



**Foothill Transit**

June 19, 2020

Yachun Chow, Ph.D.  
Manager  
Zero Emission Truck and Bus  
Mobile Source  
California Air Resources Board  
1001 I Street  
Sacramento, California

Re: **Zero-Emission Bus Rollout Plan**

Dear Yachun Chow:

On behalf of Foothill Transit, I respectfully submit this Zero-Emission Bus Rollout Plan (Rollout Plan) in compliance with the Innovative Clean Transit (ICT) regulation, which became effective on October 1, 2019. Enclosed, please find a supplemental report by consulting firm Burns & McDonnell titled, "In-Depot Charging and Planning Study."

The goals set forth in this Rollout Plan are based on information that is currently available to us. As you have acknowledged in the Rollout Plan Guidance, our Rollout Plan is a living document that will be amended as new information becomes available to us over the coming years. Foothill Transit is committed to continuing to update this plan to ensure that our fleet transitions to zero-emission in compliance with the ICT regulation.

### **Section A: Transit Agency Information**

Foothill Transit is the primary public transit provider in the Pomona and San Gabriel Valleys of eastern Los Angeles County. This service area is approximately 327 square miles. Prior to the COVID-19 pandemic, we provided service to more than 48,000 riders per work day, or 14 million riders per year. Weekday ridership is down currently just over 17,000 per day due to COVID-19 crisis. Foothill Transit is under the jurisdictions of the South Coast Air Quality Management District and the South Coast Air Basin.

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**MEMBER CITIES** Arcadia, Azusa, Baldwin Park, Bradbury, Claremont, Covina, Diamond Bar, Duarte, El Monte, Glendora, Industry, Irwindale, La Puente, La Verne, Monrovia, Pasadena, Pomona, San Dimas, South El Monte, Temple City, Walnut, West Covina and Los Angeles County **A PUBLIC AGENCY**

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Since our first deployment of zero-emission buses (ZEBs) in 2010, Foothill Transit has been a leader in zero-emission efforts. Today, we have 33 battery electric buses in operation. Our remaining fleet consists of 340 Compressed Natural Gas (CNG) buses.

Regarding Joint Zero-Emission Bus Groups, Foothill Transit is not a member of such a group and will be submitting an individual Rollout Plan. Below are the names and contact information of Foothill Transit staff that will be involved in the continued development of this Rollout Plan:

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## **Section B: Rollout Plan General Information**

This Rollout Plan is in large part based on the In-Depot Charging and Planning Study (hereinafter, the Report) created for Foothill Transit by consulting firm Burns & McDonnell. Foothill Transit worked with Burns & McDonnell to better understand the infrastructure needs associated with transitioning our fleet to a full battery electric fleet by 2040. After almost a year of data acquisition and analysis, Burns & McDonnell released to us a final report. The Report summarizes a plan to build out infrastructure in our Pomona and Arcadia/Irwindale bus depots and transition to battery-electric buses over the next decades.



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Most recently, the Foothill Transit Executive Board agreed to move forward with procurement and deployment of 20 hydrogen fuel-cell buses. They will be deployed on Line 486, which is a 35-mile roundtrip route traveling between the Pomona Transit Center and El Monte Station. Unlike battery electric buses, hydrogen fuel-cell buses have range capabilities that are more comparable to CNG buses. Fueling hydrogen fuel cell buses also compares favorably to the fueling system we currently use for our CNG buses. However, hydrogen fuel-cell buses have a higher upfront capital cost than battery electric buses. These are all changes we need to account for as we move forward with this new transition.

As such, the goals and predictions in this report are based on initial estimates created by Burns & McDonnell with adjustments for hydrogen fuel-cell buses and infrastructure based on the best estimates available to us today.

This Rollout Plan was approved by our Executive Board on May 29, 2020, Resolution Number 2020-03. I have included a copy of the board approved resolution with this submission.

#### **Section F: Providing Service in Disadvantaged Communities**

Foothill Transit provides service to disadvantaged communities as listed in the latest version of CaEnviroScreen. We serve the following cities as highlighted in the survey: Azusa, Baldwin Park, Covina, Duarte, El Monte, Hacienda Heights, La Puente, Los Angeles, Monrovia, Montclair, Montebello, Pomona, South El Monte, West Covina, and Whittier. Based on the survey, forty-one percent of Foothill Transit's bus stops are currently located in these communities. Since we do not assign buses to specific routes, these buses will still serve these communities based on our service area and stop distribution.

One specific disadvantaged community is serviced by Foothill Transit's Line 291. This route runs from La Verne to South Pomona and has already been fully electrified for many years. Other communities mentioned above are also served by zero-emission buses based on service areas and bus stop distribution.

Currently, we have focused our continued electrification efforts on Line 486, where hydrogen fuel-cell buses will soon serve the community while reducing carbon emissions.



