BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E) For Authority To Update Electric Rate Design Effective on January 1, 2020	Application 19-07-XXX

PREPARED DIRECT TESTIMONY OF
PRAEM KODIATH
ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

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JULY 3, 2019

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I. OVERVIEW AND PURPOSE

This prepared direct testimony estimates monthly electric bills for customers enrolled in the Electric Vehicle High Power ("EV-HP") rate proposed by San Diego Gas & Electric Company ("SDG&E"). The EV-HP rate is proposed as an optional rate for separately-metered electric vehicle ("EV") direct current fast charging ("DCFC") and on and off-road medium-duty and heavy-duty ("MD/HD") EV charging. As discussed in the prepared direct testimony of Brittany Applestein Syz, the EV-HP rate is intended to accelerate transportation electrification ("TE") and is consistent with state policy. Specific details regarding the EV-HP rate design are provided in the prepared direct testimony William Saxe.

SDG&E estimates that switching from their current general service rate to the EV-HP rate will reduce the bills of some, but not all, DCFC and MD/HD EV customers. Some customers with relatively high energy throughput and corresponding high load factors may be better off remaining on existing demand-metered general service rates, as the low energy charges in these rates benefit high load factor customers. Accordingly, SDG&E will provide the option for customers to remain on their existing rate.

II. CUSTOMER BILL COMPARISONS

SDG&E estimated the customer bill impacts of switching to the EV-HP rate for large and small medium-duty ("MD") EV commercial fleets, a transit bus depot, a school bus depot, and a DCFC station. These sample customers' site characteristics and hourly load curves are illustrative, with individual modeling inputs drawn from published research, industry sources, and SDG&E estimates. These estimates compare the monthly bills of customers taking service

at the secondary voltage level on the EV-HP rate and Schedule AL-TOU, which is the default general service rate for SDG&E medium and large commercial and industrial ("C&I") customers. For all illustrative customer examples, the commodity rate is the SDG&E Critical Peak Pricing rate (Schedule EECC-CPP-D). The equivalent cost of the incumbent fuel is also estimated for some customers at recent fossil fuel prices.

These estimates are rough approximations of actual customer bills, which are influenced by a variety of factors, including their load profile and the number of EVs charged. Per-mile costs are dependent on vehicle efficiency. Moreover, real-world conditions and driving behavior can have a substantial effect on EV energy efficiency.

A. Large Medium-Duty EV Fleets

This analysis compares the cost of charging for a fleet of Class 6 electric delivery trucks with equivalent diesel vehicles.

Table 1: Large MD EV site characteristics
• 20 MD electric trucks per site • Trucks drive 50 miles per weekday • One 20 kW charger per truck, charging concurrently (400 kilowatt ["kW"] maximum) • Trucks charge 12 – 4am

The characteristics of the illustrative large MD EV fleet site, including fleet size and charging time, are shown in Table 1 above.

