

**Attachment B**  
**Supplemental to Economic Impact Assessment**

## SUPPLEMENTAL TO ECONOMIC IMPACTS ASSESSMENT OF THE INITIAL STATEMENT OF REASONS FOR THE INNOVATIVE CLEAN TRANSIT REGULATION

This analysis is an addendum to the Initial Statement of Reasons (ISOR) for the Proposed Innovative Clean Transit (ICT) Regulation that includes further analysis of costs and adds detailed financing examples that demonstrates the regulation is feasible and will not cause reductions in service nor adverse impacts on fares.

In chapter VIII of the ISOR, staff acknowledges a higher upfront capital cost for zero-emission buses (ZEBs) but also shows that annual operating costs are lower, resulting in a total cost of ownership that is comparable to or lower than conventional buses. The cost analysis shows the annual costs of the regulation reflect higher initial costs for zero-emission buses and associated infrastructure without grant funding or financing.

Substantial funding is currently available in multiple programs and can reduce or eliminate upfront incremental costs of ZEBs and corresponding infrastructure, such as the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program (HVIP), Low Carbon Transit Operation Program (LCTOP), Transit and Intercity Rail Capital Program (TIRCP), utility investments, and other funding. Funding cannot be guaranteed to be available indefinitely and may not be necessary in later years as the incremental costs decline. This uncertainty was mentioned in the ICT ISOR with reference to financing or battery leasing as viable options. These options can reduce or eliminate higher upfront costs and spread them out over several years, and the annual installments would be paid for with operational savings. This supplemental document provides more detail on financing options and includes example analyses showing annual costs for zero emission bus purchases that are financed without funding grants or incentives.

Financing bus purchases is a viable option for transit agencies in the U.S. to purchase vehicles. In the 2016 reporting period, National Transit Database (NTD) shows that 9,414 revenue vehicles were leased.<sup>1</sup> The Fixing America's Surface Transportation (FAST) Act section 3019(c) removed the requirement that limited leasing arrangements to only those that are more cost effective than purchase or construction.<sup>2</sup> This change simplifies the requirement for transit agencies to use financing option when needed.

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<sup>1</sup> U.S. Department of Transportation (U.S. DOT), Federal Transit Administration (FTA) (2017). Annual Report on Leasing Arrangements. Available: <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/funding/funding-finance-resources/capital-leasing/69001/tbp-171031-001-capital-leasing-report-2017.pdf>, released December, 2017. Leased revenue vehicles is a small portion of total revenue vehicles because usually budgets allow for full payment upfront, especially since government funding is often available to assist in covering the bus price.

<sup>2</sup> U.S. Department of Transportation (U.S. DOT), Federal Transit Administration (FTA) (2016). Annual Report on Leasing Arrangements. Available: <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA%202016%20Annual%20Report%20on%20Leasing%20Arrangements.pdf>, released December, 2016.

Several bus manufacturers already offer multiple financing options to help transit agencies mitigate upfront costs for zero-emission buses and associated infrastructure. These options complement existing federal, state, and local municipal funding sources when making zero emission bus purchases. For example, Proterra has several leasing options, including:

- **Capital leases**, which are generally a low-cost financing tool for local governments with investment-grade credits;
- **Operating leases**, which allow customers to pay for the use of a bus over time, with the option to permanently transition the bus into a fleet at the end of the lease term; and
- **Battery leases**, which enable customers to purchase a vehicle for roughly the same price as a diesel bus, putting the operating savings toward the battery lease. Proterra is responsible for the performance of the batteries through the life of the lease (including any midlife battery replacement).<sup>3</sup>

BYD partnered with Generate Capital for an electric bus leasing program that allocated \$200 million to accelerate adoption of private and public sector electric buses.<sup>4</sup> These programs are options for purchasing buses beyond normal government financing that is commonly used for infrastructure and other capital improvements.

