Metropolitan Transportation Commission

Meeting Agenda

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

Planning Committee

James P. Spering, Chair Anne W Halsted, Vice Chair

Alicia C. Aguirre, Damon Connolly,
Dave Cortese, Sam Liccardo, Julie Pierce
Non-Voting Members: Tom Azumbrado, Dorene M. Giacopini

Friday, July 13, 2018 **10:00 AM** **Board Room - 1st Floor**

PLEASE NOTE TIME
This meeting is scheduled to be webcast live on the Metropolitan Transportation Commission's Web site: http://mtc.ca.gov/whats-happening/meetings and will take place at 10:00 a.m.

1. Roll Call / Confirm Quorum

Quorum: A quorum of the MTC Planning Committee shall be a majority of its regular voting members (4).

2. Pledge of Allegiance

3. Compensation Announcement - Clerk of the Committee

4. Consent Calendar

4a. 18-0483 Approval of MTC Planning Committee Minutes of the June 8, 2018 Meeting

Action: Committee Approval

Attachments: 4a_MTC PLNG_Minutes_JUN 8 2018.pdf

4b. 18-0366 Federal Performance Target-Setting Update - July 2018

Overview of federal performance targets finalized over the past six months for transit asset condition, traffic congestion, modal shift, and emissions reductions.

Action: Information

Presenter: Dave Vautin

Attachments: 4b_FederalPerformance_July2018Update.pdf

4c. 18-0513 MTC Resolution No. 2611, Revised: MTC/ Sacramento Area Council of Governments (SACOG) Memorandum of Understanding (MOU) for Air Quality Planning in Eastern Solano County

Revision to the MTC / SACOG MOU addressing project-level conformity requirements and defining travel model data exchange responsibilities in eastern Solano County.

Action: Commission Approval

Presenter: Harold Brazil

Attachments: 4c_MTC-SACOG MOU.pdf

5. Approval

5a. 18-0509 Diesel Free by '33 Statement of Purpose

Approval of Diesel Free by 2033 Memorandum of Understanding (MOU). The purpose of this MOU is to reduce diesel emissions in communities from stationary and mobile sources to zero by December 31, 2033.

Action: Commission Approval

Presenter: Krute Sing, MTC and
Abby Young, Bay Area Air Quality Management District

Attachments: 5a_Diesel Free Pledge.pdf
5a_Handout-Air District_Diesel_Free_by_33_TechAssessmentReport.pdf

6. Information

6a. 18-0484 Horizon: Proposed Futures for Analysis

Overview of Horizon's development process for futures (i.e., "what if" scenarios), including a proposed shortlist to study over the coming year.

Action: Information

Presenter: Dave Vautin and Cynthia Kroll

Attachments: 6a_Horizon_Proposed Futures.pdf

7. Public Comment / Other Business

8. Adjournment / Next Meeting

The next meeting of the MTC Planning Committee will be Friday, September 14, 2018 at 10:00 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) for public review for at least one year.

Accessibility and Title VI: MTC provides services/accommodations upon request to persons with disabilities and individuals who are limited-English proficient who wish to address Commission matters. For accommodations or translations assistance, please call 415.778.6757 or 415.778.6769 for TDD/TTY. We require three working days' notice to accommodate your request.

可及性和法令第六章：MTC 根據要求向希望來委員會討論有關事宜的殘疾人士及英語有限者提供服務/方便。需要便利設施或翻譯協助者，請致電 415.778.6757 或 415.778.6769 TDD / TTY。我們要求您在三個工作日前告知，以滿足您的要求。

Acceso y el Titulo VI: La MTC puede proveer asistencia/facilitar la comunicación a las personas discapacitadas y los individuos con conocimiento limitado del inglés quienes quieran dirigirse a la Comisión. Para solicitar asistencia, por favor llame al número 415.778.6757 o al 415.778.6769 para TDD/TTY. Requerimos que solicite asistencia con tres días hábiles de anticipación para poderle proveer asistencia.

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.

MTC's Chair and Vice-Chair are ex-officio voting members of all standing Committees.

375 Beale Street, Suite 800
San Francisco, CA 94105

Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	18-0483	**Version:**	1	**Name:**	
Type:	Minutes			**Status:**	Consent
File created:	6/8/2018			**In control:**	Planning Committee
On agenda:	7/13/2018			**Final action:**	
Title:	Approval of MTC Planning Committee Minutes of the June 8, 2018 Meeting				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	4a_MTC PLNG_Minutes_JUN 8 2018.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Approval of MTC Planning Committee Minutes of the June 8, 2018 Meeting

Recommended Action:
Committee Approval

Attachments:

Metropolitan Transportation Commission

Meeting Minutes - Draft

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

Planning Committee

James P. Spering, Chair Anne W Halsted, Vice Chair

Alicia C. Aguirre, Damon Connolly,
Dave Cortese, Sam Liccardo, Julie Pierce
Non-Voting Members: Tom Azumbrado, Dorene M. Giacopini

Friday, June 8, 2018 | **10:00 AM** | **Board Room - 1st Floor**

1. Roll Call / Confirm Quorum

Present: 6 - Commissioner Aguirre, Vice Chair Halsted, Commissioner Liccardo, Commissioner Pierce, Chair Spering, and Commissioner Cortese
Absent: 1 - Commissioner Connolly

Non-Voting Member Present: Commissioner Giacopini
Non-Voting Member Absent: Commissioner Azumbrado
Ex Officio Voting Members Present: Commission Chair Mackenzie and Commission Vice Chair Haggerty
Ad Hoc Non-Voting Member Present: Commissioner Josefowitz

2. Pledge of Allegiance

3. Compensation Announcement - Clerk of the Committee

4. Consent Calendar

Approval of the Consent Calendar

Upon the motion by Commissioner Aguirre and second by Commissioner Pierce, the Consent Calendar was approved by the following vote:

Aye: 6 - Commissioner Aguirre, Vice Chair Halsted, Commissioner Liccardo, Commissioner Pierce, Chair Spering and Commissioner Cortese
Absent: 1 - Commissioner Connolly

4a. 18-0365 Minutes of the May 11, 2018 Meeting

Action: Committee Approval

4b. 18-0367 MTC Resolution No. 4174, Revised: Revised Draft 2018 MTC Public Participation Plan

Action: Commission Approval

Presenter: Ursula Vogler

5. Information

5a. 18-0368 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: Ken Kirkey and Adam Noelting of MTC / ABAG &
Will Baumgardner and Melissa Ruhl of ARUP

Aleta Dupree was called to speak

5b. 18-0369 Horizon and Plan Bay Area 2050: Project Performance Assessment Overview

Overview of the project performance assessment for major transportation investments, currently under development for use in Horizon and Plan Bay Area 2050.

Action: Information

Presenter: Dave Vautin

6. Public Comment / Other Business

Rich Hedges was called to speak.

7. Adjournment / Next Meeting

The next meeting of the Planning Committee will be Friday, July 13, 2018 at 10:00 a.m. at the Bay Area Metro Center, 375 Beale Street, San Francisco, CA.

375 Beale Street, Suite 800
San Francisco, CA 94105

Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	18-0366	Version:	1	Name:	
Type:	Report			Status:	Consent
File created:	5/4/2018			In control:	Planning Committee
On agenda:	7/13/2018			Final action:	
Title:	Federal Performance Target-Setting Update - July 2018 Overview of federal performance targets finalized over the past six months for transit asset condition, traffic congestion, modal shift, and emissions reductions.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	4b_FederalPerformance_July2018Update.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Federal Performance Target-Setting Update - July 2018

Overview of federal performance targets finalized over the past six months for transit asset condition, traffic congestion, modal shift, and emissions reductions.

Presenter:
Dave Vautin

Recommended Action:
Information

Attachments:

METROPOLITAN
TRANSPORTATION
COMMISSION

Agenda Item 4b
Bay Area Metro Center
375 Beale Street
San Francisco, CA 94105
TEL 415.778.6700
WEB www.mtc.ca.gov

Memorandum

TO: Planning Committee DATE: July 6, 2018

FR: Executive Director

RE: Federal Performance Target-Setting Update – July 2018

Background
The Moving Ahead for Progress in the 21st Century Act, also known as MAP-21, was signed into law in 2012 and established a suite of new performance requirements for state Departments of Transportation (DOTs), metropolitan planning organizations (MPOs), and transit agencies as shown in **Attachment A**. Over the past six years, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) have been working through the rulemaking process to identify a set of performance measures that meet the requirements of the law. With these rules now coming into effect, MPOs must either support short-range statewide targets or set short-range regional targets on a recurring basis. Furthermore, MPOs must incorporate these short-range targets into their planning process – most notably, the Transportation Improvement Program (TIP) and the Regional Transportation Plan (RTP).

Under the final performance rules, MTC is responsible for setting targets for each performance measure on an ongoing rolling basis. Each measure has its own schedule and cycle for target updates, meaning that ongoing collaboration with state, regional, and local partners will be essential. These performance targets – which are focused solely on short-term transportation objectives defined by federal law – are fundamentally different from those in *Plan Bay Area 2040*. Under MTC Resolution No. 4295 adopted in June 2017, the Planning Committee delegated authority for target-setting to staff, requiring regular consultation with stakeholders through MTC's working groups and semiannual updates to the committee going forward.

2020 and 2022 Congestion and Mode Shift Targets
As discussed in **Attachment B** and **Attachment C**, MTC is required to establish traffic congestion and mode shift targets in coordination with Caltrans, as MTC receives funding through the Congestion Mitigation and Air Quality (CMAQ) Program. After working with the Regional Advisory Working Group and Caltrans throughout the spring, the agencies reached consensus on four percent traffic congestion reduction targets for San Francisco-Oakland and San Jose urbanized areas by 2022, and two percentage point increase modal shift targets by 2022. There is no penalty for failing to achieve these targets.

2018 Transit Asset Management Targets
As discussed in **Attachment D** and **Attachment E**, staff has worked with transit operators across the region to roll up their individual agency asset management targets required by FTA into year 2018 regional targets. In 2017, the Bay Area achieved two of its four transit asset condition targets (transit facilities and infrastructure) but fell short on transit revenue vehicle and non-revenue vehicle targets. 2018 targets make slight adjustments to the 2017 targets but are relatively similar overall. Unlike congestion and mode shift targets above – which are adopted every two to four years – transit asset management targets are updated annually in collaboration with transit operators.

Next Steps

Note that while there are no direct funding impacts from an MPO's failure to achieve a given performance target, MPO target-setting and performance-based planning processes will be evaluated as part of the agency's triennial review. Federal requirements also mandate that MPOs report their targets to their respective state DOT and that MPOs quantify progress made towards targets in the context of their TIPs and RTPs. These targets will also be updated on the Vital Signs performance monitoring website in the coming weeks (refer to **vitalsigns.mtc.ca.gov** for more info).

Finally, another fourteen federally-required performance targets remain to be set in the coming months, as shown in **Attachment A**. These include asset management targets for pavement and bridges as well as targets for system reliability, goods movement, and roadway safety. Staff will return to the Planning Committee with the next federal performance target-setting update in November 2018.

Steve Heminger

Attachments:

- Attachment A: List of Federally-Required Performance Measures
- Attachment B: July 2018 Target-Setting Summary: Congestion & Mode Shift Targets
- Attachment C: Proposed 2020 and 2022 Targets for Congestion & Mode Shift
- Attachment D: July 2018 Target-Setting Summary: Transit Asset Management Targets
- Attachment E: Proposed 2018 Targets for Transit Asset Management

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List of Federally-Required Performance Measures

FEDERAL GOALS & PROGRAMS	GENERAL MEASURES IN LAW	FINAL PERFORMANCE MEASURES	TARGET-SETTING FREQUENCY	TARGET-SETTING DUE DATES	CURRENT STATUS
Safety HSIP TSOP	Number of Fatalities on Roads	**1. Total number of road fatalities**	**Annual**	State: **annually in August** MPO: **annually in February**	MTC supported the State's Toward Zero Deaths targets for roadway safety in 2018. The State is currently updating targets for 2019; MTC will determine how to proceed with regards to 2019 targets in the fall.
	Rate of Fatalities on Roads	**2. Road fatalities per VMT**	**Annual**	State: **annually in August** MPO: **annually in February**	
	Number of Serious Injuries on Roads	**3. Total number of serious injuries on roads**	**Annual**	State: **annually in August** MPO: **annually in February**	
	Rate of Serious Injuries on Roads	**4. Serious injuries on roads per VMT**	**Annual**	State: **annually in August** MPO: **annually in February**	
	Non-Motorized Safety on Roads	**5. Combined total number of non-motorized fatalities and serious injuries**	**Annual**	State: **annually in August** MPO: **annually in February**	
	Safety of Public Transit Systems	**6. Total number of reportable transit fatalities** **7. Reportable transit fatalities per RVM by mode** *(example below)* *a. Motor bus* *b. Light rail* *c. etc.* **8. Total number of reportable transit injuries** **9. Reportable transit injuries per RVM by mode** *(example below)* *a. Motor bus* *b. Light rail* *c. etc.* **10. Total number of reportable transit safety events** **11. Reportable transit safety events per RVM by mode** *(example below)* *a. Motor bus* *b. Light rail* *c. etc.* **12. Mean distance between major mechanical failures by mode** *(example below)* *a. Motor bus* *b. Light rail* *c. etc.*	**Annual**	Operators: **TBD*** MPO: **TBD*** ** = measures approved in January 2017 regulatory action but transit & MPO safety target-setting requirements are slated for additional regulation later this year*	On hold pending secondary rule process and establishment of deadlines. Operators will likely have 3 months to set targets, followed by 6 months for MTC to set regional targets.

FEDERAL GOALS & PROGRAMS	GENERAL MEASURES IN LAW	FINAL PERFORMANCE MEASURES	TARGET-SETTING FREQUENCY	TARGET-SETTING DUE DATES	CURRENT STATUS
Infrastructure Condition NHPP NTAMS	Pavement Condition on the IHS	**13. Percentage of pavements on the IHS in good condition** **14. Percentage of pavements on the IHS in poor condition**	**Every 2-4 years**	State: **May 21, 2018** MPO: **November 17, 2018**	State set targets in May 2018 for pavement and bridge condition. MTC has until November 2018 to set its 1st cycle targets.
	Pavement Condition on the NHS	**15. Percentage of pavements on the non-IHS NHS in good condition** **16. Percentage of pavements on the non-IHS NHS in poor condition**	**Every 2-4 years**	State: **May 21, 2018** MPO: **November 17, 2018**	
	Bridge Condition on the NHS	**17. Percentage of NHS bridges classified in good condition** **18. Percentage of NHS bridges classified in poor condition**	**Every 2-4 years**	State: **May 21, 2018** MPO: **November 17, 2018**	
	State of Good Repair for Public Transit Assets	**19. Percentage of revenue vehicles that have met or exceeded their ULB by asset class** *(example below)* *a. Motor bus* *b. Light rail vehicle* *c. etc.* **20. Percentage of facilities within a condition rating below fair by asset class** *(example below)* *a. Maintenance yards* *b. Stations* *c. etc.* **21. Percentage of guideway directional route-miles with performance restrictions** **22. Percentage of non-revenue vehicles that have met or exceeded their ULB**	**Annual**	Operators: **annually in January** (2017 & 2018)**; annually in October** (going forward) MPO: **annually in July** (2017 & 2018)**; annually in March** (going forward)	Operators have set their 2017 and 2018 targets by FTA's January 1st deadline. MTC set its 2017 targets by July 2017 and has now finalized its 2018 TAM targets.
System Reliability NHPP	Performance of the Interstate System	**23. Percentage of person-miles traveled on the IHS that are reliable**	**Every 2-4 years**	State: **May 21, 2018** MPO: **November 17, 2018**	State set targets in May 2018 for system reliability. MTC has until November 2018 to set its 1st cycle targets. The CO_2 performance target requirement was eliminated by FHWA rulemaking in spring 2018.
	Performance of the NHS	**24. Percentage of person-miles traveled on the non-IHS NHS that are reliable** ~~**25. Percent change in NHS tailpipe CO_2 emissions** *(compared to 2017 baseline)*~~	**Every 2-4 years**	State: **May 21, 2018** MPO: **November 17, 2018**	