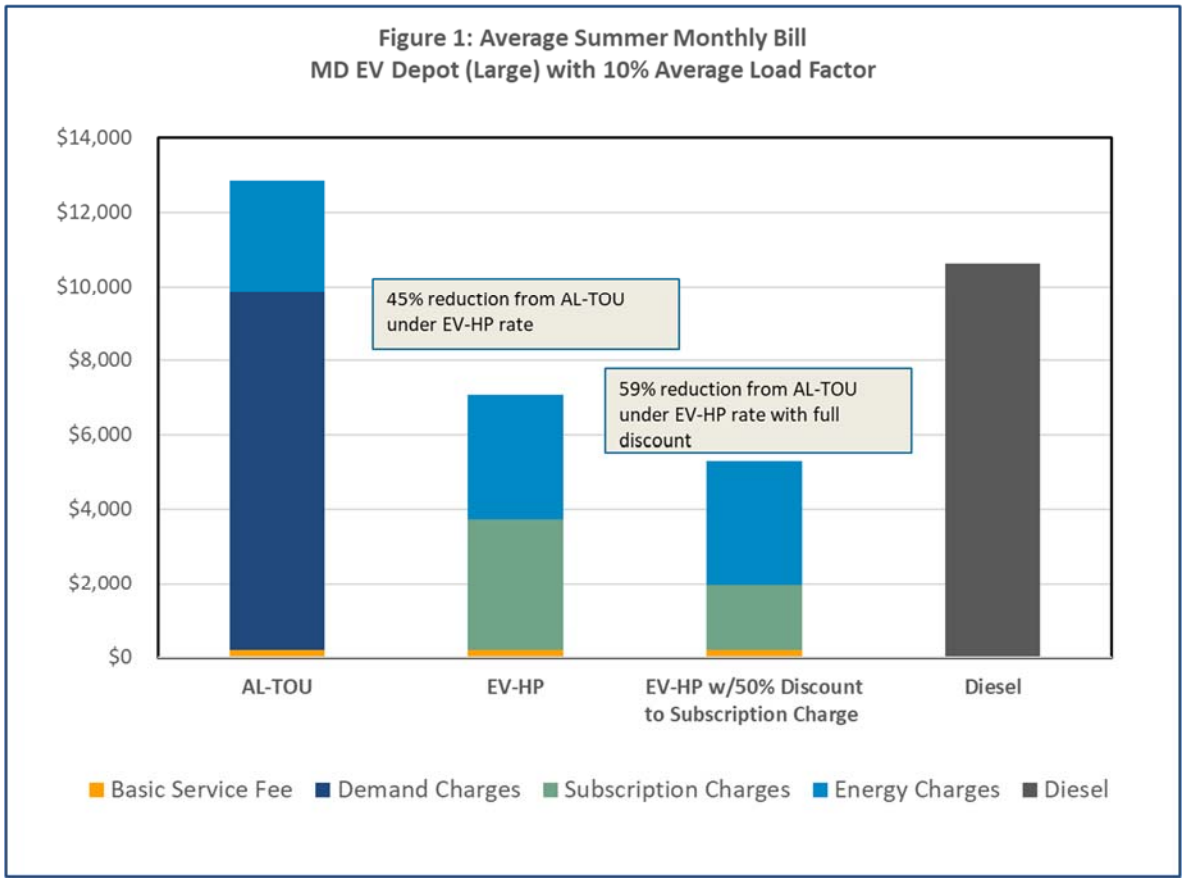


Figure 1 above shows the average summer monthly electric bill for identical customers charging on the AL-TOU rate and the proposed EV-HP rate with no discount and the EV-HP rate with the full 50% subscription charge discount applied. It also shows the monthly fuel bill for comparable diesel trucks with an identical duty cycle.

The per-mile cost of electricity for this large MD EV fleet operator driving each truck 50 miles per weekday on SDG&E's AL-TOU rate is higher than the monthly fuel cost of the same fleet using diesel fuel, even if the customer charges entirely during super off-peak hours. A large MD truck fleet with the characteristics given above has a monthly fuel cost on EV-HP rate of approximately $5,300 (equivalent to 25¢ per mile) when avoiding on-peak charging and with the full discount applied, which is much lower than the estimated $10,600 monthly fuel cost of

diesel (equivalent to 49¢ per mile). This analysis does not include the impact of the customer charging on-peak, which results in higher per-mile costs on both the AL-TOU and EV-HP rates.

B. Small Medium-Duty EV Fleets

SDG&E also estimated the cost of charging for a small business that operates a smaller number of Class 6 MD EVs and drives them fewer miles per day than the large fleet operator but for all days of the week.

Table 2: Small MD EV site characteristics
• 3 MD electric trucks per site • Trucks drive 36 miles per day, weekdays and weekends • One 20 kW charger per truck, charging concurrently (60 kW maximum) • Trucks charge 12am – 3 am

The fleet size and charging characteristics for the small MD EV site is shown in Table 2 above. The trucks in this example drive 36 miles per day.

