Lisa McGhee
19-2-16

CALIFORNIA AIR RESOURCES BOARD ZEV AIRPORT SHUTTLE BUS

COMMENTS OF SAN DIEGO AIRPORT PARKING COMPANY (SDAP) ON CARB PROPOSED REGULATION OF ZERO-EMISSION AIRPORT SHUTTLE REGULATION

Lisa McGhee
San Diego Airport Parking
Company
2771 Kurtz St.,
San Diego, California 92110
714-881-4856
E-mail: sdapparking@gmail.com

February 21, 2019

I. INTRODUCTION

San Diego Airport Parking Company ("SDAP") submits the following comments on the Proposed Regulation to consider a Zero-Emission Airport Shuttle Regulation (ZAS). SDAP represents small commercial business fleets and shuttle and airport ground transportation operators, that provide service to urban and densely populated areas that are mainly supporting the residential communities in the territory and provide transportation services in the surrounding roadways that are to and from the San Diego Airport. The areas that in are proximity to the airport are exposed to the highest levels of pollution and thereby when airport and port fleet operators adopt zero emission vehicles, this will directly benefit the low-income communities throughout this territory. SDAP is specifically a small business fleet that has been in business since 1991 and serving the San Diego Airport customer, providing parking and shuttle service to and from the airport 24/7 and 365 days per year. SDAP operates 20,000 miles per month with a Class 2b or Class 3 shuttle bus in short duty cycle with many stops and idle times throughout the day. SDAP has been an SDG&E small business commercial class customer since beginning business in 1991 and thereby has never incurred 20 kilowatts or any demand fees in its SDGE rates and billing.

SDAP has Transportation Electrification (TE) fleet experience in both EV commercial vehicles and EVSE charging equipment including installing equipment and running an EV Fleet. In Q2 of 2015 SDAP became the very first Airport EV bus in California when it purchased its first electric shuttle bus and within 1 year had purchased 3 electric buses by Q2 2016 which comprised of 50% of SDAP's fleet. In 2015, SDAP installed three Level-2 AC 14 kW chargers to support its EV fleet. SDAP has operated over 100,000 electric miles with plans to be 100% electric by 2020. SDAP was a party in the SB350 Priority Review (PR) and Standard Review (SR) proceeding with the CPUC and thereby contributed to the decisions in the PR pilot projects for SDG&E. SDAP is a site host for the Green Shuttle PR (GSP) pilot project in the SDGE territory *(see CPUC filing on 1-31-19 by SDGE , The interim report, proceeding # 17-01-020)* and expects to have all construction completed by Q1 2019 which is expected to include two DCFC chargers at 50 kW of 3-phase power, a new 400-amp meter and a new 480-volt transformer. SDAP has procured it's 2nd generation of EV shuttles which will be delivered to SDAP Q2 of 2019 which will provide 3-phase power technology and will be delivered by Green Power Bus. Additionally, SDAP is also a site host to SDGE Power Your Drive Pilot and installation was completed in Dec 2018 and the site will be energized in March 2019, this included installing 10 Level-2 AC chargers with 6 kW single phase, trenching, a new 400-amp meter and a design to meet the ADA Commercial Building Code requirements.

All ground transportation operations at Airports are creating emissions and it should be the responsibility of all commercial operations to achieve the same compliance. For example, the taxi and TNC modes should be required to achieve the same. Additionally, all vehicles can only be reliable if required to be certified which is protecting the public with safe and reliable vehicles. Currently, the proposed ZEV certification is only optional and thereby there are no requirements for the OEM to provide local garage support to the customer with this proprietary equipment ----

this is still very much a "wild west" stage in the MHD EV space – which is very different than the LD passenger EV cars. For these reasons, SDAP is highly supportive of this Proposed Regulation with Modifications that must include all commercial vehicles.