FEDERAL GOALS & PROGRAMS	GENERAL MEASURES IN LAW	FINAL PERFORMANCE MEASURES	TARGET-SETTING FREQUENCY	TARGET-SETTING DUE DATES	CURRENT STATUS
Freight Movement and Economic Vitality NHFP	Freight Movement on the Interstate System	**26. Percentage of IHS mileage providing reliable truck travel times**	**Every 2-4 years**	State: **May 21, 2018** MPO: **November 17, 2018**	State set targets in May 2018 for goods movement. MTC has until November 2018 to set its 1st cycle targets.
Congestion Reduction CMAQ	Traffic Congestion	**27. Annual hours of peak-hour excessive delay per capita by urbanized area** **a. San Francisco-Oakland UA** **b. San Jose UA** **c. Concord UA**** **d. Santa Rosa UA**** **e. Antioch UA**** **28. Percent of non-SOV travel by urbanized area** **a. San Francisco-Oakland UA** **b. San Jose UA** **c. Concord UA**** **d. Santa Rosa UA**** **e. Antioch UA**** *** = not required during 1st target-setting cycle*	**Every 2 years**	State: **May 21, 2018** MPO: **November 17, 2018** *Note that targets must be fully consistent with state targets; therefore the de facto target-setting deadline for both State and MPO is May 21.*	State & MTC agreed upon targets in May 2018 for PHED and non-SOV travel.
Environmental Sustainability CMAQ	On-Road Mobile Source Emissions	**29. Total emissions reductions from CMAQ-funded projects by pollutant** **a. $PM_{2.5}$** **b. PM_{10}** **c. CO** **d. VOC** **e. NO_x**	**Every 2 years**	State: **May 21, 2018** MPO: **November 17, 2018**	State set targets in May 2018 for CMAQ emissions reductions. MTC has until November 2018 to set its 1st cycle targets.
Reduced Project Delivery Delays	*none*	***none*** *(neither MAP-21 nor FAST included performance measures for this goal)*	***n/a***	***n/a***	***n/a***

July 2018 Target-Setting Summary: Congestion and Mode Shift Targets

Overview

The final rule from FHWA established two performance measures to assess performance for congestion reduction, which are required for regions receiving CMAQ funding, in accordance with MAP-21. The rule contained new requirements for State DOTs and MPOs. The major requirements of the rule related to congestion and mode shift are:

1) **Congestion and Mode Shift Performance Targets** – The final rule established two performance measures to assess progress towards the congestion reduction goal. The final rule establishes the following performance measures for congestion and mode shift:

Measure	Definition
Annual hours of peak-hour excessive delay per capita by urbanized area	The number of person-hours per year for which people experience excess delay – defined as travel times below 20 mph or 60 percent of the posted speed limit during peak periods – on the National Highway System, divided by the population of the applicable urbanized area.
Percent of non-SOV travel by urbanized area	Share of commute trips for which the primary mode is not a single-occupant vehicle as defined by the U.S. Census Bureau, including travel avoided by telecommuting.

State DOTs and MPOs must set two-year and four-year numerical targets every four years for each CMAQ measure to comply with the regulation. Unlike most other targets, the state DOT and MPO targets for each urbanized area must be fully consistent.

2) **Reporting** – MTC must report progress on these measures in future Regional Transportation Plans (RTPs) and Transportation Improvement Programs (TIPs), as well as through a new CMAQ Performance Plan requirement. FHWA will review MPO performance as part of the triennial review process.

3) **Evaluation –** State DOTs and MPOs are not subject to "significant progress" determinations for targets under the CMAQ program. Instead, state DOTs will be evaluated for making progress towards the related system reliability and goods movement targets.

MPOs are required to establish their 2020 and 2022 targets for traffic congestion and mode shift by November 17, 2018, 180 days after the state DOT requirement. However, because the state DOT and MPO targets must be fully consistent for these measures, the *de facto* deadline for target-setting was May 21, 2018. These targets are set every 4 years; adjustments to the 4-year targets (e.g., 2022 targets for this round) are allowed at the halfway point of the four-year cycle. The process will be repeated in 2022, with additional requirements to set targets for Concord, Santa Rosa, and Antioch urbanized areas at that time.

Target-Setting Approach and Rationale

In compliance with new federal performance management rules, state and regional performance targets for congestion and mode shift must be fully consistent with those set by Caltrans. Caltrans held several workshops across the state with MPO partners to determine the appropriate approach for setting these targets. There was significant discussion regarding the tradeoffs between setting ambitious targets and achievable targets, especially given rising congestion due to the state's booming economy and declining transit ridership (particularly in Southern California).

This spring, staff sought input from stakeholders on target-setting options for traffic congestion and mode shift at the Regional Advisory Working Group, which includes representatives from CMAs, cities, NGOs, and others. Stakeholders provided input on their preferred target setting approach, noting that the target-setting approach should be consistent across urbanized areas (i.e., apply the same percentage increase to San Francisco-Oakland and San Jose urbanized areas). There was also support for aligning targets with the adopted longer-term targets for mode shift and congestion reduction in *Plan Bay Area 2040*.

Ultimately, Caltrans and the MPOs reached a consensus to set somewhat aspirational targets to slightly reduce congestion and slightly increase non-SOV mode share over the next four years, given new funding for transportation from sources like Senate Bill 1. For the Bay Area, the congestion reduction targets reflect a reversal of the trend of rising congestion over the last decade, but the mode shift targets are consistent with our region's steady rise in non-SOV mode share since the end of the Great Recession. Targets for the San Francisco Bay Area were somewhat more ambitious than those elsewhere in the state to align them more closely with the longer-range trajectory of targets from *Plan Bay Area 2040*.

Summary of Proposed Targets

Measure	Current*	2020 Target	2022 Target
Annual hours of peak-hour excessive delay per capita *(San Francisco-Oakland UA)*	31.3 hours/year	N/A	30.0 hours/year
Annual hours of peak-hour excessive delay per capita *(San Jose UA)*	27.5 hours/year	N/A	26.4 hours/year
Percent of non-single-occupant vehicle travel *(San Francisco-Oakland UA)*	44.3%	45.3%	46.3%
Percent of non-single-occupant vehicle travel *(San Jose UA)*	24.5%	25.5%	26.5%

***** = *based upon most recently available data; for congestion (peak-hour delay), year 2017 data is used; for mode share, year 2016 data is used.*

Proposed 2020 and 2022 Targets for Congestion and Mode Shift

General Information

Goal	Congestion Reduction
Performance Measure(s)	• Annual hours of peak-hour excessive delay per capita *(by urbanized area)* • Percent of non-single-occupant vehicle (non-SOV) travel *(by urbanized area)*
Target(s) for Year	2020 and 2022
Target(s) Deadline for MTC Approval	May 21, 2018 *(concurrence with Caltrans; de facto deadline)* November 17, 2018 *(official deadline)*

Current Conditions and Proposed Targets

Measure	Urbanized Area	Current*	Target (2020)	Target (2022)	Measure ID
Annual hours of peak-hour excessive delay per capita *(by urbanized area)*	San Francisco-Oakland	**31.3**	N/A	**30.0**	*US-27a*
	San Jose	**27.5**	N/A	**26.4**	*US-27b*
	Concord	N/A	N/A	N/A	*US-27c*
	Santa Rosa	N/A	N/A	N/A	*US-27d*
	Antioch	N/A	N/A	N/A	*US-27e*
Percent of non-single-occupant vehicle travel *(by urbanized area)*	San Francisco-Oakland	**44.3%**	**45.3%**	**46.3%**	*US-28a*
	San Jose	**24.5%**	**25.5%**	**26.5%**	*US-28b*
	Concord	N/A	N/A	N/A	*US-28c*
	Santa Rosa	N/A	N/A	N/A	*US-28d*
	Antioch	N/A	N/A	N/A	*US-28e*

Cells marked with N/A indicate that these targets are not required this cycle, but they will be required going forward in perpetuity starting in 2022.

***** = based upon most recently available data; for congestion (peak-hour delay), year 2017 data is used; for mode share, year 2016 data is used.*

July 2018 Target-Setting Summary: Transit Asset Management Targets

Overview

The transit asset management (TAM) final rule published by FTA in July 2016 established a National TAM System in accordance with MAP-21. The rule contained new requirements for public transit providers, and designated recipients such as MTC. The major requirements of the rule include:

1) **State of Good Repair (SGR) Performance Targets** – Targets must be set for each applicable asset including Rolling Stock, Equipment, Infrastructure, and Facilities. The final rule establishes SGR standards and SGR performance measures as shown below:

Asset Category	**Performance Measure**
Rolling Stock: All revenue vehicles	Percentage of revenue vehicles within a particular asset class that have either met or exceeded their Useful Life Benchmark (ULB)
Facilities: All buildings or structures and parking facilities	Percentage of facilities within an asset class, rated below condition 3 (fair) on the TERM scale
Infrastructure: Only rail fixed guideway, tracks, signals and systems	Percentage of guideway directional route-miles with performance restrictions
Equipment: Only non-revenue (service) vehicles	Percentage of non-revenue vehicles that have either met or exceeded their ULB

In the case of rolling stock and facilities, the major asset categories are further broken down into distinct asset classes, with targets required for each asset class. For the 2018 target-setting effort, targets for rolling stock were set by asset class (trains, buses, trolleys, etc.). Similarly, targets for facilities were set by categories (administrative & maintenance facilities and passenger & parking facilities).

Note that over time some targets improve relative to existing performance measures if there is funding available to replace or repair assets that are in poor condition. On the other hand, if there is no funding available to replace or repair assets, targets can worsen due to these assets aging another year and exceeding their useful lives.

2) **Development of TAM Plans** – Tier I operators (rail operators and any operators with 101 or more vehicles) must do their own TAM plan consisting of nine required elements. Tier II operators (operators with 100 vehicles or less) may do their own plan or participate in a group plan. There are only four required elements to the TAM plan for Tier II operators.

3) **Reporting –** Operators must report annually to FTA on SGR targets, asset conditions, and progress made towards meeting set targets.

The Planning Rule requires that each MPO establish targets no later than 180 days after the date on which the transit providers establish their performance targets. Therefore, staff has developed proposed 2018 regional transit asset management targets to comply with the Rule.

Target-Setting Approach and Rationale

To set the initial targets, MTC staff assessed the current condition of operators' assets using data from the Regional Transit Capital Inventory (RTCI). The RTCI is a comprehensive regional database of the transit assets that are owned by transit agencies across the region. MTC developed the RTCI in order to collect consistent and comparable data on the region's transit capital assets and associated replacement and rehabilitation costs from each operator.

To set the target for each asset category, MTC staff provided each operator with existing performance measures (by asset class) for their asset inventory included in the RTCI and requested that each operator conduct an analysis of expected funding from all sources for the coming fiscal year that will be used to repair or replace transit assets. Most operators used this assessment to predict which vehicle assets would be replaced or repaired, and presented MTC with a target percentage of assets expected not to be in a state of good repair by the end of the fiscal year.

Operators were instructed to keep the targets realistic and base them on reasonable financial projections. For revenue vehicles, facilities, non-revenue vehicles, and infrastructure, MTC staff consolidated the targets for all operators to identify a regional target for each asset class.

Summary of Proposed Targets

As presented in detail in **Attachment E**, staff recommends setting the following targets for transit asset management for year 2018, based on a consolidation of individual operator targets. As shown below, the regional targets seek to reduce the share of revenue vehicles and non-revenue vehicles considered not to be in a state of good repair, but predict a slight decline in the condition of infrastructure and facilities in the coming year.

Percent of Assets Not in a State of Good Repair

Asset Category	2017 Target	2017 Performance	2018 Target
Revenue Vehicles	28%	36% ***(target not achieved)***	31%
Facilities	25%	21% ***(target achieved)***	24%
Infrastructure	2.4%	1.5% ***(target achieved)***	1.8%
Non-Revenue Vehicles	48%	64% ***(target not achieved)***	53%

Review of Past Performance

Revenue Vehicles: There has been an overall decline in the performance of revenue vehicle assets which is primarily attributable to a couple of the larger operators retaining bus fleets for a year or two beyond useful life. Operators often need to keep buses in service for one to two years beyond useful life in order to amass sufficient funding and complete the procurement process. At least one of the region's operators has plans to replace their fleet this year.

Facilities: The facilities performance measure has improved since last year. This is mainly attributable to a different methodology used for calculating the performance measure for facilities by one large operator. That operator has also adopted a lower target for facilities' state of repair over the coming year.

Infrastructure: The infrastructure performance measure has improved as rail operators saw a decline in their guideway directional route-miles with restrictions and expect it to increase marginally over the coming year.

Non-Revenue Vehicles: There has also been an overall decline in the performance of non-revenue vehicle assets as most of the operators reported non-revenue vehicles which have exceeded their useful life over the past year. Some of these vehicles will be replaced over the coming year.

Proposed 2018 Targets for Transit Asset Management

General Information

Goal	Infrastructure Condition
Performance Measure(s)	• Percentage of revenue vehicles that have met or exceeded their useful life benchmark (ULB) by asset class • Percentage of facilities within a condition rating below fair by asset class • Percentage of guideway directional route-miles with performance restrictions • Percentage of non-revenue vehicles that have met or exceeded their ULB
Target(s) for Year	2018
Target(s) Deadline for MTC Approval	July 1, 2018

Past Targets & Past Performance

Measure	Subcategory	Target (2017)	Actual (2017)	Target Achieved?	Measure ID
Percentage of revenue vehicles that have met or exceeded their useful life benchmark (ULB)	Articulated bus	13%	23%	No	*US-19a*
	Automated guideway vehicle	0%	0%	Yes	*US-19b*
	Bus	18%	36%	No	*US-19c*
	Bus rapid transit	0%	N/A	N/A	*US-19d*
	Cable car	0%	0%	Yes	*US-19e*
	Commuter rail – locomotive	58%	69%	No	*US-19f*
	Commuter rail – passenger coach	42%	53%	No	*US-19g*
	Commuter rail – self-propelled passenger car	44%	42%	Yes	*US-19h*
	Ferryboat	29%	24%	Yes	*US-19i*
	Heavy rail	85%	81%	Yes	*US-19j*
	Light rail	0%	0%	Yes	*US-19k*
	Over-the-road bus	12%	19%	No	*US-19l*
	Trolley bus	0%	10%	No	*US-19m*
	Van	37%	41%	No	*US-19n*
	Vintage trolley[1]	25%	51%	No	*US-19o*
Percentage of facilities with a condition rating below fair	n/a*	25%	21%	Yes	*US-20*
Percentage of guideway directional route-miles with performance restrictions	n/a	2.4%	1.5%	Yes	*US-21*
Percentage of non-revenue vehicles that have met or exceeded their ULB	n/a	48%	64%	No	*US-22*

***** = *For the 2017 target-setting effort, a single target was set for all facilities combined. At that time, MTC did not have sufficient information from operators required to classify facilities and components of facilities into the specific classes defined by FTA.*

Current Conditions and Proposed Targets

Measure	Subcategory	Current (2017)	Target (2018)	Total #	Measure ID
Percentage of revenue vehicles that have met or exceeded their useful life benchmark (ULB)	Articulated bus	23%	19%	400	*US-19a*
	Automated guideway vehicle	0%	0%	12	*US-19b*
	Bus	36%	27%	2,120	*US-19c*
	Cable car	0%	0%	42	*US-19e*
	Commuter rail – locomotive	69%	69%	35	*US-19f*
	Commuter rail – passenger coach	53%	53%	129	*US-19g*
	Commuter rail – self-propelled passenger car	42%	42%	50	*US-19h*
	Ferryboat	24%	13%	21	*US-19i*
	Heavy rail	81%	81%	669	*US-19j*
	Light rail	0%	0%	250	*US-19k*
	Over-the-road bus	19%	31%	176	*US-19l*
	Trolley bus	10%	24%	333	*US-19m*
	Van	41%	32%	622	*US-19n*
	Vintage trolley[1]	51%	0%	43	*US-19o*
Percentage of facilities with a condition rating below fair	Administrative & Maintenance	24%	18%	N/A	*US-20a*
	Passenger & Parking	4%	5%	N/A	*US-20b*
Percentage of guideway directional route-miles with performance restrictions	n/a	1.5%	1.8%	474	*US-21*
Percentage of non-revenue vehicles that have met or exceeded their ULB	n/a	64%	53%	1,941	*US-22*

[1] *Performance measures and targets for these historic assets (that will not be retired) are calculated based on whether an overhaul has been completed at the designated interval or whether it has been deferred for longer than that amount of time. Useful life benchmarks for historic assets are set based on an expected overhaul schedule.*

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San Francisco, CA 94105

Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	18-0513	Version: 1	Name:		
Type:	Report		Status:	Consent	
File created:	6/11/2018		In control:	Joint MTC Planning Committee with the ABAG Administrative Committee	
On agenda:	7/13/2018		Final action:		
Title:	MTC Resolution No. 2611, Revised: MTC/ Sacramento Area Council of Governments (SACOG) Memorandum of Understanding (MOU) for Air Quality Planning in Eastern Solano County Revision to the MTC / SACOG MOU addressing project-level conformity requirements and defining travel model data exchange responsibilities in eastern Solano County.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	4c_MTC-SACOG MOU.pdf				

Date	Ver.	Action By	Action	Result

Subject:

MTC Resolution No. 2611, Revised: MTC/ Sacramento Area Council of Governments (SACOG) Memorandum of Understanding (MOU) for Air Quality Planning in Eastern Solano County

Revision to the MTC / SACOG MOU addressing project-level conformity requirements and defining travel model data exchange responsibilities in eastern Solano County.

