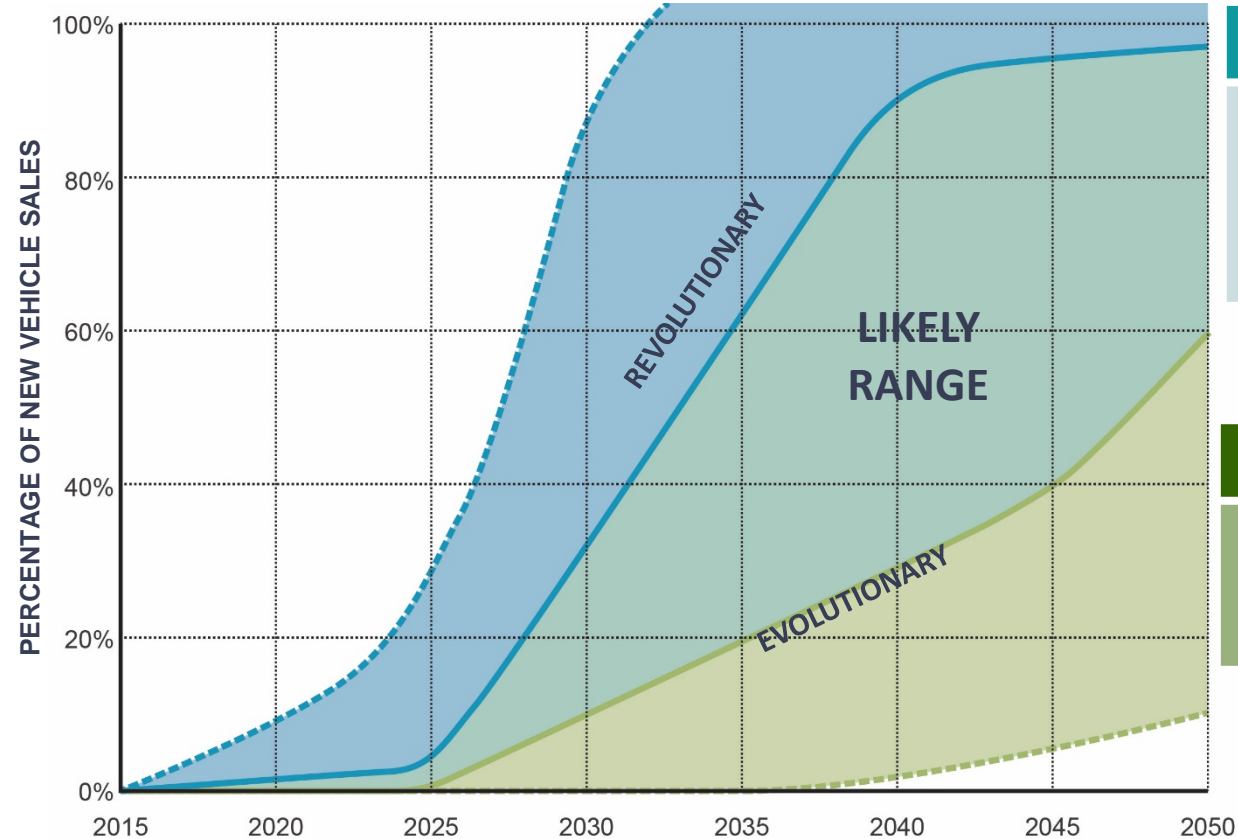


# Levels of Automation





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





HORIZON

# 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.

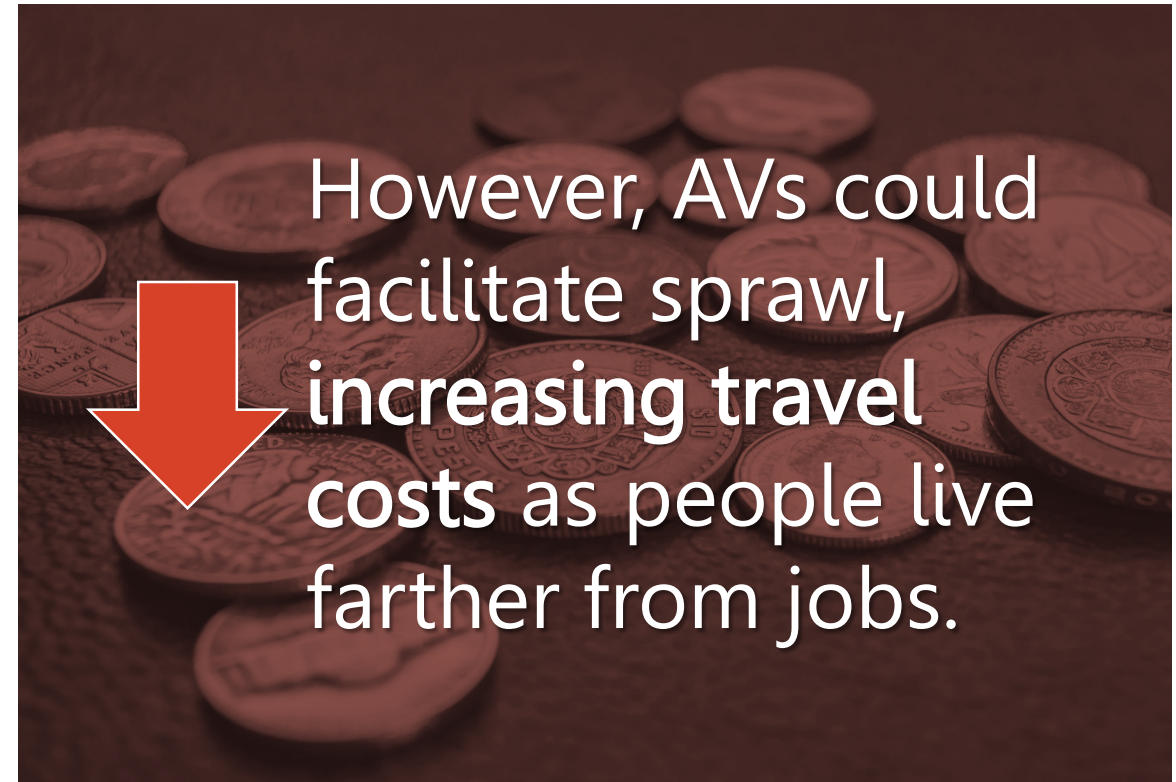


## VIBRANT

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



For lower income households, housing and transportation costs could increase to 67% of household budgets by 2040.