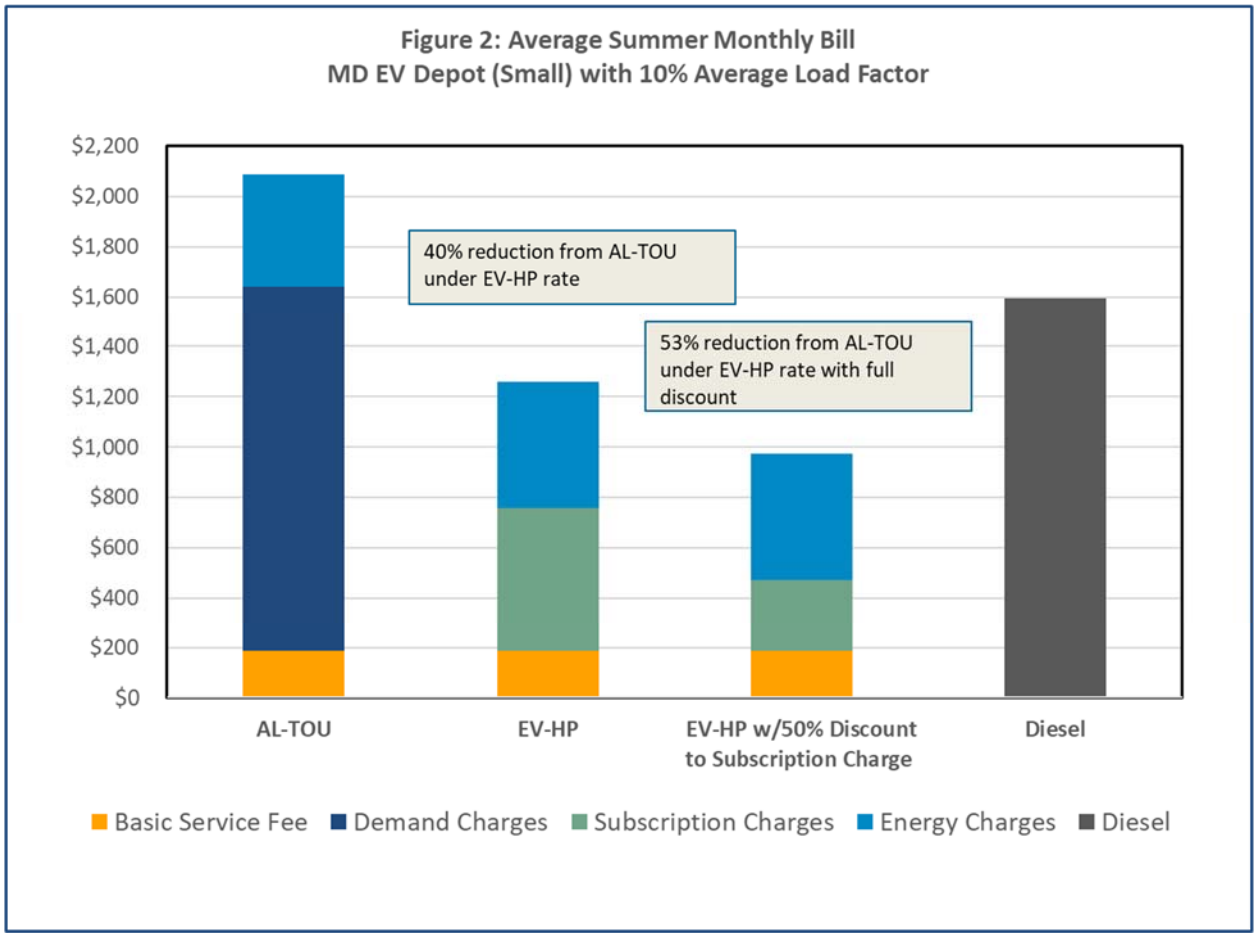


Figure 2 above shows that this illustrative customer's monthly fuel cost is approximately $2,100 (equivalent to 64¢ per mile) on the existing AL-TOU rate, significantly higher than the monthly diesel cost of approximately $1,600 (equivalent to 49¢ per mile). Switching to the EV-HP rate with the full incentive brings this customer's monthly electricity costs to approximately $975 (equivalent to 30¢ per mile), below the per mile cost of diesel.