Presenter:

Harold Brazil

Recommended Action:

Commission Approval

Attachments:

METROPOLITAN
TRANSPORTATION
COMMISSION

Agenda Item 4c
Bay Area Metro Center
375 Beale Street
San Francisco, CA 94105
TEL 415.778.6700
WEB www.mtc.ca.gov

Memorandum

TO: Planning Committee DATE: July 6, 2018

FR: Executive Director W. I. 1412

RE: MTC Resolution No. 2611, Revised: MTC/ Sacramento Area Council of Governments (SACOG) Memorandum of Understanding (MOU) for Air Quality Planning in Eastern Solano County

For federal transportation planning and fund programming purposes, the San Francisco Bay Area is defined as the entire nine California counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. All but the eastern half of Solano County and the northern half of Sonoma County lie within the San Francisco Bay Area federal 8-hour ozone and $PM_{2.5}$ nonattainment areas. The eastern half of Solano County is also designated nonattainment for the ozone national ambient air quality standards but is included in the Sacramento Metropolitan air quality planning area. The northern half of Sonoma County is designated unclassifiable/attainment for 8-hour ozone and $PM_{2.5}$. As a result, transportation-air quality conformity procedures in the eastern half of Solano County are the responsibility of the SACOG, while MTC has the transportation planning and fund programming responsibilities for both the eastern and western portions of Solano County.

Background
In May 1994, MTC and SACOG entered into a MOU in response to federal planning and consultation requirements for states and MPOs to coordinate plans and programs. Specifically, the original MTC/SACOG MOU (1994) satisfied requirements regarding the programming of Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds in the eastern Solano County air quality/transportation planning overlap area. The original MTC/SACOG MOU was revised in July 2004 to clarify MTC and SACOG's roles and responsibilities to program CMAQ funds in the event of a non-conforming Regional Transportation Plan or Transportation Improvement Program or a conformity lapse in the respective regions.

MTC staff has consulted with the Bay Area's interagency Air Quality Conformity Task Force[1] and SACOG staff to prepare revisions to the MTC/SACOG MOU (2004). The proposed revisions account for additional federal transportation-air quality requirements and provide clarity on MTC and SACOG's roles and responsibilities on these new requirements. The proposed MTC/SACOG MOU revisions have been reviewed and approved by the Air Quality Conformity Task Force and SACOG staff. The key revisions are summarized below:

[1] The Bay Area's Air Quality Conformity Task Force consists of members of the U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Caltrans, California Air Resources Board (CARB), Bay Area Air Quality Management District (BAAQMD), and MTC/ABAG.

- Coordination between MTC and SACOG when exchanging travel data for emission inventories in eastern Solano County; and,
- Coordination between MTC and SACOG when conducting project-level conformity in eastern Solano County.

Recommendation

MTC staff requests the Planning Committee refer MTC Resolution No. 2611, Revised, to the Commission for approval and authorize MTC's Executive Director or his designee to execute the MTC/SACOG MOU.

Steve Heminger

Attachment:

- Attachment A: MTC Resolution No. 2611, Revised

SH:hb
J:\COMMITTE\Planning Committee\2018\07_PLNG_Jul 2018\4ci_MTC-SACOG MOU Update Memo-2.docx

Date: September 23, 1993
W.I.: 902.90.01
Referred by: WPC
Revised: 07/28/04-C
07/25/18-C

ABSTRACT

MTC Resolution No. 2611, Revised

This resolution approves and adopts a Memorandum of Understanding (MOU) between MTC and the Sacramento Area Council of Government (SACOG) related to the programming of federal Congestion Mitigation and Air Quality funds and federal air quality conformity procedures in a portion of Solano County.

This resolution was previously revised on July 28, 2004, to clarify the responsibilities of MTC and SACOG for the overlapped area during a conformity lapse.

This resolution was revised again on July 25, 2018, to update and clarify the responsibilities of MTC and SACOG for the overlapped area for conducting the project-level conformity process and coordinating the exchange of travel data.

Further discussion of this action is contained in the Executive Director's memos dated July 2, 2004 and July 13, 2018.

Date: September 23, 1993
W.I.: 902.90.01
Referred by: WPC

Re: Approval of Memorandum of Understanding with Sacramento Area Council of Governments coordinating Planning and Programming in a portion of Solano County.

METROPOLITAN TRANSPORTATION COMMISSION

RESOLUTION NO. 2611

WHEREAS, the Metropolitan Transportation Commission (MTC) is the regional transportation planning agency for the San Francisco Bay Area pursuant to Government Code Section 66500 et seq. and is the region's Metropolitan Planning Organization (MPO); and

WHEREAS, the Intermodal Surface Transportation Efficiency Act (ISTEA) (Public Law 102-240, 105 Stat.1914, December 19, 1991) created the Congestion Mitigation and Air Quality Program (23 U.S.C. Section 149) to fund programs and projects which contribute to the attainment of national air quality standards in nonattainment areas; and

WHEREAS, the federal Clean Air Act Amendments of 1990 (42 U.S.C. Section 7401 et seq.) require an air quality conformity analysis to be conducted on the region's Transportation Improvement Program (TIP); and

WHEREAS, ISTEA prescribes a specified formula for the distribution of CMAQ funds and state law requires funds to be distributed by this same formula to MPOs; and

WHEREAS, MTC is responsible for conforming the region's TIP to federal air quality requirements and with the programming and allocation of CMAQ funds; and

WHEREAS, a portion of Solano County which is in MTC's metropolitan planning area is in the Sacramento air basin, for which the MPO is Sacramento Area Council of Governments (SACOG); and

WHEREAS, ISTEA requires that if more than one MPO has authority in an area which is designated as nonattainment, the MPOs must consult with each other and the state in the coordination of plans and programs; and

WHEREAS, MTC and SACOG have developed, in consultation with the State Department of Transportation (Caltrans), the State Air Resources Board, and the Governor's Office, a process set forth in Attachment A to this Resolution for determining conformity with the federal Clean Air Act of projects in the TIP located in the part of Solano County located in the Sacramento air basin and for distributing CMAQ funds in this overlapping area within Solano County; now, therefore, be it

RESOLVED, that the Memorandum of Understanding (MOU) between MTC and SACOG attached hereto as Attachment A to this Resolution and incorporated herein as though set forth in full is hereby approved; and, be it further

RESOLVED, that the Executive Director or his designee has the authority to negotiate minor revisions to the MOU; and, be it further

RESOLVED, that MTC's responsibilities in allocating federal CMAQ funds and determining air quality conformity in the overlapping area of Solano County shall be carried out pursuant to the procedures in Attachment A.

METROPOLITAN TRANSPORTATION COMMISSION

Jane Baker

Jane Baker, Chairwoman

The above resolution was entered into by the Metropolitan Transportation Commission at a regular meeting of the Commission held in Oakland, California, on September 22, 1993

Amended and Restated Memorandum of Understanding Between The Metropolitan Transportation Commission And The Sacramento Area Council of Governments

THIS AMENDED AND RESTATED MEMORANDUM OF UNDERSTANDING (the "Agreement"), is made effective as of the _____ day of _____, 2018, by and between the Metropolitan Transportation Commission ("MTC") and the Sacramento Area Council of Governments ("SACOG").

Purpose

The purpose of this Memorandum of Understanding (MOU) is to establish agreement among the undersigned parties regarding the programming of federal Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds in Solano County and on federal conformity procedures consistent with federal regulations.

Background

The CMAQ Program was established by the Intermodal Surface Transportation Efficiency Act (ISTEA) (Public Law # 102-240), and continued by the Fixing America's Surface Transportation Act (FAST Act) (Public Law #114-94), to fund programs and projects that contribute to the attainment of national air quality standards in nonattainment areas. Pursuant to the FAST Act, CMAQ funds are distributed to the state by a formula based on relative nonattainment area population and a pollution severity factor. State law (Streets and Highway Code Section 182) requires CMAQ funds to be apportioned by the State Department of Transportation to metropolitan planning organizations (MPOs) and transportation planning agencies in accordance with this same formula.

Metropolitan boundaries define the area in which a metropolitan planning process must be carried out. The boundaries are determined by agreement between the MPO and the Governor and must encompass the current urbanized areas and the area expected to be urbanized during a 20-year forecast period. In nonattainment areas for ozone and/or carbon monoxide, the boundaries must encompass the entire nonattainment area, unless the MPO and the Governor decide to exclude a portion of the nonattainment area (23 USC 13 (c)).

As result of these boundary requirements, a portion of Solano County is in the Sacramento air basin, which is governed by the Sacramento Area Council of Governments (SACOG). The entirety of Solano County, however, remains part of the MTC region and MTC has responsibility for the planning and programming process in the County. Due to this overlapping boundary situation, MTC and SACOG wish to establish a cooperative procedure for developing a programming and conformity process for this area.

The U.S. Environmental Protection Agency's (EPA's) "Guidance for Transportation Conformity Implementation in Multi-Jurisdictional Nonattainment and Maintenance Areas" states that there must be a regional emissions analysis for the entire nonattainment area, whether the nonattainment area includes one MPO or more than one MPO, a donut area, portions of more than one state, or any combination of these jurisdictions. In addition, the federal transportation conformity rules maintain that MPO(s) must complete their transportation plan/TIP conformity determinations for the entire nonattainment area and coordinate their conformity determinations, pursuant to 40 CFR 93.124(d). Specifically, 40 CFR 93.124(d) states:

> "If a nonattainment area includes more than one MPO, the implementation plan may establish motor vehicle emissions budgets for each MPO, or else the MPOs must collectively make a conformity determination for the entire nonattainment area."

Fine particle pollution, or $PM_{2.5}$, describes particulate matter that is 2.5 micrometers in diameter and smaller. On December 14, 2009, the Environmental Protection Agency (EPA) designated the nine-county San Francisco Bay Area as nonattainment for the national 24-hour $PM_{2.5}$ standards established in 2006. This does not include the eastern portion of Solano County (i.e., the Overlap Area, as defined in Section 2, below), nor the northern portion of Sonoma County, which is designated as an unclassifiable/attainment area. On June 28, 2013, EPA took final action to determine that the Sacramento nonattainment area, including the Overlap Area, had attained and continued to attain the national 24-hour $PM_{2.5}$ standards established in 2006.

Effective May 12, 1994, the parties hereto entered into a Memorandum of Understanding (as amended on December 30, 2004, the "Original MOU") in order to satisfy all requirements with regard to the programming of CMAQ funds in the Overlap Area (defined in Section 2, below). The parties now desire to amend and restate the Original MOU to incorporate updated air quality standards and planning responsibilities. The parties intend that this Agreement shall supersede and replace the Original MOU in its entirety.

TERMS AND CONDITIONS

1. CONSULTATION

MTC and SACOG will establish a consultation process to guide discussion on issues in the CMAQ programming process in an effort to provide effective coordination of decisions by both MPOs.

2. RESPONSIBILITIES:

In the overlapping boundary area (in non-shaded portion of eastern Solano County) shown on the map attached hereto as Attachment A (the "Overlap Area"), responsibilities are as follows:

a. State Implementation Plan (SIP):

SACOG will include the Overlap Area in its SIP for the Sacramento air basin and will develop transportation control measures (TCMs) for its SIP in consultation with MTC.

Within 90 days after a request by SACOG, MTC will provide SACOG with vehicle emission estimates (or base travel figures), inclusive of draft vehicle emissions estimates, for the Overlap Area in the development of the SIP for the Sacramento air basin purposes.

b. Regional Transportation Plan (RTP):

MTC will include the Overlap Area when it develops its RTP and will consult with SACOG regarding projects in the Overlap Area. Projects in the Overlap Area included in MTC's RTP will be subject to the TCMs resulting from "2a" above.

c. Transportation Improvement Program (TIP):

MTC will program federal and state projects in the Overlap Area in MTC's TIP with the exception of CMAQ projects, which will be programmed as described in "2d" below.

d. Congestion Mitigation and Air Quality Improvement Program (CMAQ):

CMAQ funds available for projects in the Overlap Area will be prioritized to TCMs resulting from "2a" above. Caltrans estimates and distributes the CMAQ funds for the Overlap Area to MTC. MTC will work with the Solano Transportation Authority to select CMAQ projects consistent with SACOG's SIP objectives and include CMAQ funded projects in MTC's TIP.

e. Conformity

For Regional Transportation Conformity

SACOG will include the Overlap Area when it conducts its regional transportation conformity analysis and makes its conformity determination of the Sacramento air basin consistent with the requirements of the United States Environmental Protection Agency and Department of Transportation regulations.

Should the TIP or Plan for Sacramento be found nonconforming and a regional transportation conformity lapse occur in the SACOG region, MTC will approve funding only for TCMs in an approved SIP and exempt projects in the Overlap Area, provided the metropolitan transportation planning requirements have been met. Projects in the portion of the Solano County in the San Francisco Bay Area air basin would not be impacted.

Should the TIP or Plan for the San Francisco Bay Area be found nonconforming and a regional transportation conformity lapse occur in the MTC region, MTC will approve funding only for TCMs in approved SIPs and exempt projects in the portion of Solano County in the San Francisco Bay Area air basin. Projects in the Overlap Area would not be affected.

In no event will either of the parties to this MOU approve funding for any phase of a non-exempt project in the Overlap Area unless regional transportation conformity requirements for SACOG's planning process have been met. This regional transportation conformity finding would include the projects from MTC's TIP or Plan that lie in the Overlap Area.

Within 90 days after a request by SACOG, MTC will provide SACOG with vehicle emission estimates (or base travel figures) and corresponding individual project listings for the Overlap Area for SACOG's RTP and TIP regional transportation conformity purposes.

For Project-Level Conformity Determinations
Beginning December 14, 2010, sponsors of certain projects that involve significant levels of diesel vehicle traffic are required to complete a $PM_{2.5}$ hot-spot analysis for project-level conformity determinations made by the Federal Highway Administration (FHWA) or Federal Transit Administration (FTA).

The $PM_{2.5}$ project-level conformity process is conducted while a NEPA environmental document is being prepared. A project-level conformity determination must be completed before the NEPA document is approved. A full-scale project-level conformity analysis is normally required only for projects that (i) are not exempt from conformity (40 CFR 93.126, 128, and in ozone-only areas 127), (ii) are considered to be a "project of air quality concern (POAQC)" by the Air

Quality Conformity Task Force, and (iii) are regionally significant (see definition at 40 CFR 93.101). The project-level conformity determinations are made by the FHWA or FTA with input from EPA and Caltrans.

Solano County projects in the Overlap Area appear only in MTC's TIP and Plan; however, they are accounted for in SACOG's regional conformity determinations. Project-level conformity determinations in the Overlap Area will be made by MTC's interagency consultation body, the Air Quality Conformity Task Force, and MTC will inform the SACOG interagency consultation body, the Regional Planning Partnership (RPP) of any such determinations. SACOG and MTC will use a mutually agreed upon process to outline how the RPP will be informed of determinations made for projects in the Overlap Area.