To illustrate how financing can address concerns about higher incremental costs, staff chose several examples where \$300,000, which represents about 40 percent of the bus cost on average, is financed over a 14-year period and the remaining costs are paid up front as the down payment. This makes the upfront payment about the same as purchasing a diesel bus. The financed amount can vary depending on the transit agency's need. In this analysis, an interest rate of 3.5 percent is used, as in Proterra's case study,<sup>5</sup> and the rate represents a low-risk loan to the lender with more than a 50 percent down payment. The financed \$300,000 is paid back in equal annual installments of \$27,471 in all examples.

For simplicity, the cash flow is shown as the difference in costs each year for financing the cost of between a depot-charging battery electric bus (BEB) with associated infrastructure and conventional buses. The comparisons are shown in Tables 1-6 with purchases in 2023, 2026, and 2029 with battery capacity increasing from 330 kWh, 440 kWh, and 550 kWh, respectively. Each table shows the upfront costs for the purchase

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<sup>3</sup> Proterra (2017). Funding Opportunities for Electric Buses. Available: <https://www.proterra.com/news-resources/blog/financing-a-proterra-bus/>, released January 11, 2017.

<sup>4</sup> BYD (2018). BYD and Generate Capital to Launch First-Ever U.S. Partnership for an Electric Bus Leasing Program \$200 million allocated to lease program to accelerate adoption of private and public sector electric buses. Available: [http://www.byd.com/sites/Satellite?c=BydArticle&cid=1514427870145&d=Touch&pagename=BYD\\_EN%2FBydArticle%2FByd\\_ENCommon%2FArticleDetails&rendermode=preview](http://www.byd.com/sites/Satellite?c=BydArticle&cid=1514427870145&d=Touch&pagename=BYD_EN%2FBydArticle%2FByd_ENCommon%2FArticleDetails&rendermode=preview), released July 11, 2018.

<sup>5</sup> Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Available: <https://vimeo.com/247358040/eaec37fc3d9>, released December, 2017.

of a bus and annual operating costs. For the BEB's the upfront costs include the infrastructure and bus costs minus the \$300,000 financed. The payments are part of the annual costs. All cost assumptions, such as bus price, infrastructure costs, fuel efficiency, fuel price, and maintenance costs, are the same as described in the ICT ISOR, Chapter VIII and Appendix I, except for the financing costs.

With the leasing examples presented, the total annual cost of purchasing and operating BEBs are about the same or lower than conventional buses in most years. In general, the financed payments are offset by cost-savings in maintenance and fuel from BEBs, and Low Carbon Fuel Standard (LCFS) credit revenues from electricity except at the time of midlife (seven years after the initial purchase). The higher cost at midlife is because the assumed costs for battery replacements are higher than conventional engine rebuilds. In most examples, the higher costs at midlife are offset by the cumulative annual savings in the first six years. In all examples, the net impact of leasing BEBs over 14-year bus lifetime results in overall neutral cost impacts or results in annual cost-savings for individual bus purchases. These individual bus purchase cost impacts would only apply to a portion of the overall fleet as ZEBs are gradually phased-in.

The State is committed to using incentives to help with the transition to zero-emission technologies, and there are several major funding programs established to reduce the incremental costs associated with zero-emission technologies. Staff's proposal provides sufficient time and opportunities for transit agencies to access funding to deploy ZEBs in a manner that is consistent with a transit agency's normal bus purchase schedule.

In summary, this analysis shows that in the case that incentives are not available to reduce upfront costs, financing is a viable option for transit agencies to reduce or eliminate incremental upfront cost of purchasing BEBs at some level by distributing the incremental cost over several years. Compared with purchasing conventional buses, even without incentives, the impact of leasing BEBs on annual cash flow is not expected to be noticeable, would not result in adverse changes in transit service or fares, nor would result in a change in rider behavior. Finally, in the case that a transit agency is unable to finance the higher incremental cost of available battery electric bus, the transit agency would be able to get an exemption from the zero-emission bus purchase requirement and would have no additional cost to consider.