C. Transit Bus Depot

Transit agencies are expected to be major adopters of MD/HD electric vehicles, including heavy-duty ("HD") electric transit buses.[1] Nearly all the transit agency buses in SDG&E's service territory are fueled by compressed natural gas ("CNG").[2] The Innovative Clean Transit ("ICT") regulation adopted by the California Air Resources Board ("CARB") is intended to transition these fleets to zero-emission vehicles by 2040.[3]

As shown below, a transit bus depot with the usage profile given in Table 3 is expected to reduce their bill to approximately the cost of CNG by switching from the AL-TOU to EV-HP rate.

Table 3: Transit depot site characteristics
• 20 buses per site • Buses drive 129 miles per weekday • One 80 kW charger per bus, charging concurrently (1,600 kW maximum) • Buses charge 12 – 4 am

[1] The New York Times, *California Requires New City Buses to Be Electric by 2029* (December 14, 2018), *available at* https://www.nytimes.com/2018/12/14/climate/california-electric-buses.html.
[2] *See* San Diego Metropolitan Transit System, *Zero Emission Bus Pilot Programs*, *available at* https://www.sdmts.com/inside-mts-current-projects/zero-emissions-bus-pilot-program; North County Transit District, *NCTD Completes Successful Pass Program, Gears Up for Electric Buses* (June 22, 2018), *available at* https://www.gonctd.com/nctd-completes-successful-pass-program-gears-up-for-electric-buses/.
[3] California Air Resources Board, *California transitioning to all-electric public bus fleet by 2040* (December 14, 2018), *available at* https://ww2.arb.ca.gov/news/california-transitioning-all-electric-public-bus-fleet-2040.

