

December 6, 2019

Governor Charles D. Baker
Massachusetts State House
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Boston, MA 02133

Secretary Stephanie Pollack
Department of Transportation
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Re: Expedite the Transition to a Zero Emission Fleet at Massachusetts Bay Transportation Authority (MBTA)

Dear Governor Baker, Secretary Pollack, Chairman Aiello, and esteemed members of the Fiscal and Management Control Board (FMCB):

The undersigned members of the Zero Emission Vehicle (ZEV) coalition represent environmental, transit, labor, community, and public health organizations dedicated to accelerating the electrification of public transit and vehicle fleets. Thank you for the opportunity to comment on the *Bus Fleet and Facilities Plan* updates and the creation of a *Bus Transformation Office*. We offer the following recommendations for your consideration.

In summary, we ask the MBTA to:

- **Limit the testing period for the five electric buses** that were introduced in the summer of 2019 to a one-year pilot (until summer 2020).
- **Commit to replace the Dual Mode Articulated (DMA) fleet and *at least half of the bus procurements mentioned in the 2021-2024 CIP*** with battery electric buses or other technology with zero tailpipe emissions.
- **Expedite the work at the Southampton and Quincy garage facilities** to start hosting electric bus fleet by 2022.
- **Outline short-term (5 years) and long term (10-15 years) goals and a timeline** for existing and new garage facilities to support fully electric bus fleets.
- **Commit to all electric bus purchases starting 2030**, complete fleet electrification by 2040
- **Prioritize the deployment of electric buses in environmental justice communities** to deliver a much-improved service in areas that are disproportionately impacted by air pollution while being most dependent on public buses.

Transportation emissions, which have been on the rise nationally, represented 43% of greenhouse gases (GHG) in Massachusetts.¹ The latest climate science tells us that, at the current GHG emission rates, we have a 50% chance to keep the global temperature rise limited to +1.5 degrees Celsius only if we collectively *stop emitting* GHG by 2030 and reach net-zero *globally* around 2050.² These requirements are even more stringent than those of the Massachusetts Global Warming Solution Act (GWSA).

As stated in the report to the Governor from the Commission on the Future of Transportation, the decarbonization of the public transit sector – buses and trains – is a critical, actionable first step to achieve the Commonwealth’s 2050 GWSA mandate.

In addition to reducing GHG emissions, the elimination of fossil fuels from public transit will have enormous co-benefits for air quality and public health. Diesel fuel, in particular, is a recognized hazard to human health³ and a documented occupational hazard for fuelers, garage, and maintenance workers subjected to routine exposure.⁴ Pollution control technologies deployed on diesel-hybrid buses do not entirely eliminate diesel exhaust, leaving behind ultrafine particles containing soot and heavy metals that are a serious threat to human health.^{5,6}

We commend the MBTA for deploying the first five battery electric buses on the Silver Line, including on routes that serve Chelsea, a disadvantaged community burdened by high asthma rates. However, we ask that the plan to test these initial five buses for two years⁷ is shortened to a one-year pilot, in order to accelerate the transition to battery electric buses.

We are also pleased by the FMCB decision to establish a *Bus Transformation Office* to “develop and implement environmental, financial, procurement, and operational strategies and others as required” to significantly improve the bus service in and around Boston.

Prioritizing investments in zero emission technologies should be a key component of the transformation of the bus system to deliver a modern service and a better rider experience.

¹ Mass.gov, MA GHG Emission Trends: MA and US GHG by Sector. <https://www.mass.gov/service-details/ma-ghg-emission-trends>

² IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty World Meteorological Organization, Geneva, Switzerland, 32 pp. https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_SPM_FINAL.pdf

³ California Office for Environmental Health Hazard Assessment (2001). Health Effects of Diesel Exhaust. <https://oehha.ca.gov/air/health-effects-diesel-exhaust>

⁴ National Council for Occupational Safety and Health (n.d.). Diesel Hazards. <https://www.coshnetwork.org/node/358>

⁵ DPF Solution Sheffield, UK. (2016). New DPF Filter Effectiveness Queried by Scientists.