# Housing Opportunity Sites



AFFORDABLE

## Priority Strategies

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

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

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

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

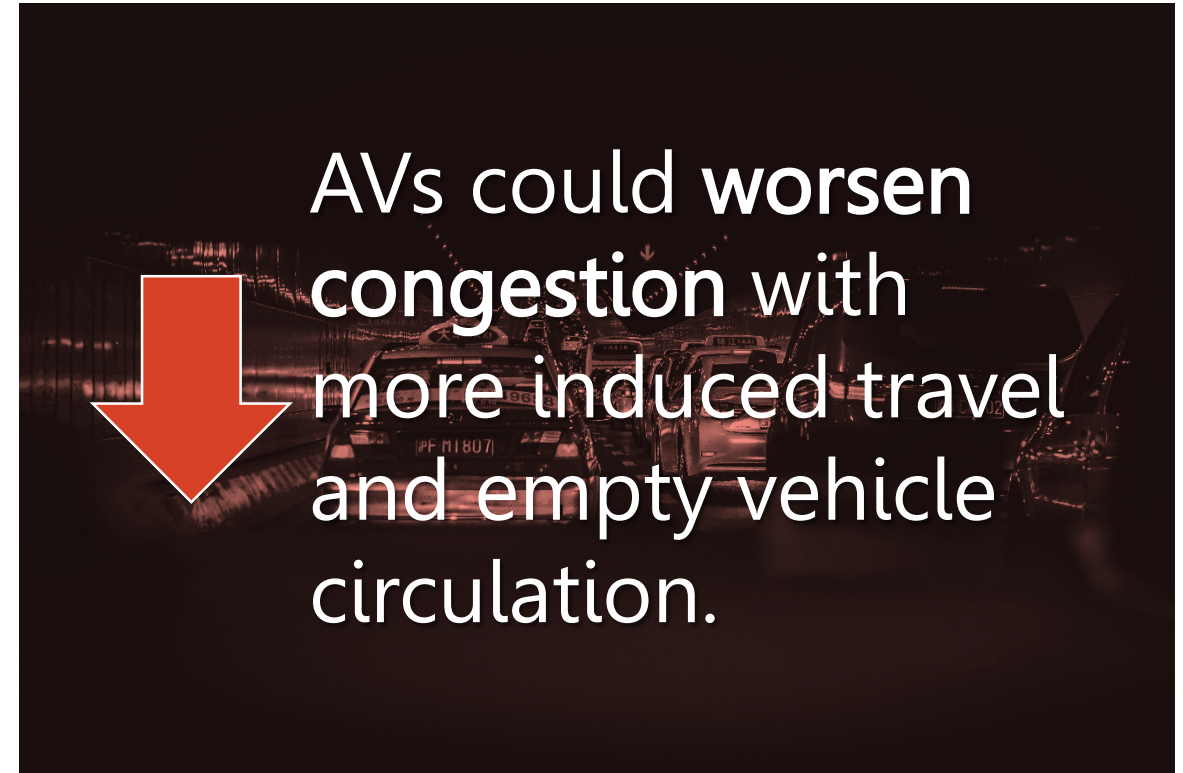
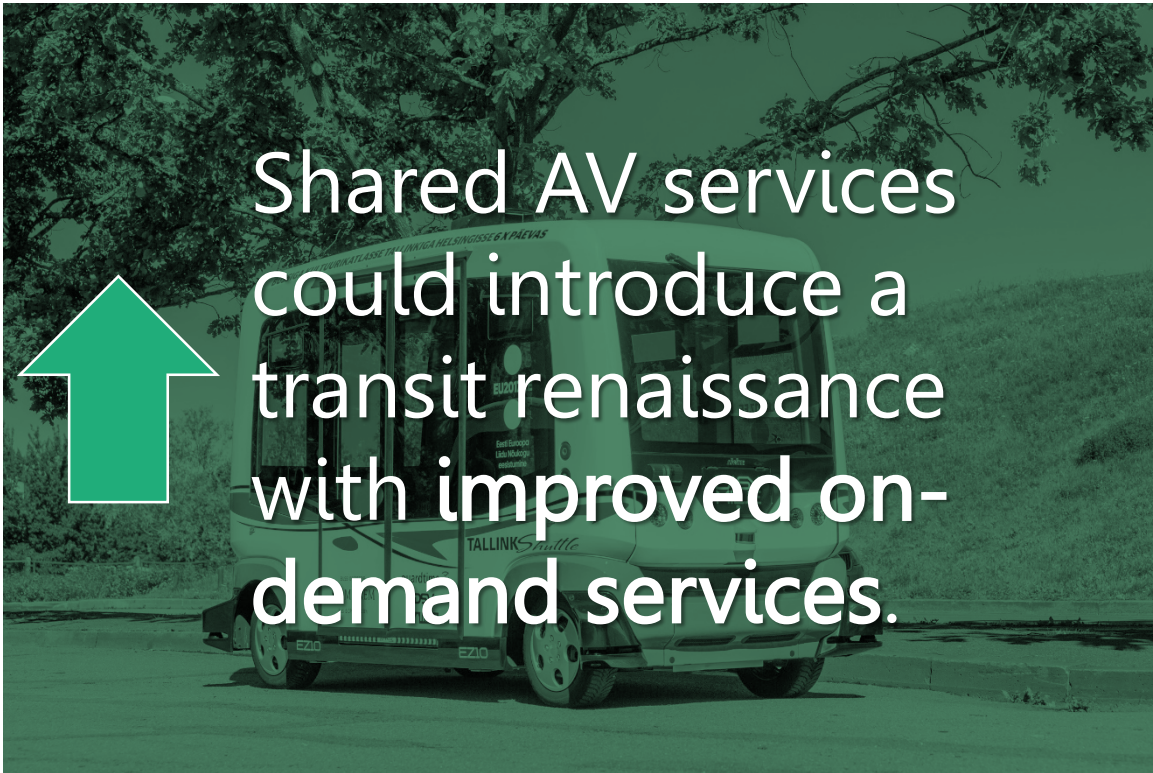
■ Parking lots and garages