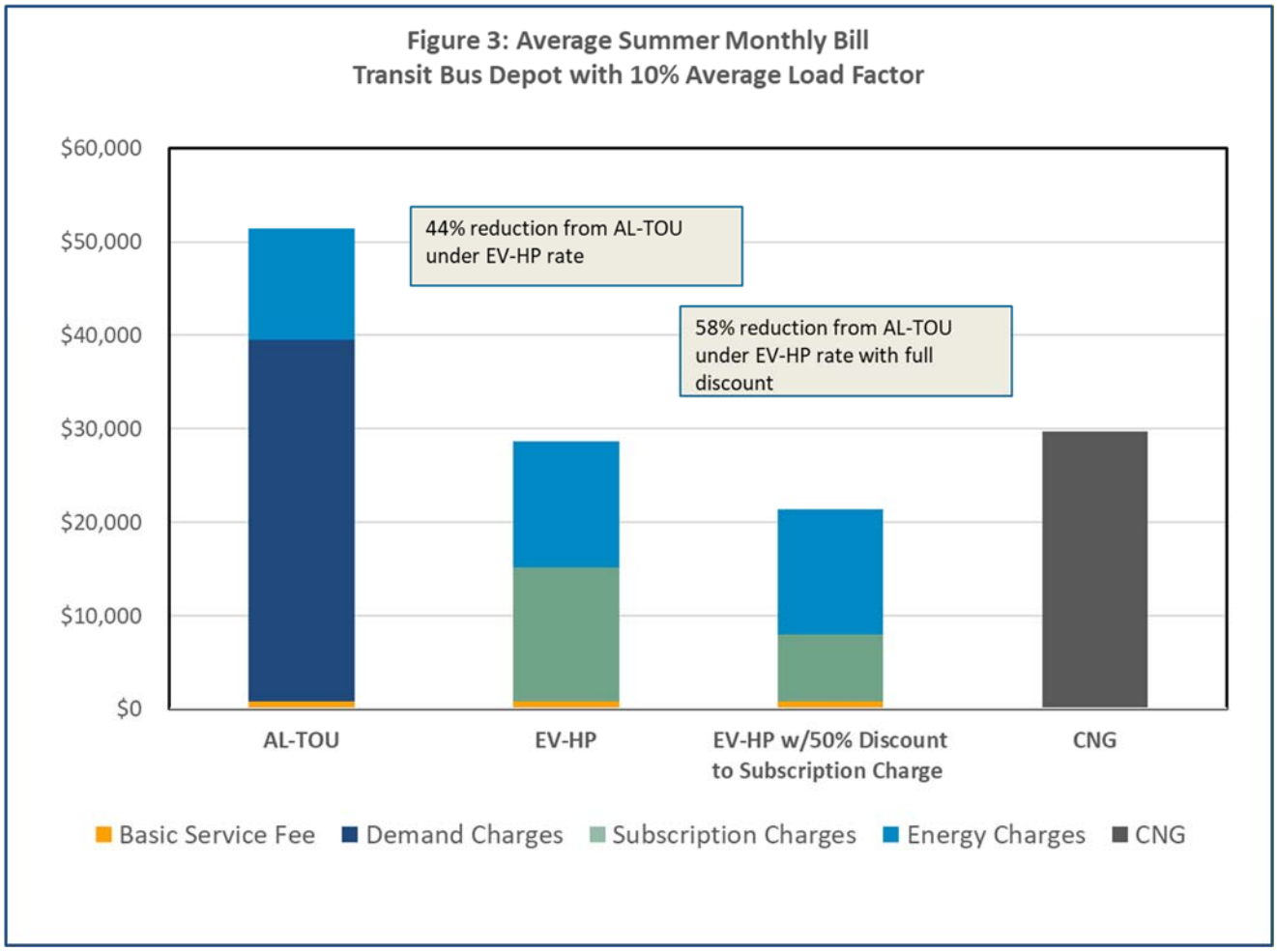


Figure 3 above shows that with the full discount applied to the subscription charge, the transit bus in this illustrative example has a monthly fuel cost of approximately $21,400 (equivalent to 38¢ per mile), lower than the estimated monthly cost of CNG of $29,700 (equivalent to 53¢ per mile).