**Table 1: Cost Comparison Between Leasing a Depot Charging BEB (330kWh at SCE) and Purchasing a CNG Bus in 2023**

<b>BEB Leasing (330 kWh at SCE)</b>															
<b>Year</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>Total</b>
Upfront Cost (Down Payment)	\$535,210	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$535,210
Annual Payment	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$384,597
Remaining Annual Cost	\$34,377	\$34,471	\$34,863	\$35,075	\$35,113	\$35,136	\$110,161	\$35,260	\$35,345	\$35,366	\$35,370	\$35,373	\$35,355	\$35,325	\$566,589
LCFS Credits	-\$11,742	-\$11,533	-\$11,325	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$149,768
Total Cost (\$/year)	\$585,316	\$50,409	\$51,010	\$51,430	\$51,676	\$51,911	\$127,144	\$52,452	\$52,536	\$52,558	\$52,562	\$52,564	\$52,546	\$52,516	\$1,336,629
<b>CNG Purchase</b>															
<b>Year</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>Total</b>
Upfront Cost	\$575,955	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$575,955
Annual Cost	\$50,580	\$54,120	\$54,368	\$54,437	\$54,538	\$54,546	\$90,158	\$55,145	\$55,165	\$55,213	\$55,251	\$55,311	\$55,347	\$55,508	\$799,689
LCFS Credits	-\$296	-\$86	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$382
Total Cost (\$/year)	\$626,240	\$54,033	\$54,368	\$54,437	\$54,538	\$54,546	\$90,158	\$55,145	\$55,165	\$55,213	\$55,251	\$55,311	\$55,347	\$55,508	\$1,375,262
<b>Δ (BEB Leasing-CNG Purchase)</b>															
<b>Year</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>Total</b>
Upfront Cost	-\$40,745	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$40,745
Annual Cost	\$11,267	\$7,822	\$7,966	\$8,109	\$8,046	\$8,062	\$47,474	\$7,587	\$7,651	\$7,625	\$7,590	\$7,532	\$7,479	\$7,289	\$151,498
LCFS Credits	-\$11,446	-\$11,447	-\$11,325	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$149,385
Total Cost (\$/year)	-\$40,924	-\$3,625	-\$3,359	-\$3,007	-\$2,862	-\$2,635	\$36,985	-\$2,693	-\$2,629	-\$2,655	-\$2,690	-\$2,747	-\$2,801	-\$2,991	-\$38,633

Note:

1. BEB leasing is capital leasing with \$300,000 being financed, at a 3.5% interest rate (as used in Proterra's case study<sup>6</sup>) over a 14-year period.
2. The assumptions about cost inputs, such as bus and infrastructure costs, fuel efficiency, price, and maintenance costs, are the same as described in the ICT ISOR, Chapter VIII and Appendix I.

<sup>6</sup> Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Available: <https://vimeo.com/247358040/eae37fc3d9>, released December, 2017.

**Table 2: Cost Comparison Between Leasing a Depot Charging BEB (440kWh at SCE) and Purchasing a CNG Bus in 2026**

<b>BEB Leasing (440 kWh at SCE)</b>															
<b>Year</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>Total</b>
Upfront Cost (Down Payment)	\$577,422	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$577,422
Annual Payment	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$384,597
Remaining Annual Cost	\$35,075	\$35,113	\$35,136	\$35,161	\$35,260	\$35,345	\$135,366	\$35,370	\$35,373	\$35,355	\$35,325	\$35,291	\$35,250	\$35,192	\$593,611
LCFS Credits	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$146,007
Total Cost (\$/year)	\$628,852	\$51,676	\$51,911	\$52,144	\$52,452	\$52,536	\$152,558	\$52,562	\$52,564	\$52,546	\$52,516	\$52,482	\$52,441	\$52,384	\$1,409,623
<b>CNG Purchase</b>															
<b>Year</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>Total</b>
Upfront Cost	\$613,872	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$613,872
Annual Cost	\$54,437	\$54,538	\$54,546	\$55,158	\$55,145	\$55,165	\$90,213	\$55,251	\$55,311	\$55,347	\$55,508	\$55,581	\$55,669	\$55,750	\$807,620
LCFS Credits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Cost (\$/year)	\$668,309	\$54,538	\$54,546	\$55,158	\$55,145	\$55,165	\$90,213	\$55,251	\$55,311	\$55,347	\$55,508	\$55,581	\$55,669	\$55,750	\$1,421,492
<b>Δ (BEB Leasing-CNG Purchase)</b>															
<b>Year</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>Total</b>
Upfront Cost	-\$36,450	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$36,450
Annual Cost	\$8,109	\$8,046	\$8,062	\$7,474	\$7,587	\$7,651	\$72,625	\$7,590	\$7,532	\$7,479	\$7,289	\$7,180	\$7,052	\$6,914	\$170,588
LCFS Credits	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$146,007
Total Cost (\$/year)	-\$39,457	-\$2,862	-\$2,635	-\$3,015	-\$2,693	-\$2,629	\$62,345	-\$2,690	-\$2,747	-\$2,801	-\$2,991	-\$3,099	-\$3,228	-\$3,366	-\$11,869

