

THIS PRINT COVERS CALENDAR ITEM NO.: 11

**SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY**

DIVISION: Transit

BRIEF DESCRIPTION:

Committing to start procuring zero emission battery buses to replace the electric hybrid vehicles by 2025, with a goal of achieving a 100% electric vehicle fleet by 2035.

SUMMARY:



- The SFMTA has been one of the national leaders in supporting sustainable, reduced or zero emissions revenue transit vehicles.
- The SFMTA currently operates the largest fleet of zero emissions electric trolley vehicles, running on 100% greenhouse gas-free electricity, in North America and a fleet of low emissions electric hybrid vehicles running on renewable diesel, and has been aggressively pursuing and implementing the latest in reduced or zero emissions technologies.
- San Francisco is one of 26 signatory cities worldwide to the “C40 Cities Clean Bus Declaration of Intent,” calling for manufacturers and other key partners to work with cities to increase availability and affordability of vehicles that meet cities’ needs.
- The SFMTA is implementing the San Francisco Municipal Railway 2004 Clean Air Plan, which established a strategy for achieving the lowest possible overall fleet emissions in working toward a 100% zero emission fleet.
- In April 2018, San Francisco announced a historic commitment to net-zero emissions by 2050.
- The SFMTA intends to evaluate and implement a pilot program of battery electric vehicles. From the pilot program, the SFMTA will be able to determine the infrastructure upgrades and the adjustment of maintenance resources.

ENCLOSURES:

1. SFMTAB Zero Emission Vehicle Resolution
2. [Clean Air Plan 2004](#)

APPROVALS:

DATE

| | | |
|-----------|--|-------------------|
| DIRECTOR |  _____ | 5/8/2018 _____ |
| SECRETARY |  _____ | 5/8/2018 _____ |

ASSIGNED SFMTAB CALENDAR DATE: May 15, 2018

PURPOSE

The purpose of this calendar item is to request the SFMTA Board of Directors commit to start procuring zero emission battery buses to replace the electric hybrid vehicles by 2025, with a goal of achieving a 100% electric vehicle fleet by 2035.

STRATEGIC PLAN GOALS AND TRANSIT FIRST POLICY PRINCIPLES

This action supports the following SFMTA Strategic Plan Goals and Objectives.

Goal 1 - Create a safer transportation experience for everyone.

Objective 1.2: Improve the safety of the transit system.

Goal 3 - Improve the quality of life and environment in San Francisco and the region.

Objective 3.4: Provide environmental stewardship to improve air quality, enhance resource efficiency, and address climate change.

This action supports the following Transit First Policy Principles:

- To ensure quality of life and economic health in San Francisco, the primary objective of the transportation system must be the safe and efficient movement of people and goods.
- Public transit, including taxis and vanpools, is an economically and environmentally sound alternative to transportation by individual automobiles. Within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile.
- The City and County shall encourage innovative solutions to meet public transportation needs wherever possible and where the provision of such service will not adversely affect the service provided by the Municipal Railway.

DESCRIPTION

Background

The San Francisco Municipal Transportation Agency is a national leader in confronting climate change and is committed to advancing the goals and priorities highlighted in the 2004 SFMTA and Department of Environment Zero Emission Clean Air Plan (2004 Clean Air Plan). As a matter of fact, the SFMTA operates the largest fleet of zero-emission electric trolleys in North America.

The 2004 Clean Air Plan outlined a strategy for the SFMTA to transition to a 100% zero emission fleet by 2020, but the plan was subject to industry progress, market development and other variables. The 2004 Clean Air Plan relied on the use of fuel cell technology, but the fuel cell technology is not adequate to serve the operating profile, range and topography in a city like San Francisco. While the SFMTA achieved many of the strategies in the 2004 Clean Air Plan, we cannot meet the 2020 goal of zero-emission vehicles outlined in the Plan due to lack of industry progress in fuel cell technology.

Notwithstanding the challenges posed by trying to implement fuel cell technology, over the last decade, battery technology has made considerable advances and battery manufacturers are able to produce higher density batteries which provides extended mileage range. With the improvement of the battery technology, the current battery-electric vehicles can provide adequate seating capacity, operating range and the power necessary to operate in San Francisco's topography. The transit industry has experienced significant improvement in the battery electric technology and battery electric buses offers considerable ease of maintenance. Therefore, the SFMTA has decided to pursue plug-in battery electric technology rather than "fuel-cell" technology.