II. SMALL BUSINESS

Small businesses are not only vital to California's economic health and welfare but also constitute an important class of ratepayers for utility companies. The ratepayer interests of the small business class often diverge from residential ratepayers and larger-size commercial customers on a variety of utility matters. The needs of small businesses are critical to consider not only because they have a substantial impact on California's economy but also because engagement from small businesses and their employees is critical to the future of California's grid and the ZEV technology. There are approximately 3,941,201 small businesses in the state that comprise of 99.8% of all employer firms, provide 48.8% of private sector employment, account for over 280,000 net new jobs, and comprise approximately 43.2% of California's $152.1 billion in exports. *California Small Business Profile, U.S. Small Business Administration Office of Advocacy. See https://www.sba.gov/sites/default/files/advocacy/2018-Small-Business-Profiles-CA.pdf.*

Due to the important role small businesses play in the state's economy and to the legislative mandates, SDAP believes that the ZAS ultimately needs to require all transportation modes at the airport to be regulated under the same measure. ZAS, as proposed, does not directly extend to the other stakeholders that are creating the most emissions for every mile driven and that create the most congestion at the airports. In order to achieve the reduction of emissions at airports, CARB needs to identify more benchmarks by each mode of transportation that includes the light duty sector and the limousines. There are many more permitted numbers of vehicles by both modes that are typically moving one person per mile and will also have deadheading miles one-way, which is not the case for shuttle operations. Specifically, this requirement should include LD and MD the same as HD in your proposal.

III. LCFS

Fleets that do not own the infrastructure or that use other hubs will not be able to generate credits. Fleets that are small will have a hard time monetizing the credits when volumes are low as brokers are only interested in high volumes of credits.

III. CLASS 2B AND CLASS CERTIFICATION

IF YOU BUILD or modify trucks by installing truck bodies, or related equipment, you must certify them. Failure to certify can result in penalties of $1,100 for each violation up to a maximum of $880,000 for a related series of violations.

There is no reason to not create a mandate for Completed ZEV vehicles in the MD Class 2B and Class 3 as the intention is to ensure reliability and reduce emissions and all MDHD ZEV's should be compliant to achieve the same standard. The conversion substantially changes the vehicle and increases the curb weight and impacts the center of gravity and without standards this will impact reliability as these issues have already been faced by early adopters.

To certify a vehicle is to document in writing that the vehicle that you helped to produce still conforms to all applicable motor vehicle safety standards. Companies must make such a statement when they install truck bodies or equipment on incomplete vehicles (such as a truck chassis) or if they alter a completed truck that previously had been certified (such as a complete vehicle like the Class 2B or Class 3 Gas Van that is converted but is being identified as a complete vehicle as long as it has not been registered before converted and has zero or close to no miles on it once purchased and registered).

This process involves: Determining vehicle type (chassis cab, bare chassis, cutaway van, or chassis cowl) and the standards that apply to the model being certified. Determining the type of conformity statement to be used (there are three, reviewed later within), Performing a Federal Motor Vehicle Safety Standards (FMVSS) compliance analysis. This is a checklist of the various vehicle components and how they conform to all FMVSS. Performing a payload analysis. Payload capacity is determined by subtracting the completed weight of the vehicle, including driver and passengers, from the gross vehicle weight rating (GVWR). Performing a weight distribution analysis. This determines the distribution of the total gross vehicle weight imposed on the ground at each axle (measured in units of weight or as a percent of total truck weight). Anyone who manufactures or assembles motor vehicles or motor vehicle equipment for resale is required to certify.

Who is a Manufacturer?

A manufacturer can be any person who performs a manufacturing operation on a new, incomplete vehicle. This definition includes the manufacturer of the completed vehicle or a vehicle in its incomplete, intermediate and/or final-stages. Any person who alters a completed vehicle, which has already been certified in the final stage before it is sold, is also considered a manufacturer of motor vehicles under the National Traffic and Motor Vehicle Safety Act and National Highway Traffic Safety Administration (NHTSA) regulations.

All vehicles must be certified in the final stage. Certification is also a requirement for manufacturing operations performed on motor vehicles prior to the first purchase. For example, installing a service body, or removing a pickup box before the vehicle is sold requires certification. After the vehicle is certified in the final stage, and purchased, licensed, and titled, the certification obligation ends.

The four types of motor vehicle certification are incomplete vehicle (chassis cab, stripped chassis, cutaway, cowl); intermediate stage certification; final stage certification (the last maintenance operation before it is put into use); and altered certification (altering a previously certified vehicle). For example, adding a snowplow to a pickup truck requires altered certification and thereby so should the altered and converted gas vehicle to ZEV.

