



Green Zone Pilot Program

Greener and quieter operation comes to seven Equity Strategy bus lines

Background

In May 2018, the SFMTA Board of Directors adopted a resolution to make Muni's bus fleet all-electric by 2035. As part of this effort to make Muni one of the greenest public transportation agencies in the world, SFMTA has been replacing its old diesel buses with new hybrid-electric buses. With battery technology rapidly evolving, the most recent order of hybrid-electric buses is equipped with a higher energy capacity battery, which will allow buses to operate with zero emissions within "Green Zones".



What is the Green Zone program?

- Transforms a hybrid-electric bus to a **part-time electric bus** seamlessly.
- Buses operate with their engine off to allow for **zero-emissions** within defined Green Zones.
- **Fully automated**, without requiring extra steps to be taken by the bus operator.

Benefits

- ✓ Up to 33% of the route will be running in **zero-emission mode**
- ✓ **Noise and vibration reduction** – Riders and residents will not hear engine noise or feel as much vibration when the bus is in the Green Zone
- ✓ **Same functionality** – All bus accessories operate when the bus is operating in the Green Zone.
- ✓ **Seamless transition** – Operator does not need to toggle any switch to activate the EV mode.
- ✓ **No Mechanical change** to the bus, only a computer software and firmware change

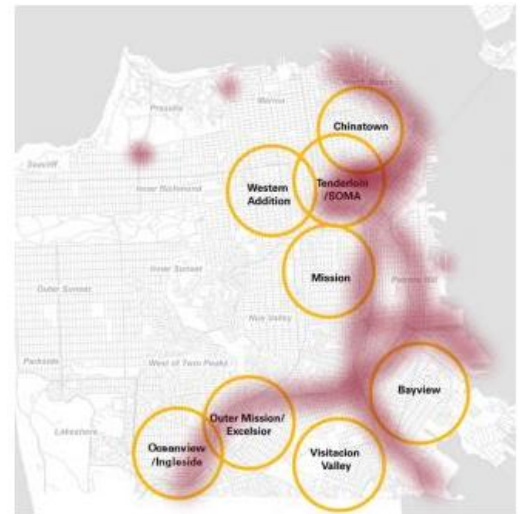
How it Works

To transform a bus from hybrid-electric part-time electric, the bus must be equipped with the following:

- ✓ **Engine stop-start feature** – Anti-idling feature automatically shuts off the engine when the bus is at rest to reduce fuel use and idling emission. The engine restarts automatically when drivers lift their foot off the brake pedal.
- ✓ **Higher-energy capacity battery** – Batteries have 3X more charge than before.
- ✓ **GPS location system** – GPS tracks the bus location when the bus crosses into a Green Zone.
- ✓ **On-board bus computer** – Shuts the engine off and on using GPS and monitors battery health.

Green Zone Selection Criteria

1. **Equity Strategy Neighborhoods** – These eight neighborhoods have higher percentages of households with low incomes and people of color. SFMTA has committed to focusing improvements to transit service performance in these areas.
2. **Low Air Quality Area** – From data published by the San Francisco Department of Public Health, air quality is lowest near freeways, heavy traffic area and the piers.
3. **Topography** – Green Zones work best in flatter areas.
4. **Length** – To maintain battery life, each Green Zone is limited to 1.5 miles at most.
5. **Benefit the most people** – It is more beneficial to riders and residents to put Green Zones on routes that operate throughout the day. The pilot program does not include Express or Owl routes.



Equity Strategy and low air quality neighborhoods

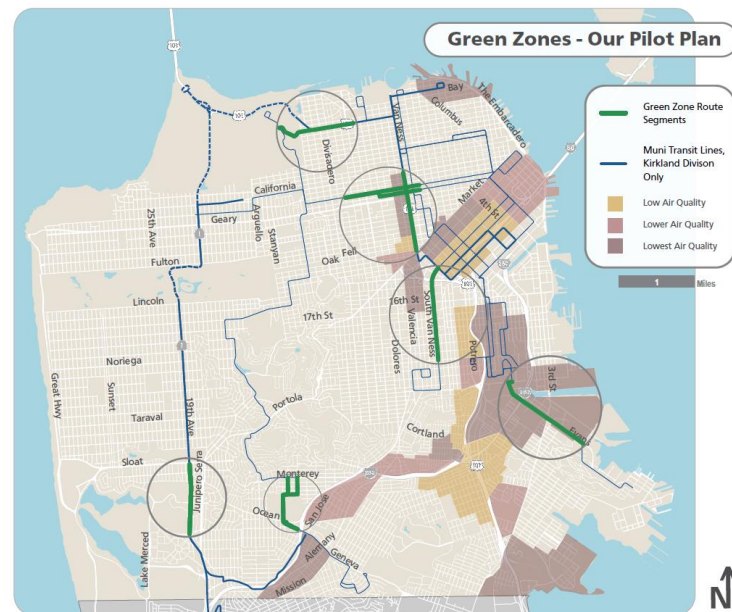
Below are the neighborhoods and bus routes selected to be used on the Green Zone pilot program:

Neighborhoods:

Western Addition, Tenderloin/SoMa, Bayview, Mission, Park Merced, Marina

Bus Routes:

- 2 Clement
- 12 Folsom/Pacific
- 19 Polk: **Soft launch** near Hunters Point and Polk St.
- 28 19th Ave
- 28R 19th Ave Rapid
- 43 Masonic
- 47 Van Ness



Green Bus Fleet Milestone

- 2007 – First 86 hybrid buses arrive in San Francisco
- 2013 – Muni procures 112 more hybrid buses to replace older diesel buses
- 2015 – Signed a contract with New Flyer to replace all remaining diesel buses with 424 hybrid buses
- 2015 – Procured first electric trolley buses that can go longer distances without overhead wires
- 2016 – Produced first hybrid buses with engine stop-start feature, first step towards Green Zones
- 2018 – Hybrid buses have higher capacity batteries to allow for Green Zones on seven routes

Next Steps

- ✓ Outreach to transit operations and maintenance staff
- ✓ Convey Green Zone locations and benefits to residents and riders