3. AMENDMENTS/TERMINATION:

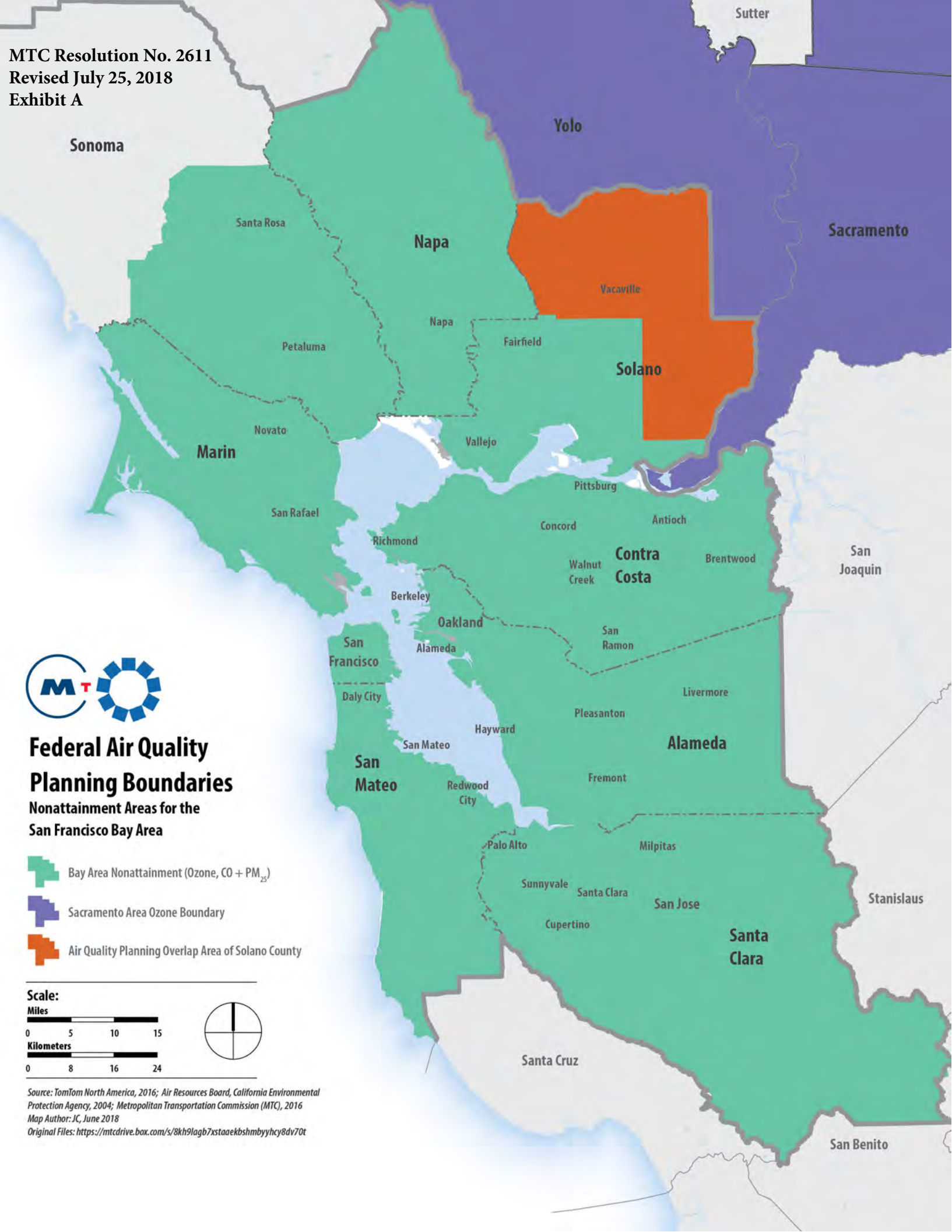
This Agreement may, consistent with federal regulations governing metropolitan planning, be amended only by a written instrument signed by both SACOG and MTC. This Agreement may be terminated by either SACOG or MTC, upon sixty days written notice to the other party.

IN WITNESS WHEREOF the parties hereto have executed the foregoing Agreement effective as of the date first above written.

James Corless, Chief Executive Officer Date
Sacramento Area Council of Governments

Steve Heminger, Executive Director Date
Metropolitan Transportation Commission

MTC Resolution No. 2611
Revised July 25, 2018
Exhibit A



Federal Air Quality Planning Boundaries

Nonattainment Areas for the San Francisco Bay Area

- Bay Area Nonattainment (Ozone, CO + PM_{25})
- Sacramento Area Ozone Boundary
- Air Quality Planning Overlap Area of Solano County

Scale:

Miles
0 5 10 15

Kilometers
0 8 16 24

Source: TomTom North America, 2016; Air Resources Board, California Environmental Protection Agency, 2004; Metropolitan Transportation Commission (MTC), 2016
Map Author: JC, June 2018
Original Files: https://mtcdrive.box.com/s/8kh9lagb7xstaaekbshmbyyhcy8dv70t

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Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	18-0509	Version:	1	Name:	
Type:	Report			Status:	Commission Approval
File created:	6/11/2018			In control:	Planning Committee
On agenda:	7/13/2018			Final action:	
Title:	Diesel Free by '33 Statement of Purpose Approval of Diesel Free by 2033 Memorandum of Understanding (MOU). The purpose of this MOU is to reduce diesel emissions in communities from stationary and mobile sources to zero by December 31, 2033.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	5a_Diesel Free Pledge.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Diesel Free by '33 Statement of Purpose

Approval of Diesel Free by 2033 Memorandum of Understanding (MOU). The purpose of this MOU is to reduce diesel emissions in communities from stationary and mobile sources to zero by December 31, 2033.

Presenter:
Krute Sing, MTC and
Abby Young, Bay Area Air Quality Management District

Recommended Action:
Commission Approval

Attachments:

METROPOLITAN
TRANSPORTATION
COMMISSION

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Agenda Item 5a

Memorandum

TO: Planning Committee DATE: July 6, 2018

FR: Executive Director

RE: Diesel Free by '33 *Statement of Purpose*

Summary

Two of the key objectives of Plan Bay Area 2040 were climate protection and healthy and safe communities. Staff has been working closely with the Bay Area Air Quality Management District on these objectives and proposes that we support the Diesel Free by '33 *Statement of Purpose.*

Background

Governor Jerry Brown announced in 2017 that he would be hosting a Governor's Climate Summit this year in September. The Bay Area Air Quality Management District responded to the call for speakers, affiliated events, and sessions by proposing an affiliated event at the Bay Area Metro Center. The theme of the proposed event is "Diesel Free by 33," a call for the 101 cities throughout the Bay Area and cities beyond to commit to going diesel free in their cities by 2033. MTC/ABAG staff is working with the Air District, and planning has begun on this event during the summit week, September 10 -14, 2018.

Approach

The Air District is currently seeking commitments to sign on to the Diesel Free by '33 *Statement of Purpose* which joins signers together on a path to reduce and eliminate diesel emissions by '33 and embark on a collaborative process to share solutions and ideas. The Air District is developing a website where interested parties can review the *Statement of Purpose*, get additional information, and sign electronically.

Staff recommends the committee refer to the Commission and authorize the Chair to sign the Bay Area Air Quality Management District's Diesel Free by '33 *Statement of Purpose* on behalf of MTC. The ABAG Executive Board will consider similar approval and authorization of the *Statement of Purpose* at its July 19th meeting. In addition, staff will develop implementation actions including:

- Promoting purchase of zero emission buses (ZEBs), recognizing the:
  - Limited funding availability for buses and supportive ZEB infrastructure (chargers, fueling), though efforts will be made to secure additional funding
  - Implementation requirements specified by the Innovative Clean Transit (ICT) regulation recently unveiled by the California Air Resources Board (CARB)
  - Impact on fleets by automated technology in 2033

- Encouraging cities to sign the *Statement of Purpose* in connection to climate action planning efforts:
  - Many cities address diesel emission reduction by planning to transition their municipal fleet or stationary sources to cleaner fuels in their climate action plans. These cities could consider signing the Diesel Free *Statement of Purpose* highlighting their diesel free actions
  - Cities developing climate action plans could consider signing the *Statement of Purpose* by committing to eliminate their diesel use (mobile, stationary) by 2033

Next Steps
Staff will report back to the Commission on progress toward conversion to ZEBs, and will work with partner agencies, including the Air District, to provide technical assistance and funding as additional information becomes available.

Air District staff will review the *Statement of Purpose* with the Executive Committee at its July 23, 2018 meeting and will ask the full Board to adopt it at its August meeting.

Steve Heminger

Attachment:
- Attachment A: Diesel Free By 2033 Statement Of Purpose
- Presentation

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DIESEL FREE BY 2033
STATEMENT OF PURPOSE

The intention of this ***Statement of Purpose*** is to establish a goal to reduce diesel emissions in local communities throughout California and beyond. The need for this action is immediate. Diesel exhaust takes a tremendous toll on both the global climate and public health.

By signing the ***Statement of Purpose***, mayors, city and county governments, industry and businesses leaders will join the Bay Area Air Quality Management District and the Metropolitan Transportation Commission to showcase our collective leadership to identify and adopt innovative solutions to eliminate diesel emissions and black carbon from our communities.
Diesel exhaust causes significant public health effects and accelerates climate change. The California Air Resources Board estimates that on-road diesel and off-road mobile engines comprise 54 percent of the State of California's total black carbon emissions, a short-lived climate pollutant that is contributing significantly to global climate change. Diesel air pollution is highly toxic and can have an immediate impact on the health of residents in communities where emissions are most concentrated. The impacts will fall most heavily on communities and populations already significantly impacted by air pollution, environmental hazards, and economic inequality.

The signatories may each develop their own individual strategies to achieve the goal of reaching zero diesel emissions in their communities. Signatories to this agreement express their intent to:

1. Collaborate and coordinate on ordinances, policies, and procurement practices that will reduce diesel emissions to zero within their jurisdictions, communities or companies;
2. Share and promote effective financing mechanisms domestically and internationally to the extent feasible that allow for the purchase of zero emissions equipment;
3. Share information and assessments regarding zero emissions technology;
4. Build capacity for action and technology adaptation through technology transfer and sharing expertise; and
5. Use policies and incentives that assist the private sector as it moves to diesel-free fleets and buildings.
6. Periodic reporting to all signers of progress towards the zero diesel emissions goal.

This ***Statement of Purpose*** is intended to accelerate action toward meaningful progress in support of all climate protection agreements. It is not the intent of the signatories to create through this ***Statement of Purpose*** any legally binding obligation. For purposes of this *Statement*, "diesel emissions" and "diesel exhaust" means emissions or exhaust emitted from the combustion of petroleum-based diesel fuel.

Signatories are committing to develop an implementation strategy to reduce diesel emissions in their jurisdictions, share solutions, and report progress. Together, we will forge a path toward a cleaner, healthier future by reducing diesel emissions in our communities, states, and beyond.

Governor's Global Climate Action Summit

BAAQMD Affiliated Event
Diesel Free Statement of Purpose

Planning Committee

July 13, 2018

Abby Young, Air District
Krute Singa, MTC/ABAG

Governor's Global Climate Action Summit

Governor's purpose:

- Event: September 12-14 in San Francisco
- Importance of city, county and state leadership and action in achieving int'l climate goals
- Inspire public commitments, calls to action by government leaders, businesses and organizations
- Showcase innovative solutions to reducing GHG emissions

What the event will look like:

- 15,000 attendees from government, business and civil society
- Main venue at Moscone Center
- "Affiliate" events" throughout SF, Bay Area and beyond

BAAQMD Affiliated Forum

Bay Area Climate Leadership Forum

- High profile, local govt. focused event at 375 Beale
- Audience:
  - Mayors, elected officials from Bay Area and beyond
  - Regional business, civic affiliations, community leaders
- Focus-Bay Area climate innovation and leadership
- Public release of pledge to go diesel-free
- Goal: drive momentum toward region-wide diesel free solutions as catalyst promoting further action

Forum Agenda

- Opening “Mayors Roundtable”
  - Bay Area, California and international mayors
- Pledge presentation, signing, media event
- Community-based solutions
  - Business leaders, NGO’s
- Inspiring, high profile keynote speakers
- Afternoon reception

Diesel-free by 33

*The **Diesel-free by 33** Statement of Purpose and Leadership Forum provide a perfect intersection between climate protection and reducing community exposure*

- Meets Governor's priorities:
  - Significant, public commitment to climate protection
  - Advances objectives of AB 617
- Achieves Air District's goals
  - Reduces an important source of GHG emissions (black carbon)
  - Reduces community exposure to particulate matter

Diesel-free by 33

Proposed MTC/ABAG Actions for the Diesel Free by '33 *Statement of Purpose:*

Promoting purchase of zero emission buses (ZEBs), recognizing the:

- Limited funding availability for buses and supportive ZEB infrastructure (chargers, fueling), though efforts will be made to secure funding
- Implementation requirements specified by the Innovative Clean Transit (ICT) regulation recently unveiled by California Air Resources Board (CARB)
- Impact on fleets by automated technology in 2033

Encouraging cities to sign the pledge in connection to climate action planning efforts:

- Many cities address diesel emission reduction by planning to transition their municipal fleet or stationary sources to cleaner fuels in their climate action plans. These cities could consider signing the Diesel Free *Statement of Purpose* highlighting their diesel free actions
- Cities developing climate action plans could consider signing the *Statement of Purpose* by committing to eliminate their diesel use (mobile, stationary) by 2033

Diesel-free by 33

Recommendation

Refer the Diesel Free by ‘33 Statement of Purpose to the:

- Commission to authorize the Chair to sign on behalf of MTC

Summary of Available Zero-Emission Technologies and Funding Opportunities

Prepared by the Bay Area Air Quality Management District

June 2018

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Availability of Zero-Emission Technologies

The Bay Area Air Quality Management District (BAAQMD) recently assessed options for replacing diesel combustion vehicles and equipment with zero-emission technologies to help the San Francisco Bay Area region and other communities achieve the goal of "Diesel Free by 2033." This document provides a summary of the status of these technologies based on a literature review and BAAQMD staff's knowledge. Technology assessment reports from the California Air Resources Board (ARB) and the National Renewable Energy Laboratory are the primary sources of information used in this assessment[1].

Table 1 summarizes the status of zero-emission technologies for categories of equipment and vehicles that account for significant air pollution and greenhouse gases generated in the region. A technology readiness level of "commercially available" is assigned to categories that are readily available for purchase and have comparable costs to conventional technologies with or without incentives, "early commercialization" is assigned to technologies that are commercially available but have higher capital costs than similar conventional technologies due to low sales volumes, "demonstration phase" is a description of technologies that as of 2018 are being tested in very small quantities[2] and that may reach early or full commercialization level by 2033, and "not yet available" refers to categories of equipment and vehicles that have not yet been demonstrated and it is unknown when they will be commercialized.

Table 1: Summary of status of zero-emission technologies

Technology Readiness Level	Vehicle / Equipment Category
Commercially Available	Light-duty cars/SUVs
	Buses
	Cargo handling equipment
	Locomotives - switchers/yard goats
	Ocean going vessels (at berth)
	Transportation refrigeration units
	Medium-duty trucks
	Batteries for emergency or backup power (~5kW or shorter load durations)
	Fuel cell systems for emergency or backup power (~5-20kW)
Early Commercialization	Small construction equipment
	Batteries for emergency or backup power (>5kW)
Demonstration	Heavy-duty trucks
	Cargo handling equipment (container top/side picks)
Not Yet Available	Commercial harbor craft
	Large construction equipment
	Locomotive - line haul
	Ocean going vessels (at sea)

Buses

Buses are typically 35 to 45 ft. in length (or longer) and are primarily used to transport passengers[3]. Buses can range in size from small shuttles with

[1] https://www.arb.ca.gov/msprog/tech/tech.htm, https://www.nrel.gov/docs/fy14osti/60732.pdf
[2] https://www.arb.ca.gov/msprog/tech/techreport/ta_overview_v_4_3_2015_final_pdf.pdf
[3] https://law.justia.com/codes/california/2017/code-veh/division-1/section-233/

seating for 10 to 20 passengers, to school and transit buses that can seat 40 to 80 passengers, to articulated and double-decker buses that can carry over 200 passengers. In the Bay Area, most buses are propelled by an internal combustion engine (ICE) that burns diesel or compressed natural gas, or as a hybrid that operates on a combination of diesel fuel and batteries.

Battery electric buses are commercially available for use as transit, school, and shuttle buses[4, 5, 6]. Recent advancements in battery and wireless inductive charging technologies are also making wide adoption of battery electric buses more feasible and cost-effective. Other zero-emission bus technologies, including hydrogen fuel cells, are actively being tested and demonstrated in the Bay Area[7, 8]. Many Bay Area transit agencies have started to test or deploy zero-emission buses, such as the San Francisco Municipal Transportation Agency and San Mateo County Transit District, or SamTrans, who have committed to fully electrify bus fleets by 2035 and 2033, respectively[9, 10].

Light Duty Vehicles

Light-duty vehicles include motorcycles and four-wheeled passenger cars, i.e., sedans, crossovers, hatchbacks, vans, SUVs, and light-duty trucks that have a Gross Vehicle Weight Rating (GVWR) of 10,000 lbs. or less[11]. In the Bay Area, there are nearly six-million light-duty vehicles registered with more than 100,000 of these being zero-or near zero emissions. As of 2018, fully zero-emission battery electric cars are commercially available and the full lifecycle cost of ownership is nearly the same as conventional equivalent vehicles[12]. Multiple manufacturers (e.g., General Motors, Nissan, Tesla, Toyota, Volkswagen) offer at least one vehicle model, and more models are expected to come into the market in the coming years[13]. Light-duty hydrogen fuel cell cars, fully electric vans, and light-duty trucks are in the early commercialization stage but are expected to be commercially available within the next few years[14, 15, 16, 17].