Scale 1:990,000

0 5 10 15 20 25 Miles



Congestion in the Bay Area has worsened 64% since 2000, putting Bay Area traffic worst in the nation behind only Los Angeles.



# Regional On-Demand, Autonomous Microtransit



CONNECTED

- 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

— Railway network  
- - - - - Railway: Future Extension  
■ Autonomous BRT / Urban Bus  
■ Intercity Express Bus  
■ Suburban Microtransit

Scale 1:990,000  
0 5 10 15 20 25 Miles

## Priority Strategies

Double down on high-capacity bus and rail corridors

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

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

HORIZON



# Price Mobility Fairly



CONNECTED

## Priority Strategies

Price mobility fairly through **dynamic road user charging**

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

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

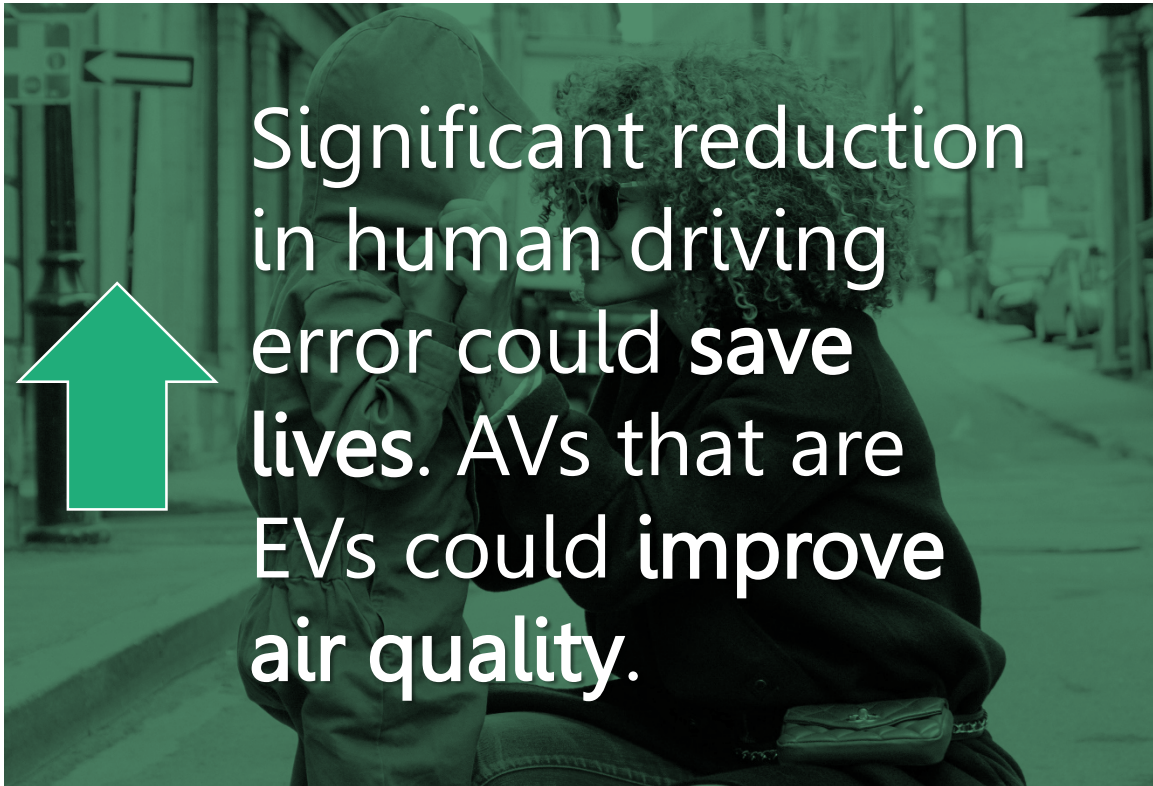
HORIZON

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

● CBD cordon price zones  
— Dynamic highway tolling

Scale 1:990,000  
0 5 10 15 20 25 Miles

Over the last 15 years, more than 6,500 people have died on Bay Area roads with an average of 6 in 100,000 residents losing their lives in traffic incidents.