D. School Buses

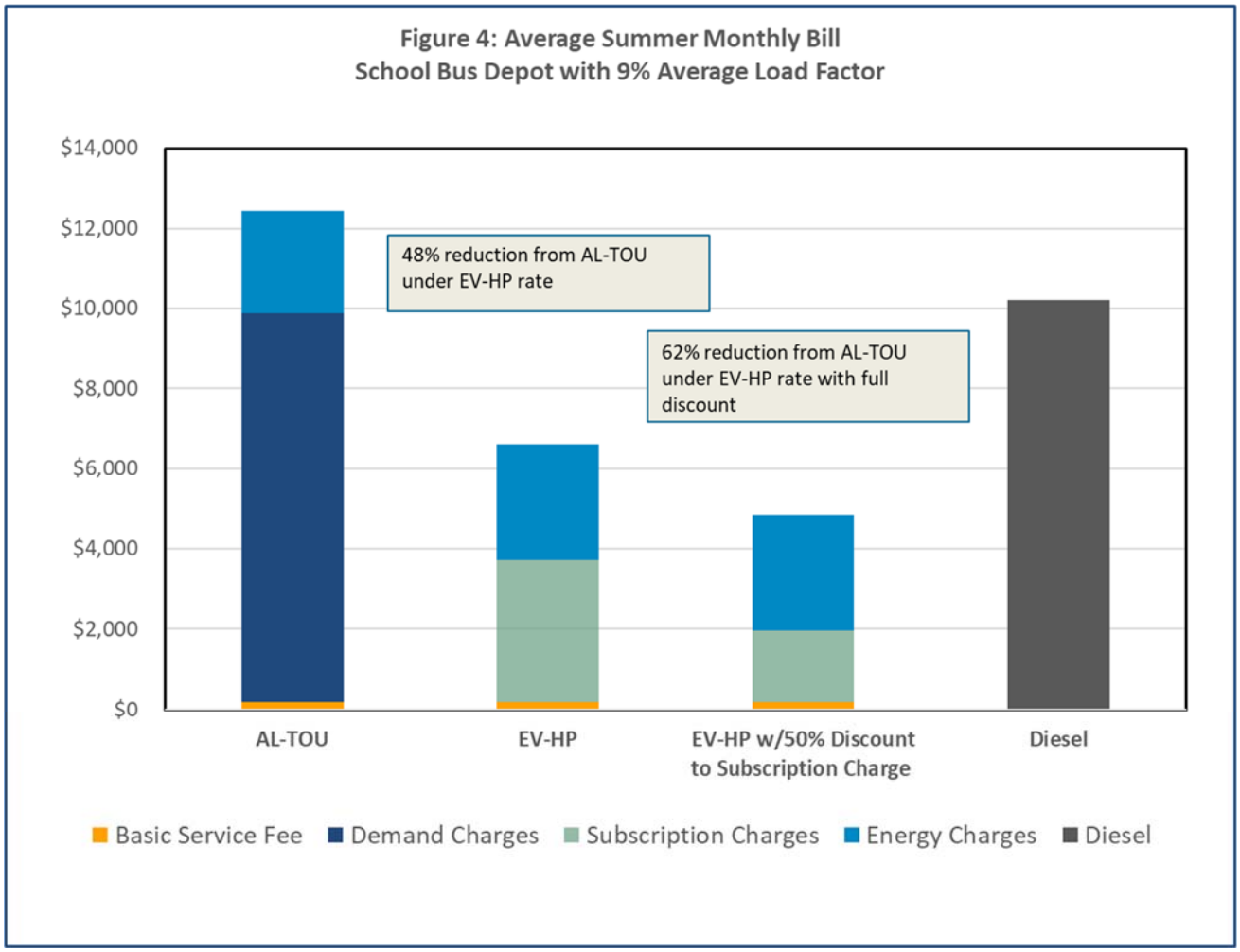
Electric school bus charging is also an important customer segment for the EV-HP rate. The number of electric school buses are expected to increase in California due to new electric

bus models from several manufacturers and a recent California Energy Commission funding round that will help provide electric buses to school districts.[4]

Table 4: School bus depot site characteristics
• 20 buses per site • Buses drive 48 miles per weekday • One 20 kW charger per bus, charging concurrently (400 kW maximum) • Buses charge 12 – 3 am weekdays

SDG&E estimates that the EV-HP rate is expected to offer savings over general service rates for battery electric school bus operators with the operating characteristics shown in Table 4 above.

[4] San Francisco Chronicle, *Goodbye, diesel: California school buses drive toward electric age* (January 16, 2018), *available at* https://www.sfgate.com/business/article/Goodbye-diesel-California-school-buses-drive-12499859.php; *see* California Energy Commission, *The School Bus Replacement Program*, *available at* https://www.energy.ca.gov/transportation/schoolbus/.