Note:

1. BEB leasing is capital leasing with \$300,000 being financed, at a 3.5% interest rate (as used in Proterra's case study<sup>7</sup>) over a 14-year period.
2. The assumptions about cost inputs, such as bus and infrastructure costs, fuel efficiency, price, and maintenance costs, are the same as described in the ICT ISOR, Chapter VIII and Appendix I.

<sup>7</sup> Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Available: <https://vimeo.com/247358040/eae37fc3d9>, released December, 2017.

**Table 3: Cost Comparison Between Leasing a Depot Charging BEB (550kWh at SCE) and Purchasing a CNG Bus in 2029**

<b>BEB Leasing (550 kWh at SCE)</b>															
<b>Year</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>Total</b>
Upfront Cost (Down Payment)	\$615,821	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$615,821
Annual Payment	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$384,597
Remaining Annual Cost	\$35,161	\$35,260	\$35,345	\$35,366	\$35,370	\$35,373	\$160,355	\$35,325	\$35,291	\$35,250	\$35,192	\$35,136	\$35,101	\$35,067	\$618,591
LCFS Credits	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$144,126
Total Cost (\$/year)	\$667,965	\$52,452	\$52,536	\$52,558	\$52,562	\$52,564	\$177,546	\$52,516	\$52,482	\$52,441	\$52,384	\$52,327	\$52,293	\$52,259	\$1,474,884
<b>CNG Purchase</b>															
<b>Year</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>Total</b>
Upfront Cost	\$654,528	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$654,528
Annual Cost	\$55,158	\$55,145	\$55,165	\$55,213	\$55,251	\$55,311	\$90,347	\$55,508	\$55,581	\$55,669	\$55,750	\$55,816	\$55,927	\$56,070	\$811,912
LCFS Credits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Cost (\$/year)	\$709,686	\$55,145	\$55,165	\$55,213	\$55,251	\$55,311	\$90,347	\$55,508	\$55,581	\$55,669	\$55,750	\$55,816	\$55,927	\$56,070	\$1,466,440
<b>Δ (BEB Leasing-CNG Purchase)</b>															
<b>Year</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>Total</b>
Upfront Cost	-\$38,707	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$38,707
Annual Cost	\$7,474	\$7,587	\$7,651	\$7,625	\$7,590	\$7,532	\$97,479	\$7,289	\$7,180	\$7,052	\$6,914	\$6,791	\$6,645	\$6,468	\$191,276
LCFS Credits	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$144,126
Total Cost (\$/year)	-\$41,721	-\$2,693	-\$2,629	-\$2,655	-\$2,690	-\$2,747	\$87,199	-\$2,991	-\$3,099	-\$3,228	-\$3,366	-\$3,489	-\$3,635	-\$3,811	\$8,444

Note:

1. BEB leasing is capital leasing with \$300,000 being financed, at a 3.5% interest rate (as used in Proterra's case study<sup>8</sup>) over a 14-year period.
2. The assumptions about cost inputs, such as bus and infrastructure costs, fuel efficiency, price, and maintenance costs, are the same as described in the ICT ISOR, Chapter VIII and Appendix I.

<sup>8</sup> Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Available: <https://vimeo.com/247358040/eae37fc3d9>, released December, 2017.