Efforts Toward Achieving Zero Emission

In working toward the goals of the 2004 San Francisco Clean Air Plan, the SFMTA has replaced over 90% of its older diesel buses with cleaner, more efficient electric hybrid vehicles. These electric hybrid vehicles offer dramatically lower fuel consumption, decreased engine idling time while in service, and a substantial reduction in emissions. The SFMTA's switch from conventional diesel to electric hybrid vehicles has reduced consumption of fuel by 5.4 million gallons and 82,000 tons of CO₂ over the 12-year life of the fleet.

In late 2016, the SFMTA incorporated the engine auto stop-start feature into 54 buses which reduces idling time and allows for vehicles to drive short distances entirely under electric-battery mode, further reducing the emission produced by the hybrid vehicles.

In an effort to continue making progress towards SFMTA's zero emission goal, the SFMTA has purchased new electric hybrid buses with higher capacity on-board battery systems. The increased on-board battery capacity will allow the SFMTA to run a test program to operate "Green Zones" along several electric hybrid routes. The "Green Zone" signifies an area in which the vehicle will not produce any emission. We are working with the planning team to identify these zones throughout the city. The "Green Zones" will be serviced by electric hybrid vehicles operating entirely on battery power with the vehicle engine off, and will encompass up to 25% engine off, zero emission driving daily. Thus, the "Green Zones" will consist of portions of the routes experiencing zero emissions from the hybrid buses.

One of SFMTA's goals is to transition to a fleet of battery electric buses that have zero pollutant emission. In 2017, the SFMTA formed a Zero Emission Fleet Technology Committee to help develop and implement plans and policies that support adoption of 100% zero emission fleet for the SFMTA's service and operating needs.

In 2018, the SFMTA will initiate a pilot project to explore the possibility of converting its existing hybrid vehicles into plug-in battery electric buses by replacing the hybrid diesel powertrains with a higher density battery packs. Once the conversion pilot is proven, this will pave the way towards a significant overhaul of our existing hybrid fleet further allowing us to expedite our zero emission goals.

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In 2019, the SFMTA intends to purchase a limited number of zero-emission battery electric buses and test them in revenue service throughout San Francisco to evaluate how they perform on crowded and hilly routes.

The SFMTA has taken these steps to ensure we continue to support sustainable, zero emission revenue transit vehicles.

In addition, the City and County of San Francisco is one of 26 signatory cities worldwide to the “C40 Cities Clean Bus Declaration of Intent,” calling for manufacturers and other key partners to work with cities to increase availability and affordability of vehicles that meet cities’ needs. This demonstrates the commitment of cities to reduce emission from transit vehicles by adopting the most innovative technologies like electric buses.

On April 19, 2018, in celebration of Earth Day, Mayor Mark Farrell committed San Francisco to net-zero greenhouse gas emission by 2050, a move that will eliminate the City’s carbon footprint.

Facility Upgrades

The most important step to support the zero-emission goal is to determine the infrastructure electric requirements and to assess the necessary infrastructure upgrade for our existing facilities. The SFMTA will incorporate the electric bus charging requirements into future facility planning and projects.

California Air Resources Board Zero Emission Vehicle Strategies

The California Air Resources Board (CARB) is developing strategies to transition the transit market to zero and near-zero emission technologies to meet air quality, climate and public health protection goals. The long-term vision of CARB’s Innovation Clean Transit (ICT) effort is to achieve a zero-emission transit system across California by 2040.

In an effort to meet or exceed the zero emission goals set forth in CARB’s proposed ICT initiative, staff proposes that the SFMTA Board of Directors affirm the agency’s commitment to begin procuring zero emission buses starting in 2025 with a goal of achieving a 100% battery electric vehicle fleet by 2035. This commitment exceeds CARB’s goal of achieving zero emission fleet by 2040.

STAKEHOLDER ENGAGEMENT

The SFMTA has reached out to Citizen’s Advisory Council, the Sierra Club and the Union of Concerned Scientists. The feedback has been positive and these entities are excited about the SFMTA’s proposed zero emission policy and the associated pilot program.

ALTERNATIVES CONSIDERED

The SFMTA considered meeting CARB's 2040 goal in lieu of the SFMTA's 2035 goal. Adhering to CARB's 2040 goal will not further SFMTA's goal to continue to reduce its carbon footprint at the desired pace and will allow SFMTA to continue its dependency on diesel hybrid buses for the foreseeable future.

FUNDING IMPACT

There is no immediate funding impact associated with the adoption of the Zero Emission Policy. However, transitioning to a battery electric bus fleet will require significant capital investment in charging infrastructure and will require modification of existing SFMTA facilities to accommodate battery electric buses in the future.