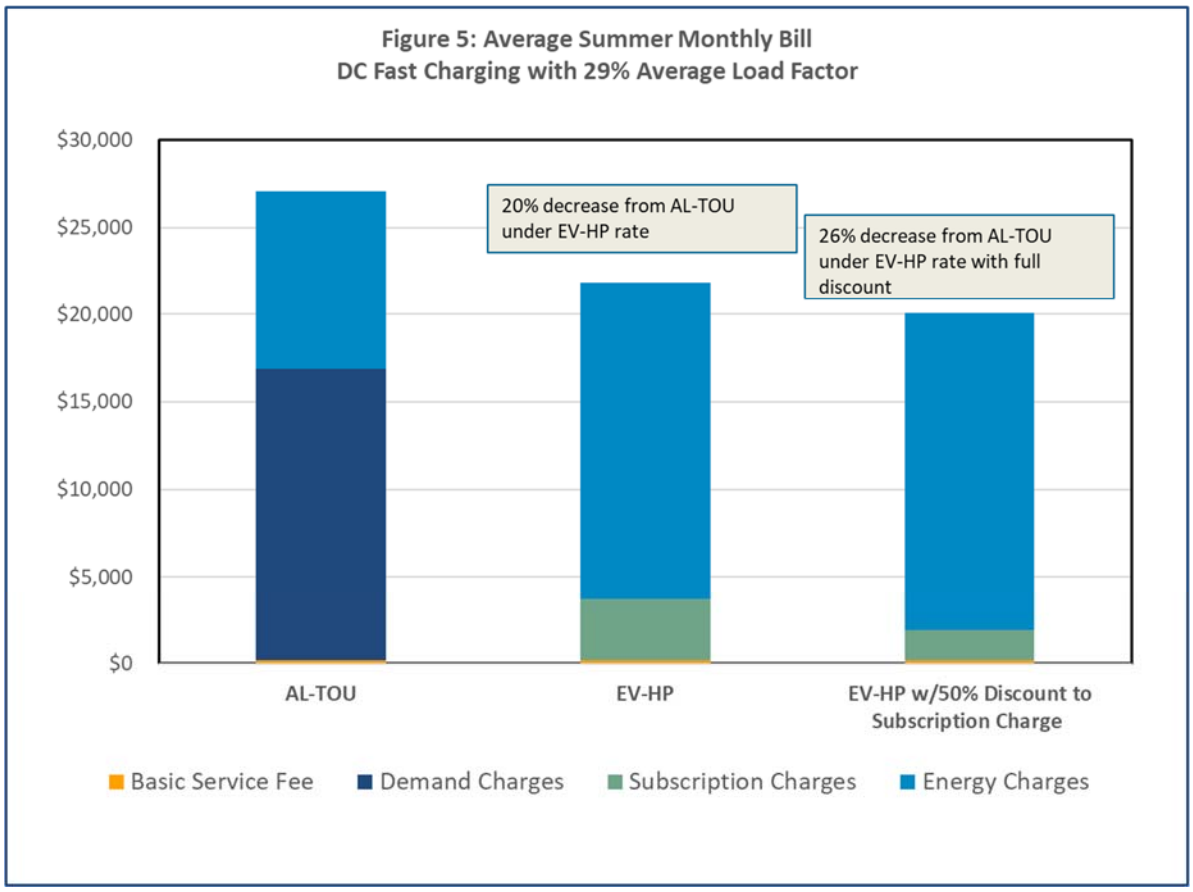
As shown above in Figure 4, the diesel school bus has a monthly cost of approximately $10,200 per month (equivalent to 49¢ per mile). With the EV-HP rate with the full incentive the monthly cost of fuel is approximately $4,800 (equivalent to 23¢ per mile), which is lower than diesel fuel.

E. DCFC

DCFC sites with relatively low usage are intended to benefit from the EV-HP rate, while those with high energy throughput and high load factors will typically be better off on existing demand-metered general service rates.

Table 5: DCFC site characteristics
• Four 100 kW ports per site (400 kW maximum) • Average of 7 hours of use per port per day

The average summer monthly bill for a DCFC with the usage characteristics given in Table 5 above is expected to fall by 26% on the EV-HP rate with the full incentive compared to AL-TOU, as shown in Figure 5 below.



We do not present the cost of gasoline for this DCFC example because the price charged to drivers by DCFC charging networks includes other costs in addition to the utility electric bill, making a per-mile comparison of DCFC electricity costs to the cost of gasoline difficult.

This concludes my prepared direct testimony.

III. STATEMENT OF QUALIFICATIONS

My name is Praem Kodiath. My business address is 8306 Century Park Court, San Diego, 92123. I am employed by SDG&E as the EV Customer Analytics Manager in Clean Transportation. I have 10 years of energy industry experience. My current duties involve project and team management of customer analytics, market forecasts, and greenhouse gas emissions methodologies.

I graduated from Marquette University, earning a Bachelor of Science degree in Business Administration. I received a Master of Business Administration degree from the University of California, San Diego.

I have not previously testified before the California Public Utilities Commission.