<https://www.dpf-solutionsheffield.co.uk/uncategorized/new-dpf-filter-effectiveness-queried-by-scientists/>

⁶ Lane, K.J., et al. (2016). Association of modeled long-term personal exposure to ultrafine particles with inflammatory and coagulation biomarkers. *Environ Int.* <https://www.researchgate.net/publication/301611510>

⁷ MBTA (July 31, 2019). First Zero emission Battery-electric Buses Join the MBTA Silver Line Fleet.

<https://www.mbta.com/news/2019-07-31/first-zero-emission-battery-electric-buses-join-the-mbta-silver-line-fleet>

The MBTA should take advantage of the creation of such an office to also investigate the potential of using of “in motion charging” (IMC) buses, which could capitalize on the existing overhead wires in the Silver Line tunnel to charge buses while in service, and then operate on batteries en route. Seattle, San Francisco, and Dayton, OH⁸ have all purchased IMC buses to extend their existing trolleybus networks.

While we understand that the North Cambridge facility has already been assigned to host battery electric buses, there will be zero reduction in emissions by replacing existing electric trolleybuses with battery electric buses. New electric buses should *only* be used to replace fossil fuel buses for maximum GHG and air pollution reductions.

We are concerned that MBTA will continue to procure significant numbers of fossil fuel buses in the next five years, as suggested by the recent *Bus and Facilities* plan. In addition to the 194 diesel hybrid buses that will replace the 2004-2005 fleet, MBTA is exploring options to add additional diesel-hybrid buses to the Dual Mode Articulated (DMA) fleet in 2020. The 2021-2024 Capital Investment Plan (CIP) outlines the purchase of up to 750 buses for both fleet replacement and expansion.

Given that buses purchased today will remain in service for at least another twelve years, it is critical that MBTA introduces zero emission buses as the old diesel fleets are retired. The planned replacement and expansion of the Dual Mode Articulated (DMA) fleet provides MBTA with an opportunity to move away from fossil fuel procurements and invest in electric buses in a timely manner. In addition, at least half of the bus procurements mentioned in the 2021-2024 CIP should be electric.

Electric buses are an advantageous long-term investment for the following reasons:

- Are up to four times more efficient than the fossil fuel counterparts, offering the greatest opportunity to reduce lifecycle carbon emissions.⁹
- Eliminate tailpipe pollution. Conversely, advanced hybrid buses can only reduce GHG emissions by 30%, based on fuel efficiency.¹⁰ Existing pollution control technologies in diesel-hybrids do not mitigate carcinogenic gases, such as benzene and Polycyclic Aromatic Hydrocarbons (PAHs). Recent studies have shown that even the most modern diesel-hybrids do not perform as expected under real-world conditions – e.g., in cold weather, in traffic – for nitrogen oxides (NOx) emission reduction.¹¹

⁸ Hulsey, L. (October 20, 2017) RTAs buy 26 NexGen electric trolley buses at \$1.2 million each.

<https://www.daytondailynews.com/news/local/rta-buy-electric-trolley-buses-million-each/sfKZdDO1p6ijxmleUVBP2J/>

⁹ O’Dea, Jimmy (2018). Electric vs. Diesel vs. Natural Gas: Which Bus is Best for the Climate? <https://blog.ucsusa.org/jimmy-odea/electric-vs-diesel-vs-natural-gas-which-bus-is-best-for-the-climate>

¹⁰ M.J. Bradley & Associates, LLC. (2013). Comparison of Modern CNG, Diesel and Diesel Hybrid Electric Transit Buses: *Efficiency and Environmental Performance*. <https://mjbradley.com/reports/comparison-modern-cng-diesel-and-diesel-hybrid-electric-transit-buses-efficiency>

¹¹ Yang, L. et al. (2016). Evaluating real-world CO₂ and NO_x emissions for public transit buses using a remote wireless on-board diagnostic (OBD) approach. *Environmental Pollution*, Vol. 218, 453-462. doi.org/10.1016/j.envpol.2016.07.025
<https://www.sciencedirect.com/science/article/pii/S0269749116305954>

- Have lower fuel and maintenance costs than combustion engine buses, and when paired with smart charging strategies and favorable time-of-use rates, they can save thousands of dollars over their lifetime. For instance, just two electric buses saved the Chicago Transit Authority more than \$50,000 every year.¹²
- Have demonstrated the capability to deal with steep grades and cold weather.¹³ There is performance data available from electric buses operating across North America and Europe in several colder weather cities where electric buses typically use auxiliary heaters (running on biofuel to limit emissions) to assist in cold weather operations.