The incomplete vehicle document is a vital guide to the certification process. The manufacturer must include this document with every new incomplete vehicle. This document helps subsequent manufacturers determine what can or cannot be done to the incomplete vehicle in order to stay

within the original manufacturers' guidelines. The same is necessary for the Completed ZEV vehicles as they are being tampered after certified as a gas vehicle.

The incomplete vehicle document contains the name and address of the incomplete vehicle manufacturer, the month and date of the last manufacturing operation, vehicle identification number, GVWR, gross axle weight rating, and vehicle type, such as truck or multipurpose passenger vehicle. The document also lists the standards (in effect at the time the incomplete vehicle was manufactured) that apply to each type, followed by a conformity statement. The three types of conformity statements are:

Type I: "A statement that the vehicle when completed will conform to the standard if no alterations are made in the identified components of the incomplete vehicle." Type II: "A statement of specific conditions of final manufacture under which the manufacturer specified that the completed vehicle will conform to the standards." Type III: "A statement that the conformity with the standard is not substantially affected by the design of the incomplete vehicle, and that the incomplete vehicle manufacturer makes no representation as to conformity with the standard."

Analyzing Payload

A payload analysis is vital because the distribution of chassis, body, and payload weight on a truck is critical to the proper operation and long life of the vehicle. It is possible for a vehicle to be overloaded even though it may not be loaded beyond the recommended GVWR. When a chassis/body combination is incorrectly matched or when the payload is not positioned properly, the front or rear gross axle weight rating (GAWR) may be overloaded.

Once the chassis configuration and payload capacity have been determined, a weight distribution calculation should be performed. This will verify that the weight of the body and/or payload is distributed to both the front and rear axles in proper proportions. It also assures that the front and rear GAWRs are not exceeded.

The weight of the driver and passenger(s) can sometimes make the difference between exceeding and not exceeding a vehicle's GAWR. Therefore, the weight of the driver and passenger(s) is included in the calculations when performing a weight distribution or payload analysis.

Ultimate Responsibility

The final stage manufacturer is the last line of defense for motor vehicle safety and bears full responsibility for any vehicle defects. If there is a defect or non-conformity in the original equipment produced by another manufacturer who refuses to recall the vehicle, the final stage manufacturer is still responsible for recalling the vehicle and correcting the problem. This is common in all technologies and there is no justification for this technology to not have enforcement with penalties when an OEM poisons the ZEV market. These are lessons learned that have been experienced and we need to move beyond after 10 years of an HVIP incentive program tied to this technology.

Once certification is complete, the certification label can be attached to the hinge pillar, the door-latch post, or the door edge that meets the door-latch post. It can also be placed next to the driver's seating position, to the left side of the instrument panel, or the inward facing surface of the door next to the driver's seating position.

IV. WARRANTY

The 50,000-mile warranty does not meet the needs of the fleet nor does it keep the fleets and roadways safe with prototype technology and does not compare to other choices such as conventional fueled vehicles that continue to have increased warranty support. There is an overall contention by State regulators, and other industry professionals, that the current HD manufacturer warranty requirements for on-road heavy-duty vehicles are not sufficient to guarantee that emission control performance will be maintained throughout the exceptionally long service life of modern heavy-duty vehicles, (e.g., up to

1,200,000 miles). This lack of emission control maintenance may contribute to a negative economic impact, and poorer air quality in California. This impression is supported in large part by the results of the owner/operator survey summarized herein. Longer warranties could potentially assist with reduced emissions and provide better longevity and durability for such vehicles. Specifically, longer warranties may contribute to timelier repair of malfunctioning components in heavy-duty vehicles and will likely lead to better vehicle maintenance (source CARB).
https://www.arb.ca.gov/regact/2018/hdwarranty18/apph.pdf?_ga=2.205632208.2111585522.1549629595-405255107.1516164047

V. REPAIRS

Carb should create a mandatory repairability provision for this technology and an incentive program is necessary in order to support the technology as improvement has not been achieved toward garage services support for this technology and fleets cannot achieve confidence without such a provision. The same concerns should be realized with the lessons learned and the amount of downtime that will increase and effect emissions. This technology faces increased emissions when not supported to stay on the roads. Without an enforcement for garage service stations by ZEV OEM's when this technology is 100% proprietary, you cannot increase confidence without the ability to be ensured of support 24/7 in all local territories, additionally these are short range vehicles with high voltage.