**Table 4: Cost Comparison Between Leasing a Depot Charging BEB (330kWh at PG&E) and Purchasing a Diesel Bus in 2023**

<b>BEB Leasing (330 kWh at PG&amp;E)</b>															
<b>Year</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>Total</b>
Upfront Cost (Down Payment)	\$535,210	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$535,210
Annual Payment	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$384,597
Remaining Annual Cost	\$42,278	\$42,447	\$43,154	\$43,535	\$43,603	\$43,646	\$118,689	\$43,868	\$44,021	\$44,059	\$44,066	\$44,071	\$44,038	\$43,985	\$685,461
LCFS Credits	-\$11,742	-\$11,533	-\$11,325	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$149,768
Total Cost (\$/year)	\$593,217	\$58,385	\$59,300	\$59,890	\$60,166	\$60,420	\$135,672	\$61,060	\$61,213	\$61,250	\$61,258	\$61,262	\$61,230	\$61,177	\$1,455,501
<b>Diesel Purchase</b>															
<b>Year</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>Total</b>
Upfront Cost	\$524,705	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$524,705
Annual Cost	\$65,552	\$69,501	\$69,927	\$70,118	\$70,516	\$70,944	\$106,894	\$72,176	\$72,608	\$72,759	\$73,153	\$73,509	\$73,684	\$73,871	\$1,035,213
LCFS Credits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Cost (\$/year)	\$590,257	\$69,501	\$69,927	\$70,118	\$70,516	\$70,944	\$106,894	\$72,176	\$72,608	\$72,759	\$73,153	\$73,509	\$73,684	\$73,871	\$1,559,918
<b>Δ (BEB Leasing-Diesel Purchase)</b>															
<b>Year</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>Total</b>
	\$10,505	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,505
Annual Cost	\$4,197	\$418	\$698	\$889	\$558	\$173	\$39,267	-\$837	-\$1,116	-\$1,229	-\$1,615	-\$1,967	-\$2,175	-\$2,415	\$34,846
LCFS Credits	-\$11,742	-\$11,533	-\$11,325	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$149,768
Total Cost (\$/year)	\$2,960	-\$11,115	-\$10,627	-\$10,227	-\$10,350	-\$10,525	\$28,778	-\$11,116	-\$11,396	-\$11,509	-\$11,895	-\$12,247	-\$12,455	-\$12,695	-\$104,417

Note:

1. BEB leasing is capital leasing with \$300,000 being financed, at a 3.5% interest rate (as used in Proterra's case study<sup>9</sup>) over a 14-year period.
2. The assumptions about cost inputs, such as bus and infrastructure costs, fuel efficiency, price, and maintenance costs, are the same as described in the ICT ISOR, Chapter VIII and Appendix I.

<sup>9</sup> Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Available: <https://vimeo.com/247358040/eae37fc3d9>, released December, 2017.



**Table 5: Cost Comparison Between Leasing a Depot Charging BEB (440kWh at PG&E) and Purchasing a Diesel Bus in 2026**

<b>BEB Leasing (440 kWh at PG&amp;E)</b>															
<b>Year</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>Total</b>
Upfront Cost (Down Payment)	\$577,422	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$577,422
Annual Payment	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$384,597
Remaining Annual Cost	\$43,535	\$43,603	\$43,646	\$43,689	\$43,868	\$44,021	\$144,059	\$44,066	\$44,071	\$44,038	\$43,985	\$43,923	\$43,849	\$43,746	\$714,100
LCFS Credits	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$146,007
Total Cost (\$/year)	\$637,312	\$60,166	\$60,420	\$60,672	\$61,060	\$61,213	\$161,250	\$61,258	\$61,262	\$61,230	\$61,177	\$61,114	\$61,041	\$60,938	\$1,530,112
<b>Diesel Purchase</b>															
<b>Year</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>Total</b>
Upfront Cost	\$562,622	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$562,622
Annual Cost	\$70,118	\$70,516	\$70,944	\$71,894	\$72,176	\$72,608	\$107,759	\$73,153	\$73,509	\$73,684	\$73,871	\$74,414	\$74,634	\$74,837	\$1,054,118
LCFS Credits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Cost (\$/year)	\$632,739	\$70,516	\$70,944	\$71,894	\$72,176	\$72,608	\$107,759	\$73,153	\$73,509	\$73,684	\$73,871	\$74,414	\$74,634	\$74,837	\$1,616,740
<b>Δ (BEB Leasing-Diesel Purchase)</b>															
<b>Year</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>Total</b>
Upfront Cost	\$14,800	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$14,800
Annual Cost	\$889	\$558	\$173	-\$733	-\$837	-\$1,116	\$63,771	-\$1,615	-\$1,967	-\$2,175	-\$2,415	-\$3,020	-\$3,314	-\$3,619	\$44,579
LCFS Credits	-\$11,116	-\$10,907	-\$10,697	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$146,007
Total Cost (\$/year)	\$4,573	-\$10,350	-\$10,525	-\$11,222	-\$11,116	-\$11,396	\$53,491	-\$11,895	-\$12,247	-\$12,455	-\$12,695	-\$13,300	-\$13,594	-\$13,899	-\$86,627