# Vision Zero 2.0



- 
- A photograph of a family walking across a street crosswalk. A woman on the left carries a baby in a carrier, wearing a colorful patterned dress. A man in a dark shirt and light pants walks in the center, holding the hand of a young girl in a white dress. They are walking from left to right across the frame.
- Train **first responders**
  - Address **cybersecurity** vulnerabilities
  - Mandate **eco-driving**
  - **EV** incentives and sharing infrastructure
  - **Vehicle-to-grid** innovation

## Priority Strategies

Cap **speed limits** in downtowns, neighborhoods

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

Develop **hacking vulnerability** “bounty program”





Nearly 600,000 people were employed in the trade, transportation, and utilities industry in 2016.



# "New Deal" for Mobility



VIBRANT

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

## Priority Strategies

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

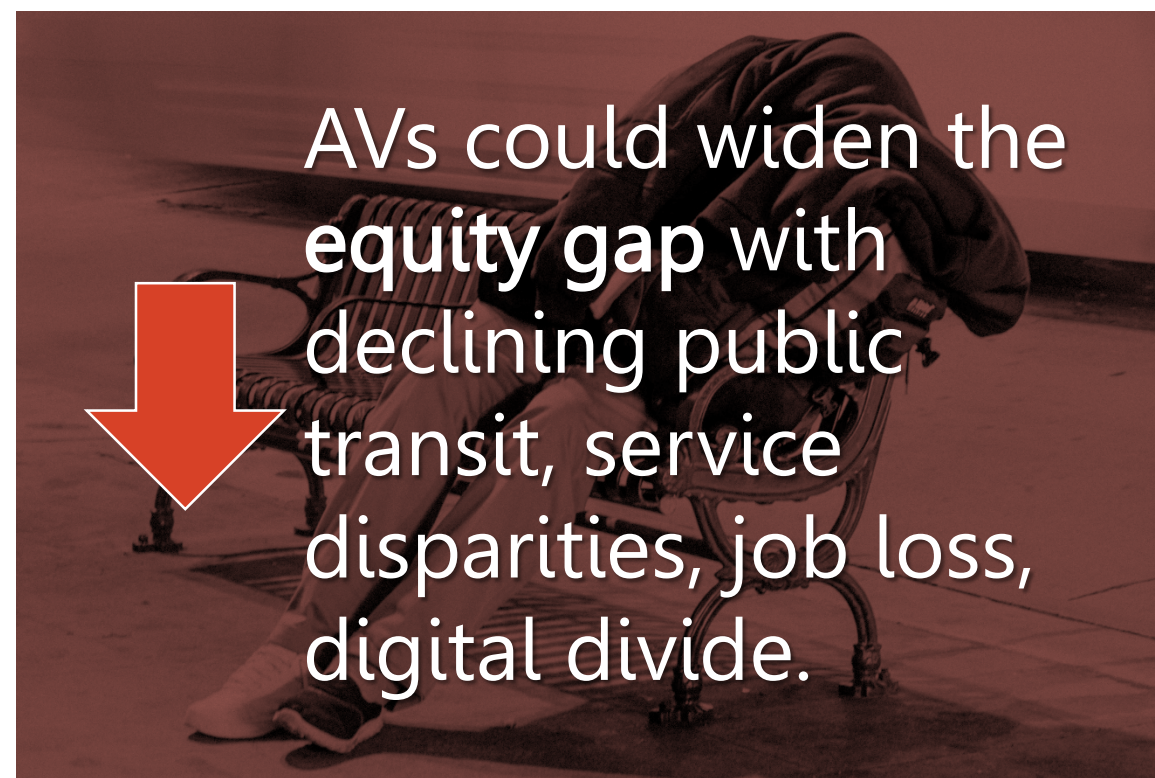
Target job clusters on **industrially-zoned land** for production, distribution, and repair