Medium- and Heavy-Duty Trucks

Medium- and heavy-duty trucks are large motor vehicles that are primarily used to transport goods and equipment. Medium-duty trucks range in GVWR from 10,001 to 26,000 pounds (lbs.) and heavy-duty trucks have a GVWR of 26,001 lbs. and above. Medium- and heavy-duty trucks have historically been powered by diesel or natural gas internal combustion engines.

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4 https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf
5 https://www.californiahvip.org/eligible-technologies/#your-clean-vehicles
6 https://electrek.co/2018/05/07/all-electric-trucks-lion-electric/
7 http://www.actransit.org/environment/the-hyroad/
8 https://www.arb.ca.gov/msprog/tech/techreport/fc_tech_report.pdf
9 https://www.sfmta.com/press-releases/san-francisco-commits-all-electric-bus-fleet-2035
10 https://www.prnewswire.com/news-releases/samtrans-orders-10-proterra-catalyst-e2-buses-and-sets-a-100-percent-zero-emission-fleet-goal-by-2033-300613692.html
11 https://www.epa.gov/emission-standards-reference-guide/vehicle-weight-classifications-emission-standards-reference-guide
12 https://www.sciencedirect.com/science/article/pii/S030626191731526X?via%3Dihub
13 https://www.driveclean.ca.gov/
14 https://www.nissan.co.uk/vehicles/new-vehicles/e-nv200.html
15 http://www.businessinsider.com/electric-suvs-coming-to-market-soon-2018-4
16 http://workhorse.com/pickup/
17 https://www.arb.ca.gov/msprog/acc/mtr/appendix_c.pdf

Today, medium-duty battery electric delivery trucks are commercially available[18,19]. These trucks are well-suited for local applications as their typical 100-mile range allows the vehicle to return-to-base for refueling. Zero-emission technologies for other medium-duty applications and heavy-duty trucks are being developed and demonstrated with a limited number of models[20,21,22,23,24]. In California, specifically the Bay Area, several early tests and demonstrations of zero-emission medium- and heavy-duty trucks are being conducted, including battery electric delivery trucks operating in urban areas[25] and battery electric heavy-duty trucks operating in and around the Port of Oakland[26].

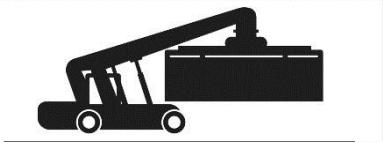
Many vehicle manufacturers, both those long established in the industry and new start-up companies, are developing zero-emission medium- and heavy-duty vehicles, and some are already producing vehicles at low volume[27]. Among the larger automotive companies, Daimler has announced that it expects to begin production on a fully electric heavy-duty truck in 2020[28].

Transport Refrigeration Units

A transport refrigeration unit (TRU) is defined as a refrigeration system powered by a diesel integral (inside housing) internal combustion engine designed to control the environment of temperature sensitive products that are transported in trucks and refrigerated trailers. TRUs may be capable of both cooling and heating. Zero-emission technologies (battery electric, plug-in electric, fuel cell, cryogenic, etc.) for TRU are commercially available; however, these options have specific infrastructure and operational requirements that need to be considered by fleet operators[29].

Mobile Cargo Handling Equipment

Mobile cargo handling equipment (CHE) is any mobile equipment used at ports, rail yards, and warehouse distribution centers to either handle freight or to perform other on-site activities, such as maintenance. Types of CHEs include yard trucks, top handlers, side handlers, reach stackers, forklifts, and gantry cranes, dozers, excavators, and loaders. In 2018, most CHEs, especially the larger vehicles, are powered by diesel internal combustion engines.



Today, there are several options for deploying zero-emission technologies for cargo handling equipment, such as automated electric equipment, electric rubber tired or rail mounted gantry (RTG or RMG) at container terminals, fuel cell and battery electric fork lifts, yard trucks at distribution centers, electric aircraft ground support equipment, battery electric belt

[18] https://www.arb.ca.gov/msprog/tech/techreport/ta_overview_v_4_3_2015_final_pdf.pdf
[19] https://electrek.co/2018/06/15/ups-fleet-1000-electric-vans-workhorse/
[20] https://www.californiahvip.org/eligible-technologies/#your-clean-vehicles
[21] https://www.californiahvip.org/vehicles/byd-6f-t7-class-6-cab-forward-truck/
[22] https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf
[23] https://www.californiahvip.org/vehicles/motiv-all-electric-powertrain-for-ford-f59-4/
[24] http://www.zenith-motors.com/wp-content/uploads/2013/05/Brochure122017.pdf
[25] http://www.cte.tv/wp-content/uploads/2018/05/ACT-BYD_Goodwill_press-release_FINAL1-1.pdf
[26] https://www.portofoakland.com/press-releases/port-oakland-first-battery-powered-truck-enters-fleet/
[27] https://www.trucks.com/2018/05/01/research-group-electric-truck-technology-advancing/
[28] https://www.theicct.org/sites/default/files/publications/Zero-emission-freight-trucks_ICCT-white-paper_26092017_vF.pdf
[29] https://www.arb.ca.gov/msprog/tech/techreport/tru_07292015.pdf

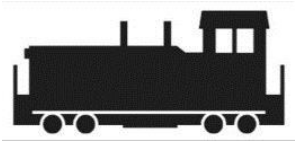
loader, electric baggage tug, are commercially available[30, 31, 32, 33]. Zero-emission technologies for container top/side picks currently are not commercially available[34, 35] although two electric container top picks are currently being demonstrated at the Port of Los Angles[36].

Construction & Earthmoving Equipment

Construction and earthmoving equipment refers to heavy-duty vehicles, specially designed to move, compact, haul, hoist, earth and other loose or bulk materials; and other types of construction equipment, such as bulldozers, graders, excavators, scrapers, loaders, trenchers, and backhoes[37]. In 2018, most of these vehicles and equipment are powered by diesel internal combustion engines.

Zero-emission technologies are in the early commercialization stage for smaller construction equipment[38,39,40]. The technology for providing full battery electric heavy-duty machinery will require further technological improvements as it has yet to meet parity with conventional powertrains[41].

Locomotives



A locomotive is a self-propelled vehicle used to push or pull trains, and the combination of locomotive(s) pulling freight or passenger railcars forms a train. Most of the freight and passenger locomotives in the Bay Area are powered by a diesel-electric system whereby an internal combustion engine that is fueled by diesel drives an electrical generator or alternator, which in turn powers electric motor(s) that drive the wheels[42].

While electric train and rail technology is commercially available, it would currently be cost prohibitive to widely deploy this technology for long haul freight and passenger use. Therefore, in the near-term, the most technologically feasible and cost-effective advanced technology available to reduce toxic and criteria pollutant emissions is the installation of a compact aftertreatment system (e.g., combination of Selective Catalytic Reduction and Diesel Oxidation Catalysts) onto new and remanufactured diesel-electric freight interstate line haul locomotives. Emissions in communities that are disproportionally impacted by diesel emissions can be further reduced by augmenting this control equipment with a combination of on-board batteries and geo-fencing technologies.

Zero-emission technologies are commercially available for switch (yard) operations (e.g., a railway electrification system that provides power through overhead or third line power line). Battery electric technologies are also being tested for switch (yard) locomotives in other parts of the United States[43].

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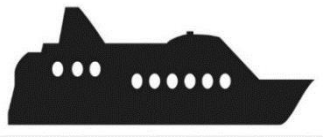
[30] https://www.arb.ca.gov/msprog/tech/techreport/che_tech_report.pdf
[31] https://orangeev.com/
[32] https://www.californiahvip.org/eligible-technologies/#your-clean-vehicles
[33] https://www.arb.ca.gov/msprog/tech/techreport/ta_overview_v_4_3_2015_final_pdf.pdf
[34] https://blog.hyster.eu/see-hyster-talk-zero-emissions-container-handling/
[35] https://www.joc.com/regulation-policy/la-lb-officials-say-zero-emissions-cargo-equipment-viable-2030_20180504.html
[36] https://www.portoflosangeles.org/Board/2017/October%202017/101917_Regular_Agenda_Item_6_Transmittal_1.pdf
[37] https://www.slideshare.net/SagarRadadiya/construction-equipments-introduction-and-classification
[38] https://www.zeecrane.com/
[39] https://www.volvoce.com/global/en/news-and-events/news-and-press-releases/volvo-ce-unveils-100-percent-electric-compact-excavator-prototype/
[40] http://www.kramer-online.com/en/discover-kramer/zero-emission/the-kramer-5055e/
[41] http://network.bellona.org/content/uploads/sites/3/2018/06/ZEC-Report-1.pdf
[42] https://www.arb.ca.gov/msprog/tech/techreport/final_rail_tech_assessment_11282016.pdf

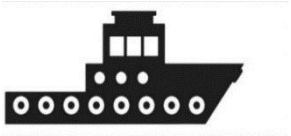
Ocean-Going Vessels

Ocean-going vessels (OGV) are large vessels designed for deep water navigation. Types of OGVs include large cargo vessels such as container vessels, tankers, bulk carriers, and car carriers, as well as passenger cruise vessels. These vessels transport containerized cargo, bulk items such as vehicles, cement, and coke, liquids such as oil and petrochemicals, and passengers. OGV propulsion (main) engines are primarily fueled by residual fuel oil and auxiliary engines that are mainly powered by diesel fuel. The majority of vessels that visit California ports are foreign-flagged vessels[44].



As of 2018, technologies (e.g., shore-side power, fuel cells, and emissions capture and control systems) are commercially available that enable vessels at dockside to achieve zero and near-zero emissions. Other than nuclear power, no other zero-emissions technology has been developed for vessels at sea[45]; however, an all-electric autonomous container ship is being planned in Norway[46].

Commercial Harbor Craft



Commercial harbor craft means any private, commercial, government, or military marine vessel including, but not limited to, passenger ferries, excursion vessels, tugboats, ocean-going tugboats, towboats, push-boats, crew and supply vessels, pilot vessels, fishing vessels, research vessels, U.S. Coast Guard vessels, hovercraft, emergency response harbor craft, and barge vessels that do not otherwise meet the definition of ocean-going or recreational vessels[47]. Nearly all commercial harbor craft vessels are powered by diesel fuel.

While no zero-emission technologies are commercially available for harbor craft, dedicated battery electric systems are being developed for larger ships but have not yet been adopted for commercial harbor craft. Also, several demonstration and early commercialization projects are underway including a zero-emission hydrogen fuel cell ferry project funded by the ARB with funding from the "California Climate Investments" (CCI) program[48] that is being administered by the BAAQMD in partnership with Golden Gate Zero Emission Marine Inc. Another demonstration project funded by US Environmental Protection Agency (USEPA) will convert an existing ferry to full electric in Alabama. Proton Exchange Membrane or Polymer Electrolyte Membrane (PEMFC) systems have been used in harbor craft demonstrations in New York[49], electric ferries are being built and operated in Norway[50,51], and a hybrid tugboat has been demonstrated at the Ports of Los Angeles and Long Beach[52].

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[43] https://www.arb.ca.gov/msprog/tech/techreport/final_rail_tech_assessment_11282016.pdf
[44] https://www.arb.ca.gov/msprog/tech/techreport/ogv_tech_report.pdf
[45] https://www.arb.ca.gov/msprog/tech/techreport/ogv_tech_report.pdf
[46] https://newatlas.com/autonomous-electric-shipping-container-vessel/49477/
[47] https://govt.westlaw.com/calregs/Document/I0FD137A0A3C111E0BACCB30E82542E24?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=%28sc.Default%29&bhcp=1
[48] www.arb.ca.gov/ccifundingguidelines
[49] https://www.arb.ca.gov/msprog/tech/techreport/draft_chc_technology_assessment.pdf
[50] https://www.workboat.com/news/shipbuilding/alabama-looks-first-u-s-electric-ferry/
[51] https://electrek.co/2018/03/05/all-electric-ferries-battery-packs/
[52] https://www.arb.ca.gov/newsrel/2010/hybridtug.htm

Stationary Engines

According to the BAAQMD emissions inventory, there are approximately 7,600 stationary diesel engines registered in the Bay Area. Although particulate matter emissions from stationary diesel engines are typically higher than on-road diesel sources, the facilities using them are generally not required to upgrade to cleaner equipment. This is because many engines predate the BAAQMD's permitting rules or because the equipment is meant for emergency or backup power and the hours in which it can operate outside of an emergency are extremely limited. For example, off-road diesel engines are generally exempt from fuel formulation requirements (such as sulfur content) and exhaust gas aftertreatment. However, there are alternatives to stationary diesel engines that are cost-competitive, especially when paired with financing and incentives.

Hydrogen fuel cells are a cost-competitive alternative to diesel engines for 5-10kW loads, especially when paired with currently available federal tax incentives. Batteries are appropriate alternatives for smaller or portable applications, particularly ones with lower power draws (~5kW) and shorter load durations (~8 hours); see Table 2 below.

While there are some cost-competitive zero emissions options in the lower kW range, it should be noted that most backup generators currently registered with the BAAQMD (92%) operate in the 35kW range and above. These generators are expected to become a more viable option for larger back-up applications within the next 15 years due to improved energy efficiency and management practices as well as lower costs for more reliable and energy dense batteries. This may also be accelerated when batteries are teamed with renewable power solutions and regulations requiring carbon pricing or market-based carbon control programs such as California's AB32 Cap-and-Trade Program.

Table 2: Estimated Annual Cost of Ownership for Backup Generator Equipment in the 4 to 6kW Range

Load Duration *For power loads in 4-6kW range*	*Diesel*	*Fuel Cell System w/ Federal Tax Incentive*	*Battery*	*Incentives*
8 hours 30-50kWh	$120/ kWh	$115/kWh	$160/kWh	Leverage existing federal tax incentives for fuel cells; Consider offering incentives for batteries
3 days 200-400kWh	$16/ kWh	$17/kWh	$90/kWh	Leverage existing federal tax incentives for fuel cells; Support R&D for reducing battery costs and increasing lifetimes
1 week 700-1000kWh	$6/ kWh	$9/kWh	$80/kWh	Not yet cost-effective to replace diesel for heavy demands; Support R&D for reducing battery costs and increasing lifetimes

Cost-competitive with diesel Cost-competitive with additional incentives R&D is recommended

Cost of ownership includes permitting and installation costs, annual maintenance costs, and annual fuel costs in backup scenarios. Source data: *Backup Power Cost of Ownership Analysis and Incumbent Technology Comparison*, National Renewable Energy Laboratory, September 2014.

Upcoming California Regulations Requiring Zero-Emission Technology

Mobile source vehicle and equipment emissions are regulated by the ARB and the USEPA. The following is a brief listing of categories of mobile sources that are being targeted for new regulatory requirements by ARB:

- Zero-emissions cargo handling equipment regulation for ARB Board consideration in 2022, with potential starting date of 2026
- Trucks: Advanced Clean Truck Rule (formerly last mile delivery rule) to be considered in 2019 and zero-emission drayage truck regulation to be developed for ARB Board consideration in 2022 (with 2026-2028 starting date)
- Commercial Harbor Craft at Seaports amendments for ARB Board consideration in 2020, with a potential starting date of 2023
- Zero-emission transportation refrigeration unit regulation for ARB Board consideration in 2019, with a potential starting date of 2020+
- School & Transit Buses
- Freight Facilities

Commitments to Adopt Zero-Emission Technologies and Reduce Petroleum Consumption Around the World

In California, the following zero-emission technology and petroleum goals have been identified by Governor Brown and other State and local agencies:

- Governor Brown identified reducing petroleum use in cars and trucks in 2015 by up to 50 percent by 2030 as one of the key climate change strategy pillars that are needed to reduce emissions to meet the 2030 greenhouse gas emissions target[53].
- In 2012, Governor Brown issued Executive Order B-16-12 directing state government to help accelerate the market for zero-emission vehicles (ZEVs) in California and sets targets for adoption of 1.5 million ZEVs in California by 2025.
- Assembly Bill 739 requires that 30% of newly purchased vehicles by state agencies be zero-emission by 2030[54].
- The California Sustainable Freight Action Plan has identified a goal of transitioning to zero-emission technology by deploying over 100,000 freight vehicles and equipment capable of zero-emission operation and maximizing near-zero emission freight vehicles and equipment powered by renewable energy by 2030[55].
- ARB is in the process of proposing a goal of achieving a zero-emission transit system by 2040[56] and a goal of replacing existing diesel airport ground support equipment with zero-emission equipment by 2032[57].
- The Bay Area Plug-In Electric Vehicle Readiness Plan (2013) adopted goals of 110,000 EVs on Bay Area roads by 2020 and 250,000 EVs by 2025. The BAAQMD's 2017 Clean Air Plan has set a longer-term goal of 90% of the Bay Area fleet being zero-emission by 2050.