Note:

1. BEB leasing is capital leasing with \$300,000 being financed, at a 3.5% interest rate (as used in Proterra’s case study<sup>10</sup>) over a 14-year period.
2. The assumptions about cost inputs, such as bus and infrastructure costs, fuel efficiency, price, and maintenance costs, are the same as described in the ICT ISOR, Chapter VIII and Appendix I.

<sup>10</sup> Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Available: <https://vimeo.com/247358040/eae37fc3d9>, released December, 2017.

**Table 6: Cost Comparison Between Leasing a Depot Charging BEB (550kWh at PG&E) and Purchasing a Diesel Bus in 2029**

<b>BEB Leasing (550 kWh at PG&amp;E)</b>															
<b>Year</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>Total</b>
Upfront Cost (Down Payment)	\$615,821	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$615,821
Annual Payment	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$27,471	\$384,597
Remaining Annual Cost	\$43,689	\$43,868	\$44,021	\$44,059	\$44,066	\$44,071	\$169,038	\$43,985	\$43,923	\$43,849	\$43,746	\$43,644	\$43,582	\$43,521	\$739,064
LCFS Credits	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$144,126
Total Cost (\$/year)	\$676,493	\$61,060	\$61,213	\$61,250	\$61,258	\$61,262	\$186,230	\$61,177	\$61,114	\$61,041	\$60,938	\$60,836	\$60,773	\$60,713	\$1,595,357
<b>Diesel Purchase</b>															
<b>Year</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>Total</b>
Upfront Cost	\$603,278	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$603,278
Annual Cost	\$71,894	\$72,176	\$72,608	\$72,759	\$73,153	\$73,509	\$108,684	\$73,871	\$74,414	\$74,634	\$74,837	\$75,029	\$75,245	\$75,279	\$1,068,092
LCFS Credits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Cost (\$/year)	\$675,172	\$72,176	\$72,608	\$72,759	\$73,153	\$73,509	\$108,684	\$73,871	\$74,414	\$74,634	\$74,837	\$75,029	\$75,245	\$75,279	\$1,671,370
<b>Δ (BEB Leasing-Diesel Purchase)</b>															
<b>Year</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>Total</b>
Upfront Cost	\$12,543	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$12,543
Annual Cost	-\$733	-\$837	-\$1,116	-\$1,229	-\$1,615	-\$1,967	\$87,825	-\$2,415	-\$3,020	-\$3,314	-\$3,619	-\$3,914	-\$4,191	-\$4,286	\$55,569
LCFS Credits	-\$10,488	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$10,280	-\$144,126
Total Cost (\$/year)	\$1,322	-\$11,116	-\$11,396	-\$11,509	-\$11,895	-\$12,247	\$77,545	-\$12,695	-\$13,300	-\$13,594	-\$13,899	-\$14,193	-\$14,471	-\$14,566	-\$76,013

Note:

1. BEB leasing is capital leasing with \$300,000 being financed, at a 3.5% interest rate (as used in Proterra's case study<sup>11</sup>) over a 14-year period.
2. The assumptions about cost inputs, such as bus and infrastructure costs, fuel efficiency, price, and maintenance costs, are the same as described in the ICT ISOR, Chapter VIII and Appendix I.

<sup>11</sup> Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Available: <https://vimeo.com/247358040/eae37fc3d9>, released December, 2017.