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





Racial minorities now make up 59% of the Bay Area's population.





# Require Equitable Outcomes



DIVERSE

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

## Priority Strategies

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

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

Establish **prioritization** programs for AV mobility services that target Communities of Concern





**Affordable**



**Connected**



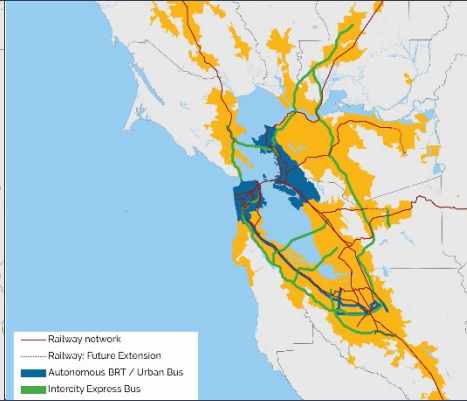
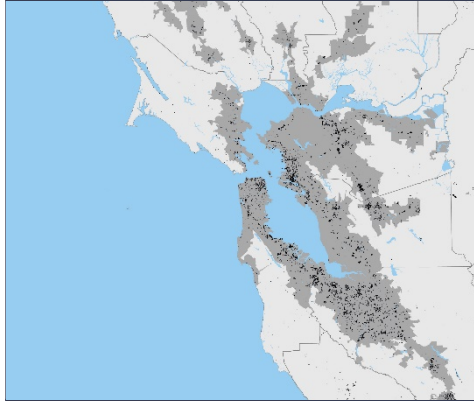
**Healthy**



**Vibrant**



**Diverse**



**Housing Opportunity Sites**

**Fair Pricing & Autonomous Transit**

**Vision Zero 2.0**

**New Deal for Mobility**

**Equitable Outcomes**

Increase affordable housing supply

Expand access to high quality transportation

Save lives and improve air quality

Expand prosperity and access to jobs

Hold mobility service providers accountable



HORIZON

# Next Steps

Incorporating Strategies to Inform Horizon and Plan Bay Area 2040



# Planning for an Uncertain Future





- This fall, the strategies advanced in the AV perspective paper will be incorporated across some or all futures, depending upon assumptions about AV penetration, sharing preferences, EV penetration, etc.
- We will identify a short-list of strategies most effective in multiple futures to carry forward into Plan Bay Area 2050.



The image is a collage. The top left has a blue header with the word 'HORIZON' in white. The background is a photograph of a white autonomous shuttle, 'The Auto Rider', parked on a paved area. The shuttle has large windows and a black roof. The text 'The Auto Rider' is visible on the side of the vehicle. The background shows a park-like setting with many trees and a tall building in the distance.

# HORIZON

Thank you!