[53] https://www.arb.ca.gov/cc/pillars/pillars.htm#factsheets
[54] https://www.arb.ca.gov/msprog/actruck/mtg/180531presentation.pdf
[55] http://dot.ca.gov/hq/tpp/offices/ogm/cs_freight_action_plan/Documents/CSFAP_Main%20Document_FINAL_07272016.pdf
[56] https://arb.ca.gov/msprog/ict/meeting/mt180611/180611presentation.pdf
[57] https://www.arb.ca.gov/msprog/offroad/gse/presentationjune6.pdf

- The San Pedro Bay Ports Clean Air Action Plan 2017 requires that, beginning in 2035, all trucks entering the port must be zero-emission or pay a fee[58].

The following map and Table 3 show petroleum reduction commitments made around the world.

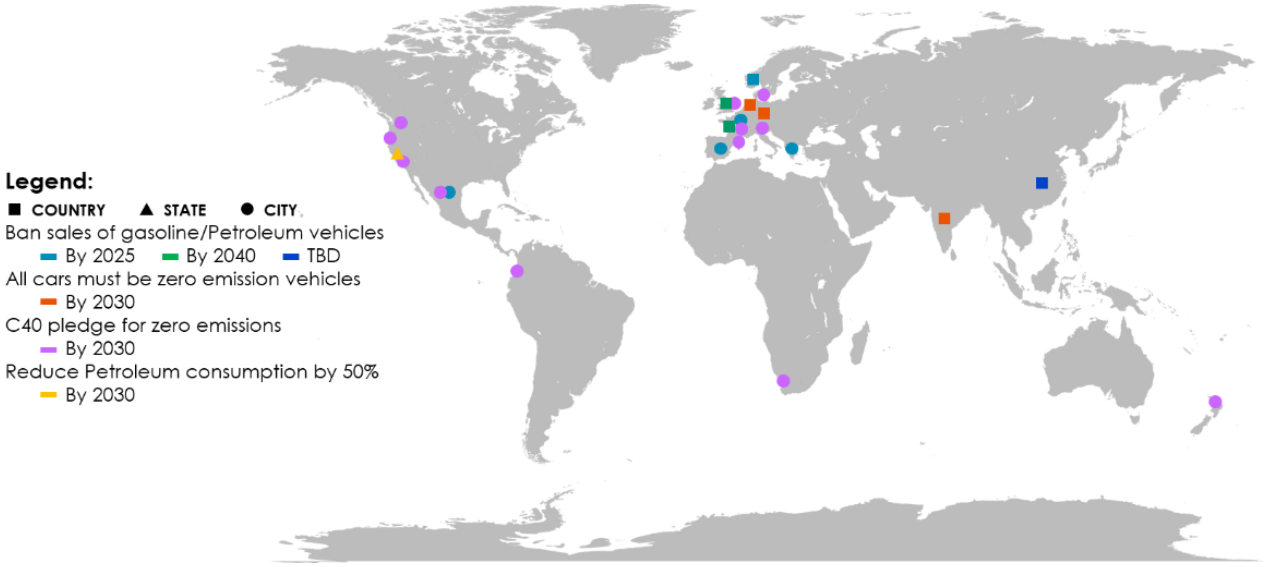

Table 3 – Commitments to Petroleum Reduction

Date	Country/State/City	Commitment
2025	**Norway, Madrid, Athens**	Ban sales of petroleum-fueled vehicles by 2025
	Paris, Mexico City	Ban sales of petroleum-fueled vehicles by 2025;
		C40 Pledge*
2030	**Netherlands, Germany, India**	All cars must be ZEVs by 2030
	London, Los Angeles, Copenhagen, Barcelona, Quito, Vancouver, Cape Town, Seattle, Auckland, Milan	C40 Pledge*
	California	Reduce petroleum consumption by 50% by 2030
2040	**France, Britain**	Ban sales of petroleum-fueled vehicles by 2040
TBD	**China**	Ban sales of petroleum-fueled vehicles by date TBD

*C40 Pledge to transition to "Fossil-Fuel-Free Streets" by: 1) procuring, with our partners, only zero-emission buses from 2025 and 2) ensuring a major area of our city is zero emission by 2030[59].

[58] https://www.arb.ca.gov/msprog/actruck/mtg/180531presentation.pdf
[59] http://c40-production-images.s3.amazonaws.com/other_uploads/images/1418_Fossil_Fuel_Free_Streets_Declaration.original.pdf?1508742654

Attachment A: Funding Opportunities for Zero-Emission Vehicles and Fueling Infrastructure

California Emissions Reduction Funding

This section summarizes funding opportunities that are currently available in most parts of California to help transition to zero-emission vehicles, equipment, and infrastructure.

- Carl Moyer Program (CMP): The CMP is a state-funded program offering grants to owners of heavy-duty vehicles and equipment, including trucks, buses, agricultural and marine equipment, and locomotives, to reduce air pollution from heavy-duty engines. Engine owners must operate CMP-funded vehicles and equipment within the BAAQMD's jurisdictional boundaries, and priority is given to projects that reduce emissions in impacted communities. More information can be found at www.baaqmd.gov/moyer.
- Community Health Protection Grant (AB134/617): AB 617 directed the California Air Resources Board, in conjunction with local air districts, to establish the Community Air Protection Program. AB 134 appropriated $250 million from the Greenhouse Gas Reduction Fund to reduce mobile emissions in communities most affected by air pollution. The Bay Area has been allocated $50 million of these funds for emission reduction projects. These funds will be used to implement projects under the Carl Moyer Program, and optionally under the Proposition 1B Goods Movement Emission Reduction Program. More information can be found at http://www.baaqmd.gov/plans-and-climate/community-health-protection-program/grant-program.
- California Climate Investments (CCI) and Greenhouse Gas Reduction Fund (GGRF): CCI is a statewide initiative that puts billions of Cap-and-Trade dollars, established by AB 1532 and SB 535 through the GGRF, to work by reducing greenhouse gas emissions, strengthening the economy, and improving public health and the environment—particularly in disadvantaged communities, low-income communities, and low-income households. More information can be found at https://ww2.arb.ca.gov/our-work/programs/california-climate-investments.
- California Clean Vehicle Rebate Project (CVRP): GGRF is the primary funding source for the CVRP, which promotes clean vehicle adoption in California by offering rebates of up to $7,000 for the purchase or lease of new, eligible zero-emission vehicles, including electric, plug-in hybrid electric and fuel cell vehicles. More information about this program can be found at: https://cleanvehiclerebate.org/eng/about-cvrp.
- Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP): The HVIP was formed by the California Air Resources Board as a result of the Air Quality Improvement Program following the passing of the California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007 (AB 118, Statutes of 2007, Chapter 750). HVIP offers point-of-sale incentives for clean trucks and buses. More information can be found at https://www.californiahvip.org/about/#why-clean-vehicles.
- Enhanced Fleet Modernization Program (EFMP): The EFMP) is a voluntary car retirement (scrap) and replacement incentive program. The goal of the program is to incentivize lower-income California motorists to scrap their older, high-emitting cars and replace them with newer, cleaner and more fuel-efficient cars. The EFMP Plus-Up Program for the Bay Area is currently under development. More information can be found at: https://www.arb.ca.gov/msprog/aqip/efmp/efmp.htm.

- Volkswagen (VW) Settlement Funds:
    - Electrify America: The settlement requires VW to invest $800 million in Zero-Emission Vehicle (ZEV) projects in California and more information about this program can be found at: https://www.electrifyamerica.com/.
    - Environmental Mitigation Trust (Trust): The settlement allocates about $423 million from an Environmental Mitigation Trust (Trust) to California. The Trust will provide focus fund on "scrap and replace" projects for the heavy-duty sector, including on-road freight trucks, transit and shuttle buses, school buses, forklifts, and port cargo handling equipment, commercial marine vessels, and freight switcher locomotives.

  More information can be found at https://www.arb.ca.gov/msprog/vw_info/vsi/vsi.htm.

- California Energy Commission (CEC): The CEC's Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) invests in the energy innovation pipeline for the development and deployment of alternative and renewable fuels and advantage transportation technologies to help meet the state's goals of reducing greenhouse gas emissions and petroleum dependence in the transportation sector. More information can be found at http://www.energy.ca.gov/contracts/transportation.html.

San Francisco Bay Area

- Local Sources: Local sources of funding in the Bay Area include the Transportation Fund for Clean Air (TFCA), which collect revenue from a $4 surcharge fee on vehicles registered in the Bay Area to fund cost-effective clean air vehicle and trip reduction projects that reduce on-road motor vehicle emissions within the BAAQMD's jurisdiction. More information can be found at: http://www.baaqmd.gov/grant-funding/funding-sources.

- Pacific Gas & Electric (PG&E) Funds:
    - PG&E provides $500 clean fuel rebates to customers with EVs (more information at https://www.pge.com/en_US/residential/solar-and-vehicles/options/clean-vehicles/electric/clean-fuel-rebate-for-electric-vehicles.page?WT.mc_id=Vanity_cleanfuelrebate-ev.
    - PG&E also launched the EV Charge Network program to accelerate California's transition to a clean transportation future by offering electric vehicle charger installation. More information can be found at https://www.pge.com/en_US/business/solar-and-vehicles/your-options/clean-vehicles/charging-stations/ev-charge-network.page.

Federal Funding Sources

- Environmental Protection Agency's (EPA) Diesel Emissions Reduction Act (DERA) Program: The EPA's DERA Program provides support for projects that protect human health and improve air quality by reducing harmful emissions from diesel engines. More information can be found at https://www.epa.gov/cleandiesel.

- Federal Highway Administration's (FHWA) Congestion Mitigation and Air Quality Program (CMAQ): Administered by the FHWA, the CMAQ supports surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. More information can be found at https://www.fhwa.dot.gov/environment/air_quality/cmaq/.

Attachment B: Financing Opportunities for Zero-Emission Alternatives to Stationary Diesel Engines

This section summarizes some of the financing opportunities that are currently available to businesses and agencies to help transition to zero-emission alternatives to stationary diesel engines.

San Francisco Bay Area

- Pacific Gas & Electric Energy Efficiency Financing: PG&E provides interest-free loans with on-bill financing to commercial customers to adopt new, energy-efficient equipment. Eligible project types include lighting, heating, ventilation and air conditioning (HVAC), electric motors, refrigeration, food service equipment and water pumps. Loans range from $5,000 to $100,000, and up to $250,000 for government agencies. More information can be found at: https://www.pge.com/en_US/business/save-energy-money/financing/energy-efficiency-financing/energy-efficiency-financing.page.

California Funding Programs

- California Hub for Energy Efficiency Financing (CHEEF): CHEEF is a program of the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA). CHEEF's energy efficiency financing pilot programs offer loans and credit enhancements for eligible energy projects for residential (single-family and affordable multifamily units), small business, and commercial customers (including for-profit, non-profit, and government entities of any size). At least 70% of the financed amount must go towards energy efficiency or demand response measures. Up to 30% of the financed amount may fund non-energy efficiency improvements. More information can be found at https://www.thecheef.com/commercial.
- California Infrastructure and Economic Development Bank (IBank):
    - California Lending for Energy and Environmental Needs (CLEEN): CLEEN is a program of the IBank which provides financing, including direct loans and publicly-offered tax-exempt bonds, to help meet the state's goals for greenhouse gas reduction, water conservation, and environmental preservation. MUSH (municipalities, utilities, schools, and hospitals) are eligible for loans ranging between $500,000 and $30 million for projects spanning energy generation, energy conservation, and energy storage. More information can be found at: http://www.ibank.ca.gov/cleen-center/.
    - Small Business Loan Guarantee Program (SBLGP): SBLGP is a program of the California Infrastructure and Economic Development Bank (IBank) which provides loan guarantees of up to $2.5 million or up to 80% of the loan amount to small businesses that experience barriers to capital access. Loan funds can be used for a variety of business-related purposes including construction, expansion, and disaster relief. More information can be found at: http://www.ibank.ca.gov/small-business-finance-center/.
- Self-**Generation Incentive Program (SGIP)**: The California Public Utilities Commission's SGIP program offers rebates to commercial and residential customers for installing distributed energy systems such as stationary engines, fuel cells, and energy storage systems. For example, incentives for battery systems can be as high as $400 per kWh. More information can be found at: http://www.cpuc.ca.gov/sgip/.

Federal Programs

- Rural Energy for America Program (REAP): USDA's REAP program provides agricultural producers and small businesses located in eligible rural areas with guaranteed loan financing and grant funding for renewable energy systems or energy efficiency improvements. More information can be found at: https://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency.
- Property Assessed Clean Energy (PACE): PACE financing programs provide loans to commercial and residential property owners to cover upfront costs of installing energy efficiency and renewable energy improvements, including energy generation with renewable fuels. Loans are repaid through property tax assessments over 5 to 25 years. PACE programs are currently available in 35 states. More information can be found at: https://www.energy.gov/eere/slsc/property-assessed-clean-energy-programs.

Attachment C: Zero-Emission Trucks and Buses Available in California Eligible for Hybrid Voucher (HVIP) funding from Air Resources Board

Category	OEM	Model
Bus	Blue Bird	Blue Bird Electric Powered All American School Bus
	Blue Bird	Blue Bird Electric Powered Vision School Bus 4x2 Configuration
	BYD Motors	BYD C10 45' All-Electric Coach Bus
	BYD Motors	BYD C6 23' All-Electric Coach Bus
	BYD Motors	BYD K11 60' Articulated All-Electric Transit Bus
	BYD Motors	BYD K7M 30' All-Electric Transit Bus
	BYD Motors	BYD K9 40' All-Electric Transit Bus
	BYD Motors	BYD K9S 35' All-Electric Transit Bus
	Complete Coach Works	Complete Coach Works Zero Emission Propulsion System
	Lion Bus	eLion School Bus Type C, 4x2 All-Electric
	Gillig	Gillig 29' ePlus Battery Electric Low Floor Bus
	Gillig	Gillig 35' ePlus Battery Electric Low Floor Bus
	Gillig	Gillig 40' ePlus Battery Electric Low Floor Bus
	Motiv Power Systems	Motiv EPIC 6 on Ford F59 Platform School Bus - 5 Battery
	Motiv Power Systems	Motiv EPIC 6 on Ford F59 Platform School Bus - 6 Battery
	New Flyer	New Flyer Xcelsior 35' All-Electric Transit Bus
	Proterra	Proterra 35' Catalyst XR+
Bus, School Bus	GreenPower	GreenPower SYNAPSE 72 All-Electric School Bus
	Motiv Power Systems	Motiv EPIC 4 Dearborn on Ford E450 Platform School Bus
Shuttle Buses	GreenPower	GreenPower EV Star All-Electric Min-eBus
	GreenPower	GreenPower SYNAPSE All-Electric Shuttle Bus
	Motiv Power Systems	Motiv All-Electric Powertrain for Ford E450
	Phoenix	Phoenix Motor Cars ZEUS 300 Shuttle Bus
	GreenPower	GreenPower EV250 30' All-Electric Bus
	GreenPower	GreenPower EV350 40' All Electric Bus
	GreenPower	GreenPower EV550 45' All-Electric Double Decker Transit Bus
Shuttle Buses	New Flyer	New Flyer 60' Xcelsior All-Electric Transit Bus
	New Flyer	New Flyer Xcelsior 40' All-Electric Transit Bus
	Proterra	Proterra 35' Catalyst E2
	Proterra	Proterra 35' Catalyst FC
	Proterra	Proterra 35' Catalyst FC+
	Proterra	Proterra 35' Catalyst XR
	Proterra	Proterra 40' Catalyst E2
	Proterra	Proterra 40' Catalyst E2 Max
	Proterra	Proterra 40' Catalyst E2+