We are aware that the transition to electric bus fleets is dependent on the availability of adequate garage facilities and we acknowledge MBTA's ongoing efforts to address the deficiencies existing with multiple structures. MBTA must ensure that garages being upgraded or rebuilt now are equipped with the necessary power and infrastructure requirements to host battery electric bus fleets.

Quieter, diesel-free garages will no longer be a nuisance for the communities hosting them and significantly improve MBTA's employees working conditions.

The MBTA should also consider adding solar generation and battery storage capability at garage locations to increase power resilience and cut costs associated with demand charges; several agencies, including Martha's Vineyard Transit Authority, are actively looking at these options.^{14,15}

It is also critical that the MBTA honors the state's Environmental Justice policy¹⁶ by prioritizing electric bus deployment in communities such as Chelsea, Lynn, Roxbury, Dorchester, Mattapan, and other areas that are already disproportionately burdened by congestion and pollution. Residents of these areas rely heavily on buses and yet are severely underserved, as outlined in the recent Livable Street Alliance report '*64 Hours: Closing the Bus Equity Gap*'.¹⁷ Because these communities should be the first to be relieved from diesel pollution, we recommend that battery electric bus deployments are prioritized in environmental justice areas, consistent with the procedures followed by other transit agencies in the U.S., such as San Francisco SFMTA.¹⁸

¹² U.S. PIRG (2019). Electric Buses in America. Lessons from Cities Pioneering Clean Transportation.

https://masspirgedfund.org/sites/pirg/files/reports/ElectricBusesInAmerica/US_Electric_bus_scrn.pdf

¹³ Lambert, F. (April 18, 2018). Proterra puts its all-electric dual motor bus to a tough test on Utah's steepest roads.

<https://electrek.co/2018/04/04/proterra-all-electric-dual-motor-bus-test-utah-steepest-roads/>

¹⁴ Shemkus, S. (December 10, 2018). Martha's Vineyard transit plan goes beyond electrification.

<https://energynews.us/2018/12/10/northeast/marthas-vineyard-transit-plan-goes-beyond-electrification/>

¹⁵ Anderson, K. (April 19, 2019). Resiliency or sustainability: Which is most important when designing for transit agencies.

<https://www.masstransitmag.com/technology/facilities/article/21076288/resiliency-or-sustainability-which-is-most-important-when-designing-for-transit-agencies>

¹⁶ Mass.gov. (January 31, 2017). Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs.

https://www.mass.gov/files/documents/2017/11/29/2017-environmental-justice-policy_0.pdf

¹⁷ Livable Streets Alliance. (September 2019). 64 Hours: Closing the Bus Equity Gap.

<https://d3n8a8pro7vhmx.cloudfront.net/livablestreetsalliance/pages/6582/attachments/original/1569205099/lisa-better-buses-2019-v9-20sep19.pdf?1569205099>

¹⁸ Fracassa, D. (October 2, 2019). Muni tries to tackle environmental justice with new SF green bus zones.

<https://www.sfchronicle.com/bayarea/article/Muni-tries-to-tackle-environmental-justice-with-14484446.php>

Finally, we look forward to seeing a clear timeline and a pathway for a transition to an electric fleet in the long-awaited bus electrification feasibility study.

Transit agencies operating in major U.S. cities including Seattle, New York, Chicago, Minneapolis, San Francisco, and Miami have already committed to full fleet electrification by 2035 or 2040. MBTA should do the same. Without a clear timeline, the required planning and momentum for full fleet electrification will continue to be delayed.

We respectfully urge MBTA to act boldly by changing the current direction of investment in the bus fleet towards electric technologies in a timely manner. Thank you for your time and consideration.

Sincerely,

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Eugenia Gibbons, Green Energy Consumers
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