ENVIRONMENTAL REVIEW

On April 12, 2018, the SFMTA, under authority delegated by the Planning Department, determined that the proposed Zero Emission Vehicles Resolution is not defined as a "project" under the California Environmental Quality Act (CEQA) pursuant to Title 14 of the California Code of Regulations Sections 15060(c) and 15378(b).

A copy of the CEQA determination is on file with the Secretary to the SFMTA Board of Directors and is incorporated herein by reference.

OTHER APPROVALS RECEIVED OR STILL REQUIRED

The City Attorney's Office has reviewed this report.

RECOMMENDATION

Staff recommends that the SFMTA Board of Directors commit to start procuring zero emission battery buses to replace the electric hybrid vehicles by 2025, with a goal of achieving a 100% electric vehicle fleet by 2035.

SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
BOARD OF DIRECTORS

RESOLUTION No. _____

WHEREAS, The San Francisco Municipal Transportation Agency has been one of the nation's leaders in supporting sustainable, reduced or zero emissions revenue transit vehicles; and,

WHEREAS, The SFMTA currently operates a fleet of low-emission electric hybrid vehicles which run on renewable diesel and the largest fleet of zero emissions electric trolley vehicles in North America; and,

WHEREAS, SFMTA has been aggressively pursuing and implementing the latest in reduced or zero emission technologies; and,

WHEREAS, The SFMTA has replaced its older diesel buses with cleaner, more efficient electric hybrid vehicles. Electric hybrid vehicles offer dramatically lower fuel consumption, decreased engine idle time while in service, and a substantial reduction in emissions; and,

WHEREAS, The switch from conventional diesel to diesel hybrid vehicles has reduced SFMTA's consumption of fuel by 5.4 million gallons and 82,000 tons of CO₂ over the 12-year life of the fleet; and,

WHEREAS, The SFMTA has taken steps toward converting its series electric hybrid vehicles to zero emissions battery buses, starting with the implementation of engine auto stop-start functionality in 54 buses which will reduce idling time and allow for vehicles to drive short distances entirely under battery power; and,

WHEREAS, While the SFMTA achieved many of the strategies in the 2004 Clean Air Plan, we cannot meet the 2020 goal of zero-emission vehicles outlined in the Plan due to lack of industry progress in fuel cell technology; and,

WHEREAS, In Fall 2018, the SFMTA will purchase 54 new electric hybrid buses with higher capacity on-board battery systems, allowing the SFMTA to run a test program to operate "Green Zones" along several electric hybrid routes: and,

WHEREAS, The "Green Zones" will be serviced by electric hybrid vehicles operating entirely on battery power with the vehicle engines off, and will encompass up to 25 percent engine off, zero emission driving daily; and,

WHEREAS, In 2019, the SFMTA intends to purchase a limited number of zero-emission battery electric buses and test them in revenue service throughout San Francisco to evaluate how they perform on crowded and hilly routes, and allow staff to evaluate the facility upgrades needed to house an all-electric fleet; and,

WHEREAS, The SFMTA will also begin a pilot program to explore the possibility of converting its existing electric hybrid vehicles into plug-in battery electric buses by replacing the hybrid diesel powertrains with battery packs in the Fall 2018; and,

WHEREAS, The battery conversion pilot program will pave the way towards a significant conversion of SFMTA's existing hybrid fleet; and,

WHEREAS, The SFMTA will conduct an assessment of each of its facilities to determine the infrastructure requirements to support a battery electric fleet; and,

WHEREAS, The SFMTA will incorporate the electric bus charging requirements into future facility planning; and,

WHEREAS, On April 30, 2018, the SFMTA, under authority delegated by the Planning Department, determined that the Zero Emission Resolution is not defined as a "project" under the California Environmental Quality Act (CEQA) pursuant Title 14 of the California Code of Regulations Sections 15060(c) and 15378(b); and,

WHEREAS, A copy of the CEQA determination is on file with the Secretary to the SFMTA Board of Directors, and is incorporated herein by reference; now, therefore, be it

RESOLVED, That the SFMTA Board of Directors hereby commits to start procuring zero emission battery buses to replace the electric hybrid vehicles by 2025, with a goal of achieving a 100% electric vehicle fleet by 2035.

I certify that the foregoing resolution was adopted by the San Francisco Municipal Transportation Agency Board of Directors at its meeting of May 15, 2017.

Secretary to the Board of Directors
San Francisco Municipal Transportation Agency