	Proterra	Proterra 40' Catalyst FC
	Proterra	Proterra 40' Catalyst FC+
	Proterra	Proterra 40' Catalyst XR
	Proterra	Proterra 40' Catalyst XR+
Bus, Truck	Motiv Power Systems	Motiv All-Electric Powertrain for Ford F59
	Motiv Power Systems	Motiv All-Electric Powertrain for Ford F59 Starcraft e-Quest XL School Bus
	Motiv Power Systems	Motiv All-Electric Powertrain for Ford F59 Starcraft e-Quest XL School Bus
Delivery	Chanje	Chanje V8070 All-Electric Panel Van
	Workhorse Group	Workhorse 4x2 E-100 All-Electric Step Van
	Zenith Motors	Zenith Motors Electric Cargo Van
Delivery, Truck	BYD Motors	BYD T5 Class 5 Cab-Forward Delivery Truck
	Motiv Power Systems	Motiv All-Electric Powertrain for Ford F59
Refuse	BYD Motors	BYD T9M Class 8 Refuse Truck
Shuttle Bus	Zenith Motors	Zenith Motors Electric Passenger Van
Terminal Truck	BYD Motors	BYD Q1M Electric Yard Tractor
	Orange EV	Orange EV T-Series 4x2 Terminal Truck Conversion of Kalmar Ottawa Truck, Extended Duty (N)
	Orange EV	Orange EV T-Series 4x2 Terminal Truck Extended Duty (N)
Terminal Truck, Truck	BYD Motors	BYD Q3M (8TT) Class 8 Battery-Electric Tractor Trailer
	Orange EV	Orange EV T-Series 4x2 Terminal Standard Duty
	Orange EV	Orange EV T-Series 4x2 Terminal Truck Conversion of Kalmar Ottawa Truck Standard Duty
Truck	BYD Motors	BYD T7 Class 6 Cab-Forward Truck
	Chanje	Chanje V8100 All-Electric Panel Van
	Lightning Systems	Lightning Systems Ford Transit 350HD with LightningElectric Drivetrain
	Phoenix	Phoenix Motor Cars ZEUS Electric Flat Bed Truck
Utility with Electric Power Take-off	Altec Industries, Inc	Altec 12E8 JEMS ePTO with Exportable Power
	Altec Industries, Inc	Altec JEMS 1820 and 18E20 ePTO

Attachment D: Availability of Mobile Source Zero-Emission Technologies

Availability	Vehicle/Equipment	References	Notes
Commercially Available	 Light-Duty Cars/SUVs	https://www.arb.ca.gov/msprog/acc/mtr/appendix_c.pdf	
	 Buses	https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf	
	 Cargo Handling Equipment	https://www.arb.ca.gov/msprog/tech/techreport/che_tech_report.pdf	Not available for container top/side picks
	 Locomotives: Switchers/Yard Goats, Passenger	https://www.arb.ca.gov/msprog/tech/techreport/final_rail_tech_assessment_11282016.pdf	Catenary and electrified third rail technologies are available
	 Ocean Going Vessels at Berth	https://www.arb.ca.gov/msprog/tech/techreport/ogv_tech_report.pdf	Shorepower, Bonnet
	 Transportation Refrigeration Unit (TRUs)	https://www.arb.ca.gov/msprog/tech/techreport/tru_07292015.pdf	
	 Medium-Duty Trucks	https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf	Delivery trucks are commercially available

Availability	Vehicle/Equipment	References	Notes
Early Commercialization	 Small Construction Equipment	http://network.bellona.org/content/uploads/sites/3/2018/06/ZEC-Report-1.pdf, http://www.kramer-online.com/en/discover-kramer/zero-emission/the-kramer-5055e/,	Available by 2020
Demonstration	 Heavy-Duty Trucks	https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf	Available by 2020
	 Commercial Harbor Craft	https://www.arb.ca.gov/msprog/tech/techreport/draft_chc_technology_assessment.pdf	Demonstration project in Bay Area 2018-2019 to demonstrate zero-emissions hydrogen fuel cell ferry
	 Container Top/Side Picks	https://www.joc.com/regulation-policy/la-lb-officials-say-zero-emissions-cargo-equipment-viable-2030_20180504.html ; https://www.portoflosangeles.org/Board/2017/October%202017/101917_Regular_Agenda_Item_6_Transmittal_1.pdf	Battery electric top picks demonstrated in Los Angeles
Not Yet Available	 Large Construction Equipment	http://network.bellona.org/content/uploads/sites/3/2018/06/ZEC-Report-1.pdf	
	 Ocean Going Vessels at Sea	https://www.arb.ca.gov/msprog/tech/techreport/ogv_tech_report.pdf	Vessel speed reduction is available; all-electric autonomous container ship to be built in Norway
	 Locomotive - Line Haul	https://www.arb.ca.gov/msprog/tech/techreport/final_rail_tech_assessment_11282016.pdf	No technologies are available other than catenary or 3rd rail electrification that are too costly to deploy

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Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	18-0484	Version: 1	Name:		
Type:	Report		Status:	Informational	
File created:	6/8/2018		In control:	Planning Committee	
On agenda:	7/13/2018		Final action:		
Title:	Horizon: Proposed Futures for Analysis Overview of Horizon's development process for futures (i.e., "what if" scenarios), including a proposed shortlist to study over the coming year.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	6a_Horizon_Proposed Futures.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Horizon: Proposed Futures for Analysis

Overview of Horizon's development process for futures (i.e., "what if" scenarios), including a proposed shortlist to study over the coming year.

Presenter:
Dave Vautin and Cynthia Kroll

Recommended Action:
Information

Attachments:

METROPOLITAN TRANSPORTATION COMMISSION
ASSOCIATION OF BAY AREA GOVERNMENTS

MEMORANDUM

HORIZON

Agenda Item 6a

TO: Planning Committee

DATE: July 6, 2018

FR: Executive Director

RE: *Horizon:* Proposed Futures for Analysis

Summary

Staff proposes to advance three futures for further analysis over the coming year, leveraging the suite of futures developed by stakeholder teams at the April *Horizon* Peer Exchange. These futures (i.e., "what if…" scenarios) are widely-divergent, designed to "stress test" strategies and investments to ensure policies are effective under a range of future conditions. 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*.

The Road to Three Futures

To help imagine potential futures the Bay Area might have to grapple with through 2050, staff started by identifying a set of regionally-significant external forces that Bay Area residents, businesses, and elected officials have little-to-no control over. These included:

- Political forces like immigration and trade policies
- Economic forces like changes in worker productivity
- Environmental forces like global sea level rise and natural disasters
- Technological forces like autonomous vehicle adoption and sharing preferences

Through an all-day peer exchange held in late April, multiple teams of experts imagined potential futures that present both challenges and opportunities for planners, policymakers, and the public to consider through the *Horizon* process.

Using stakeholder input in the weeks after the peer exchange, staff worked to narrow down the list of futures from eleven to three, considering the likelihood, regional impact, and regional ability to respond to each set of external forces. Each of the three futures is unique, with a number of potential challenges that will need to be addressed via strategy workshops this fall. The futures are not intended to be visionary or aspirational. Rather, they are meant to motivate a candid discussion about regional policies and investments that make sense regardless of what future forces affect the Bay Area.

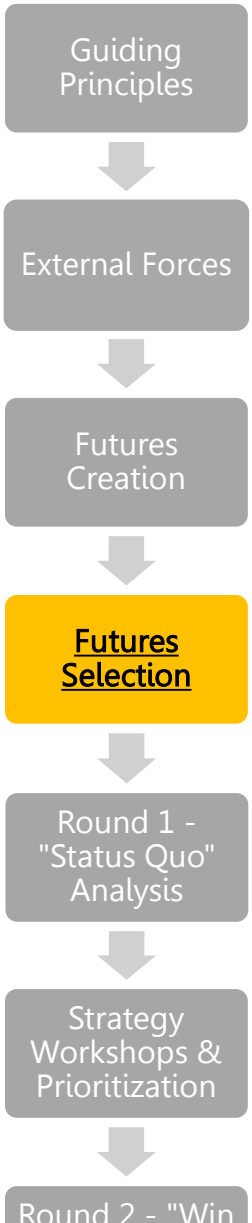

Figure 1: Primary steps of the Futures element of *Horizon.*

Proposed Futures for Analysis

Attachment A summarizes the three proposed futures and initial forecasts for the Bay Area, while **Attachment B** describes the 24 varying external forces that underpin them. Each future can be distilled to a central "what-if" question:

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

The three futures explore a diverse range of outcomes for key topics, including:

- **New Technologies:** Clean and Green and Back to the Future explore two very different potential outcomes of an automated future, while Rising Tides, Falling Fortunes considers what happens if new technologies fizzle.
- **Climate Change:** Each of the futures explores different global outcomes, with Clean and Green envisioning a world where the goals of the Paris Climate Accord are met and Rising Tides, Falling Fortunes explores a far grimmer scenario of climate impacts for 2050.
- **Federal Funding:** Clean and Green examines the economic and environmental impacts of an expanded and activist federal government, while Rising Tides, Falling Fortunes looks at what radical devolution of authority might mean for the Bay Area.
- **Immigration Policy:** Back to the Future imagines how the Bay Area might grow with a more open immigration policy than today, while Rising Tides, Falling Fortunes considers a more nationalist United States in the years ahead and the implications of an aging populace.
- **Megaregional Shifts:** Clean and Green imagines how a carbon tax and new technologies might slow growth outside of the nine Bay Area counties, while Back to the Future looks at the emergence of an interconnected region with significant residential growth in Stockton, Sacramento and beyond.

The ABAG/MTC adaptation of the REMI model (Regional Economic Models, Inc.) was used to translate broad assumptions for external forces at the national and regional levels into projections. These draft projections include population and employment growth forecasts, as well as income and demographic characteristics at the regional level. Ultimately, these external forces highlighted above result in a spectrum of outcomes for the Bay Area:

- **2050 population forecasts** range from 8.6 million in Rising Tides, Falling Fortunes to 13.6 million in Back to the Future with Clean and Green roughly midway between the two.
- **2050 job forecasts** range from 4.3 million in Rising Tides, Falling Fortunes to 6.7 million in Back to the Future with Clean and Green roughly midway between the two.
- The regional economy – and shifts in automation – lead to **significant variation in income distribution**, with households earning less than $45,000[1] representing between 22% and 31% of the regional total.
- Immigration policies and lower birth rates lead to **a much older Bay Area** in Rising Tides, Falling Fortunes compared to the other two futures.

For reference purposes, 9.6 million residents and 4.7 million jobs were forecasted for the year 2040 in the prior regional plan, *Plan Bay Area 2040*, with 28% of households being low-income and regional median age rising to 41.

[1] In current year (2018) dollars.

- Immigration policies and lower birth rates lead to **a much older Bay Area** in Rising Tides, Falling Fortunes compared to the other two futures.

For reference purposes, 9.6 million residents and 4.7 million jobs were forecasted for the year 2040 in the prior regional plan, *Plan Bay Area 2040*, with 28% of households being low-income and regional median age rising to 41.

Next Steps

After finalizing the futures for further exploration this month, staff will commence round 1 of travel & land use modeling by exploring what would happen to the Bay Area if "status quo" policies continue – despite the unique external forces incorporated in each. This will simulate what these external forces mean for key issues such as traffic congestion, public transit, housing, open space, displacement, greenhouse gas emissions, and more. This fall, staff will initiate a series of regional strategy workshops focused on the unique opportunities and challenges in each future. The public, stakeholders, elected officials, and staff will work to brainstorm solutions to better align future outcomes with the Final Guiding Principles (and ideally, "win the future"). We look forward to your input on how to best engage the diverse population of the Bay Area in this strategies discussion in the months ahead.

Steve Heminger

Attachments

- Presentation
- Attachment A: Proposed Futures: Descriptions & Summary Tables
- Attachment B: Proposed Futures: Preliminary Summary of External Forces

SH:DV
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HORIZON

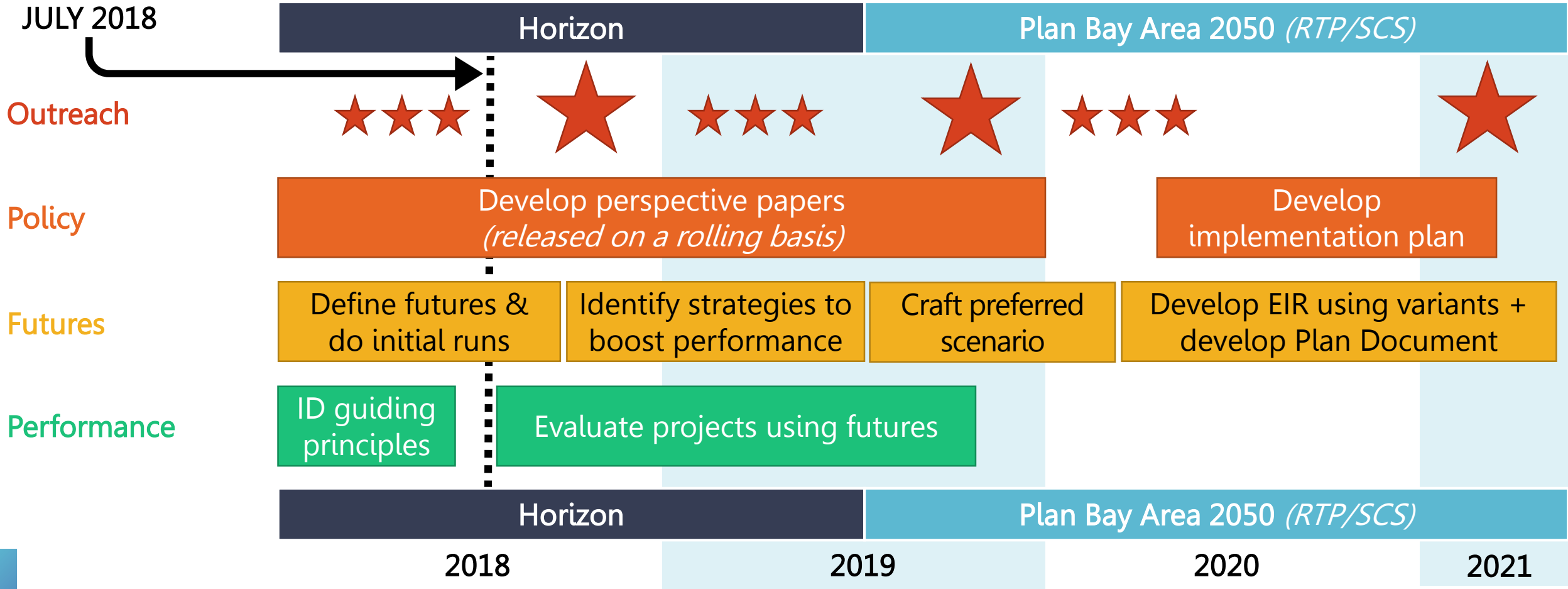
Proposed Futures

Dave Vautin and Cynthia Kroll, MTC/ABAG

Planning Committee

July 13, 2018

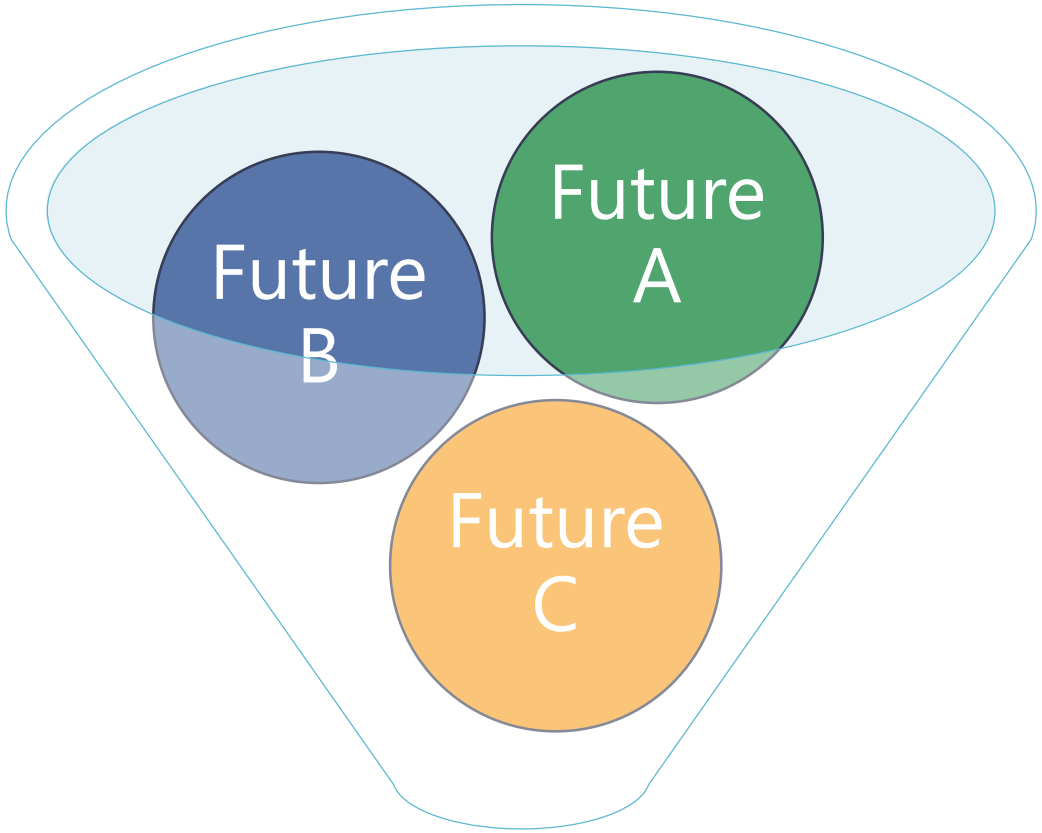
Horizon + Plan Bay Area 2050 Overview



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. The futures enable us to "stress test" policies and investments to ensure they are effective under a range of future conditions.