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When planning to deploy zero-emission buses on routes that serve disadvantaged communities, we must take into account the length of the route and whether zero-emission buses will have the range capacity to meet that demand. We face a general challenge of range capability with regards to battery-electric buses. However, we are confident that hydrogen fuel-cell buses will meet longer range demands and ensure that we can continue to serve all of our communities, especially those that suffer a higher exposure to pollution.

### **Section G: Workforce Training**

Together with original equipment manufacturers (OEMs), Foothill Transit has provided training on zero-emission buses to our bus operators and mechanics since 2010, when we procured our first battery electric buses. For bus operators, it is imperative that they learn how to drive battery-electric buses efficiently. Unlike conventional CNG buses, frequent acceleration and braking can significantly reduce bus ranges because such driving habits consume a significant amount of energy. Therefore, bus operators receive initial trainings, as well as continued training as necessary. Operators who demonstrate a higher need for training are provided additional courses to ensure they perfect their skills.

Mechanics are likewise trained on the nuances of servicing a battery electric bus. While it is true that there are fewer parts to battery electric buses, there are new components that mechanics need to be familiar with in order to safely service buses.

Foothill Transit looks forward to continuing our relationship with the OEMs to provide proper training to our staff and ensure that operations continue safely, smoothly, and efficiently.

### **Section H: Potential Funding Sources**

As you know, a key reason transit agencies are struggling to transition to a zero-emission bus fleet is the incredibly high upfront cost of zero-emission buses and the accompanying infrastructure. At Foothill Transit, we relied heavily on grants and rebate programs, such as Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) or Low or No Emission Vehicle Program (Low-No) grants, among others, to obtain and operate our 33 battery electric buses. In the next phase of our transition to zero-emission buses, we are planning to add 20 hydrogen fuel cell buses to our fleet. The data suggests that hydrogen fuel cell buses are more expensive than battery electric buses. However, hydrogen fuel cell bus fleets tend to scale easier.

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During initial discussions with Clean Energy, we have found that it will cost an estimated \$3 to \$6 million to build a liquid hydrogen station that can provide 800 kg of hydrogen per day to fuel approximately 30 hydrogen fuel-cell buses. This is a big investment that will require significant funding.

Potential funding sources for zero-emission buses include Federal Transit Administration (FTA) replacement money, as well as \$300,000 per bus from HVIP. OEMs will apply for HVIP funding at the time the buses are purchased, reducing the initial capital cost. CARB's Carl Moyer Program is another potential funding source. This program has a \$80,000 cap per bus, so long as the funding does not exceed 50 percent of the vehicle cost.

The VW Mitigation Trust has \$130 million in funds available to the transportation industry to replace old vehicles with battery or fuel-cell buses. This program would offer up to \$400,000 per vehicle.

Other funding sources include the Transit and Intercity Rail Capital Program (TIRCP), which has \$291 million available, as well as various funding opportunities from the California Energy Commission and South Coast Air Quality Management District.

Foothill Transit has also been selling LCFS credits that we earn from deployment of our CNG and battery electric buses. Assuming that the value of LCFS credits remains at approximately \$200 and the program is not discontinued, we would anticipate increased revenues once we add more fuel cell buses to our fleet.

Regarding infrastructure, Foothill Transit is open to discussing a public-private partnership with entities that are willing to pay the capital cost of infrastructure and lease the equipment to us. If such a partnership made economic sense for our agency it would also reduce the upfront cost of transitioning to a zero-emission fleet.

Foothill Transit's efforts to comply with CARB's ICT Ruling is subject to its ability to secure funding from one or more of the above mentioned sources. While we will attempt to apply for all the potential sources, it is difficult to predict how much, if any, we will be awarded in the near future and over the next two decades. It is also unclear what our chances are to receive the aforementioned funding as the entire state is in the process of transitioning to zero-emission bus fleets and California transit agencies are all competing for the same funds. Therefore, it becomes difficult to provide specific figures that predict our expenses and costs in the coming years. As always, we will continue working with our industry partners to ensure a smooth transition to a zero-emission bus fleet to the best of our ability.



**Section I: Start-up and Scale-up Challenges**

Foothill Transit has been the pioneer in deploying battery electric buses in transit service. With ten years of experience, we have identified several disadvantages in operating battery electric buses versus CNG buses. These include bus range, infrastructure cost, complex utility rates, operational impacts, and unknown battery life.

With the enormous charging infrastructure cost and the higher price of zero-emission buses, there is a lack of funding available to meet the capital demands to meet CARB's ICT Regulation. Current funding levels only provide for small-scale pilot deployments. Funding for large-scale deployments of at least 100 buses with different zero-emissions technology (battery electric and fuel cell) is necessary to further learn how zero-emissions buses perform in transit applications.

We thank you for your attention to this Rollout Plan. Foothill Transit is committed to continuing to work with CARB to transition to a ZEB fleet and reduce emissions. If you have any questions or concerns, I would be happy to discuss those with you.

Sincerely,



Doran J. Barnes  
Executive Director