However, this is not a traditional scenario planning process – none of the futures is likely to be selected as a "preferred". Rather than selecting a "preferred scenario" from this process as in past plans, the strategies that perform best in multiple futures will be incorporated into Plan Bay Area 2050.



Prioritized Strategies & Investments for Plan Bay Area 2050

Transportation
Land Use
Economic Development
Resilience

Overview Video: Proposed Futures

https://www.youtube.com/watch?v=XBgkHCGxzgs

HORIZON

Three Futures – "What If?" Scenarios

A

Clean and Green

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

B

Rising Tides, Falling Fortunes

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

C

Back to the Future

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

NEW TECHNOLOGIES

Clean and Green and **Back to the Future** explore two very different potential outcomes of an automated future, while **Rising Tides, Falling Fortunes** considers what happens if new technologies fizzle.

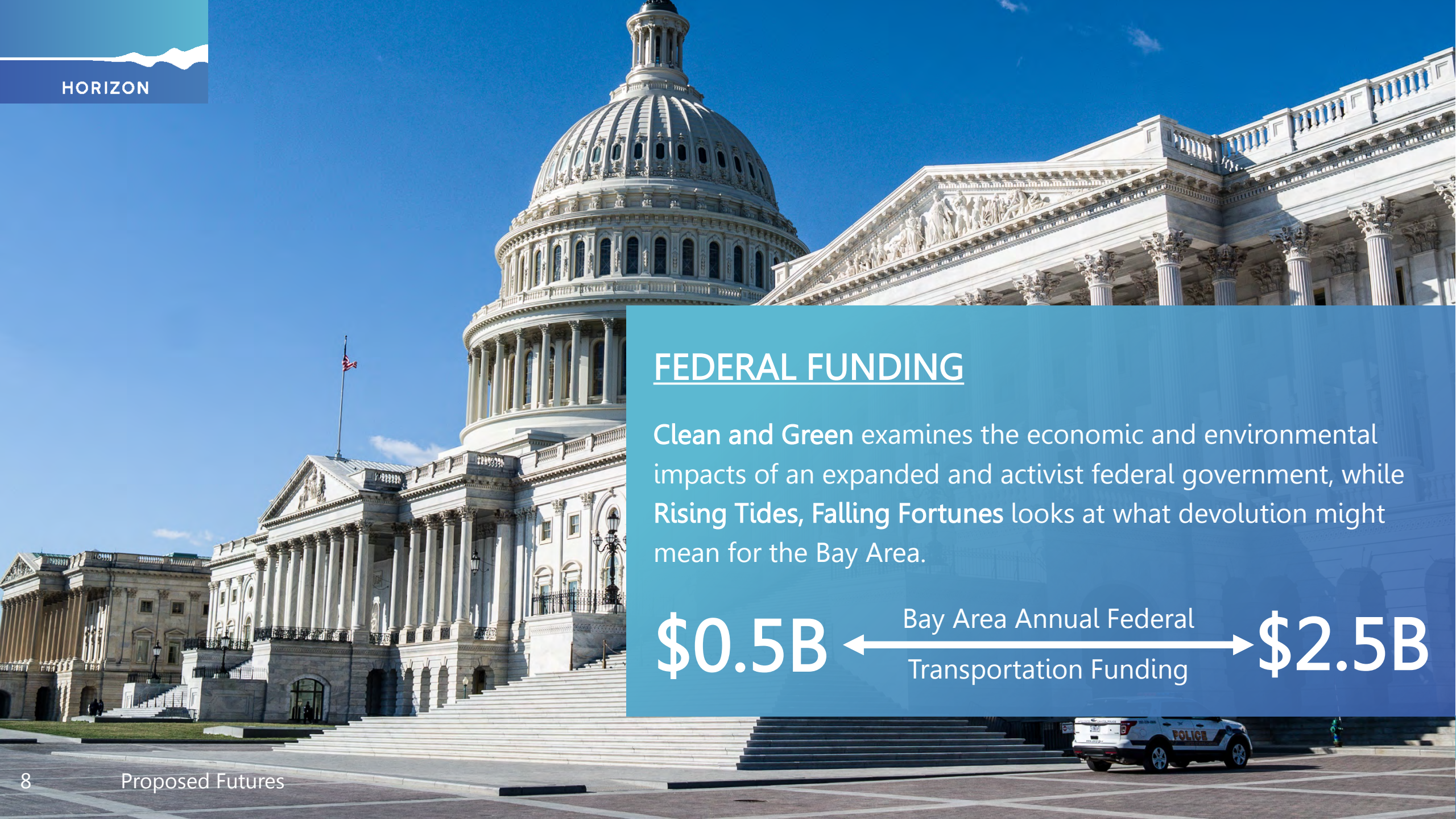
10% ← AV Market Share (2050) / EV Market Share (2050) → 95%

CLIMATE CHANGE

Each of the futures explores different global outcomes, with **Clean and Green** envisioning a world where the goals of the Paris Climate Accord are met and **Rising Tides, Falling Fortunes** explores a worst-case scenario of climate impacts for 2050.

1 ft ⟷ 3 ft

Sea Level Rise



FEDERAL FUNDING

Clean and Green examines the economic and environmental impacts of an expanded and activist federal government, while **Rising Tides, Falling Fortunes** looks at what devolution might mean for the Bay Area.

$0.5B ← Bay Area Annual Federal Transportation Funding → $2.5B

IMMIGRATION POLICY

Back to the Future imagines how the Bay Area might grow with a more open immigration policy than today, while **Rising Tides, Falling Fortunes** considers a more nationalist United States in the years ahead and the implications of an aging populace.

20K ⟷ 240K

Bay Area Immigration (annual)

Working with SJCOG & SACOG to estimate megaregional conditions

MEGAREGIONAL SHIFTS

Clean and Green imagines how a carbon tax and new technologies might slow growth outside of the nine Bay Area counties, while **Back to the Future** looks at the emergence of an interconnected region with significant residential growth in Stockton, Sacramento and beyond.

Stable ⟷ **Booming**

Interregional Flows

Summary: **External Forces**

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

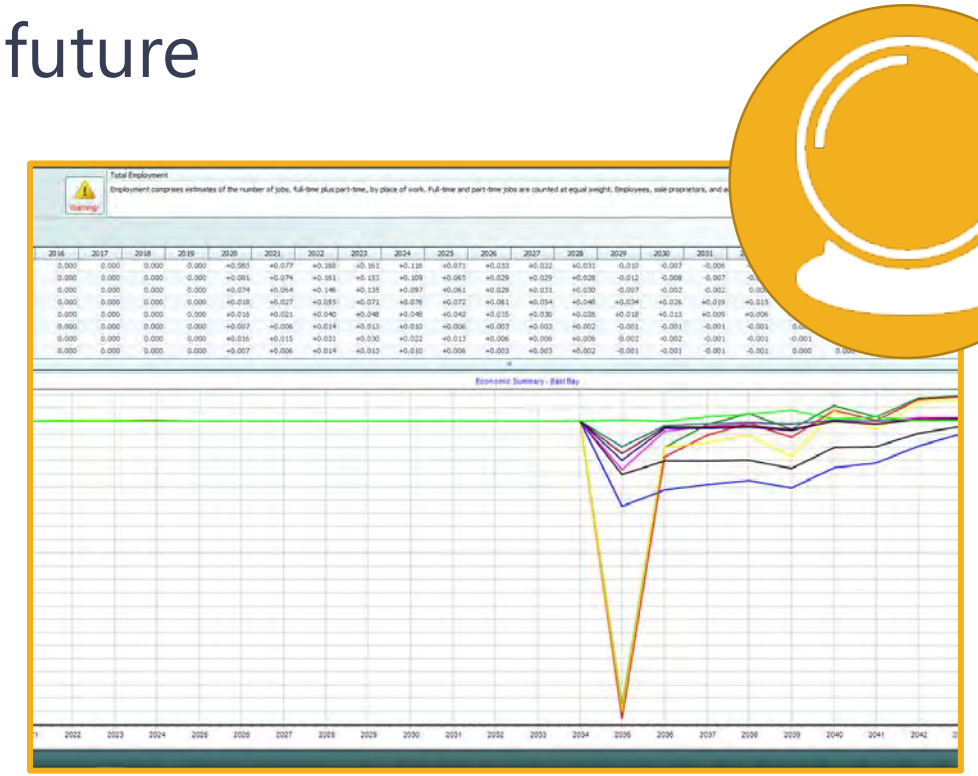
COLOR LEGEND

Lower value  Higher value

Tools: From Ideas to Model Results

*Economic forecasters assume everything except **responsibility***

- REMI gives a stylized view of the future
- A change in assumptions changes the future
  - National jobs, population, output
  - Regional jobs, population, output, total income
- Results sometimes need adjustment
- Side-model analysis for other factors
  - Households
  - Income distribution levels
- Further review & refinement through the end of July



Summary: **Population & Jobs** *(Draft)*

#	FUTURE NAME	2050 POPULATION	2050 JOBS	2050 INCOME DISTRIBUTION	2050 RACIAL DISTRIBUTION	2050 AGE DISTRIBUTION
A	Clean and Green	10.7 million	5.5 million	24% low-income	73% minority	38 median age
B	Rising Tides, Falling Fortunes	8.6 million	4.3 million	31% low-income	71% minority	43 median age
C	Back to the Future	13.6 million	6.7 million	22% low-income	77% minority	38 median age

Why do economists provide detailed forecasts out 30 years?
To prove they have a sense of humor...

Plan BayArea 2040

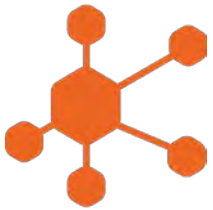
Year 2040 Forecasts *(for reference)*
9.6 million residents and **4.7 million** jobs

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 in its entirety 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

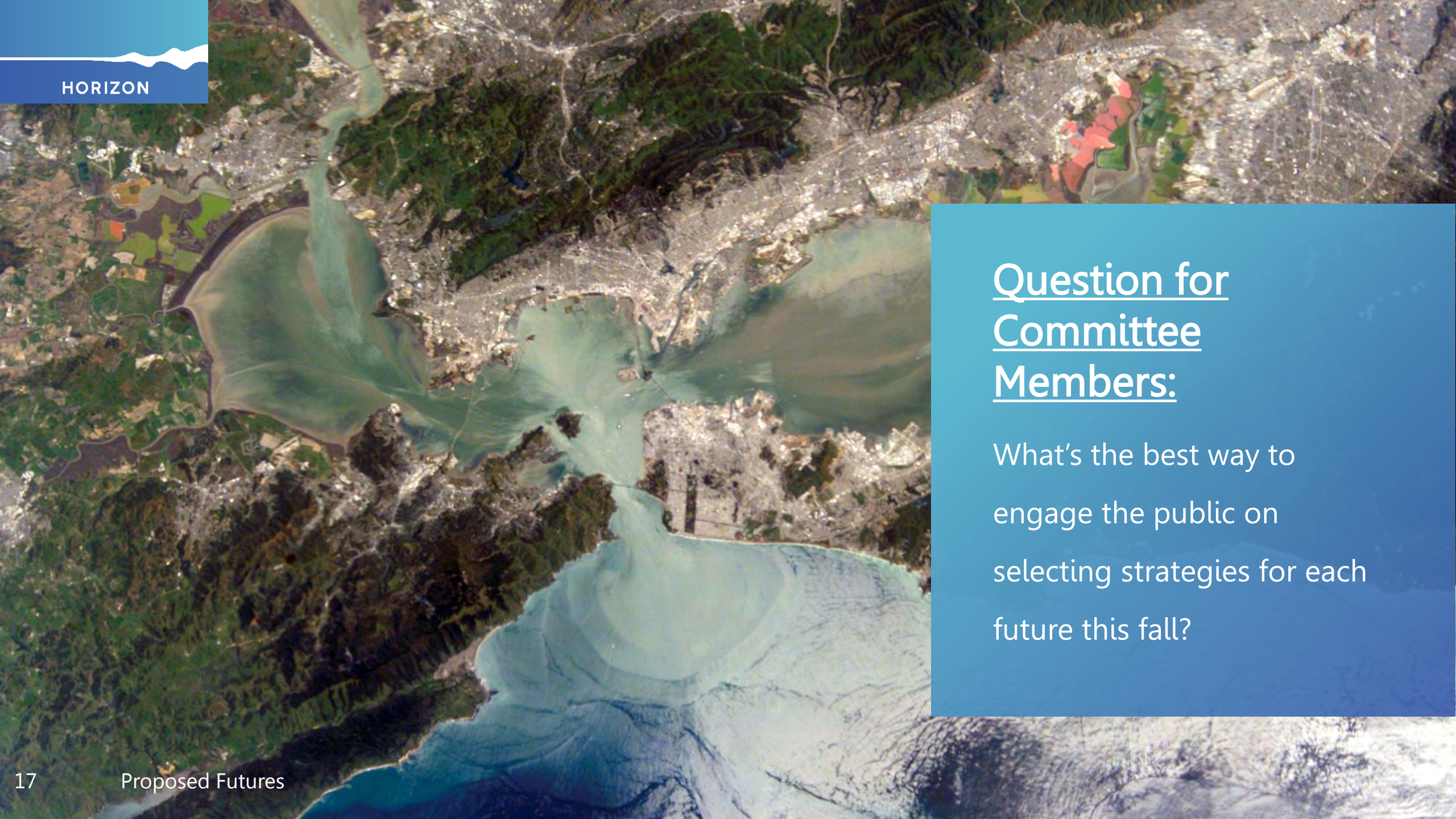
The Bay Area region is an innovation leader, creating quality job opportunities for all and ample fiscal resources for communities.

Icons Credit: The Noun Project

What's Next for the Futures in **Horizon**

July 2018	August – October 2018	Fall 2018	Winter – Spring 2019
Finalize Futures Incorporate feedback and prepare to run simulation models for transportation & land use	**Round 1 Analysis** Analyze each future with "status quo" strategies to identify opportunities & challenges	**Strategies Outreach** Collaboratively identify strategies and investments to better align future outcomes with Guiding Principles	**Round 2 Analysis** Test strategies to determine efficacy + develop Final Report on "Win-Win" Strategies

Integrate the most effective and resilient strategies into **Plan Bay Area 2050**



Question for Committee Members:

What's the best way to engage the public on selecting strategies for each future this fall?

#	FUTURE NAME	FUTURE DESCRIPTION
A	 Clean and Green	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.
B	 Rising Tides, Falling Fortunes	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.
C	 Back to the Future	The U.S. experiences continued prosperity and finds itself widely respected 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 autonomous vehicles and hyperloop lines to access urban job centers.

External Forces Summary

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

Draft Outcomes — Bay Area

#	FUTURE NAME	2050 POPULATION	2050 JOBS	2050 INCOME DISTRIBUTION	2050 RACIAL DISTRIBUTION	2050 AGE DISTRIBUTION	2050 INTERREGIONAL TRAVEL	2050 TRANSPORTATION REVENUES
A	**Clean and Green**	**10.7** million	**5.5** million	**24%** low-income	**73%** minority	**38** median age	← →	**$$$**
B	**Rising Tides, Falling Fortunes**	**8.6** million	**4.3** million	**31%** low-income	**71%** minority	**43** median age	↑	**$$**
C	**Back to the Future**	**13.6** million	**6.7** million	**22%** low-income	**77%** minority	**38** median age	↑↑↑	**$$$$**

External Forces			A Clean and Green	B Rising Tides, Falling Fortunes	C 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	+1.1%	+0.4%	+1.1%
	11	U.S. Jobs Annual Growth Rate	+0.2%	+0.4%	+1.1%
	12	U.S. Jobs Distribution	*currently being refined*	*currently being refined*	*currently being refined*
	13	U.S. Productivity	+2.7%	+1.6%	+1.6%
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	Limited Growth Rates	Current 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