See the below examples from CARB HD survey on associate cost when repairs and downtime occur.

Survey and Analysis of Heavy-Duty Vehicle Warranties in California Nov 2017.
https://www.arb.ca.gov/regact/2018/hdwarranty18/apph.pdf?_ga=2.205632208.2111585522.1549629595-405255107.1516164047

There were a significant number of days of lost revenue due to downtime for repairs. Following is a breakdown of the average number of days of downtime due to vehicles being out of commission:

Length of Downtime	% Owners	Estimated Total Days
1-2 days	14%	57
3-6 days	32%	396
1-2 weeks	19%	742
3-4 weeks	16%	1,078
More than 1 month	17%	> 1,400
Total	98%	> 3,673

Owner/Operator | Length of Repair Downtime • Owner/operators indicated that there was a significant loss of revenue attached to the downtime.

See below Table for the estimated costs associated with downtime as reported by on-road heavy-duty vehicle owners/operators:

Repair Shop owners/managers indicated that the most frequent year(s) of heavy-duty vehicles that come in for repairs are either models earlier than 2007 (25%), or 2010 and 2011 models (24%).•The majority of repair shops (56%) provide extended warranties (a warranty package that covers beyond the life of the manufacturer's mandatory warranty period) to their heavy-duty vehicle customers. The average cost of the most frequently purchased extended warranty package falls between $1,000 and $2,500 (41%), according to repair shop owners/managers. The majority (59%) of extended warranty packages cover one to two years beyond the life of the mandatory warranty period according to the repair shop owner/managers.

Loss of Revenue	% Owners	Estimated Total Revenue
Zero	5%	-
$1-$999	10%	$13,500
$1,000 -$4,999	32%	$261,000
$5,000 -$7,499	18%	$312,500
$7,500-$9,999	11%	$253,750
> $10,000	19%	$520,000
Unsure	5%	-
Total	100%	$1,360,750

VI. HVIP AND INCREMENTAL COST

The current HVIP MHD Sales to date only total 607 sales since 2009 with 365 sales by extinct OEM's that no longer exist and determines that the highest number of OEM sales by the existing OEM's is 58 by one OEM. This continues to address facts and concerns that all listed OEM's are still in the proto-type phase except for a couple of the OEMs' that have larger sales outside of California. The tables below depict the list of OEMs' with sales as of 1-23-19. A total of 17 OEM's have had a history of sales (the red text is OEM's that no longer exist) and a total of 12 OEM's are by remaining existing OEM's. The last table demonstrates the history and number of sales years over year since the HVIP began in 2009. *https://www.californiahvip.org/eligible-technologies/*

	Vehicle OEM Sales		
1	BYD Motors	45	7.41%
2	Chanje	20	3.29%
3	*EVI*	112	18.45%
4	*Ford*	51	8.40%
5	Lion Bus	6	0.99%
6	Motiv Powers	10	1.65%
7	*Navistar*	34	5.60%
8	New Flyer	0	0.00%
9	Orange EV	26	4.28%
10	Phoenix MotorCars	43	7.08%
11	Proterra	23	3.79%
12	*Smith Electric*	168	27.68%
13	Zenith Motors	58	9.56%
14	Workhorse AMP / Thor	1	0.16%
15	Lightning Systems	3	0.49%
16	Eldorado National	5	0.82%
17	Blue Bird	2	0.33%
	Total EV ZEV Sales	**607**	**100.00%**

	New OEM's with Sales		
1	BYD	45	7.41%
2	Chanje	20	3.29%
3	Lion Bus	6	0.99%
4	Motive Powers	10	1.65%
5	Orange EV	26	4.28%
6	Phoenix MotorCars	43	7.08%
7	Proterra	23	3.79%
8	Zenith Motors	58	9.56%
9	Workhorse AMP	1	0.16%
10	Lightning Systems	3	0.49%
11	Eldorado National	5	0.82%
12	BlueBird	2	0.33%
		242	39.87%

Fiscal Year Sales			
Fiscal Year 2009-10	1	0.16%	
Fiscal Year 2010-11	305	50.25%	
Fiscal Year 2011-12	55	9.06%	
Fiscal Year 2012-13	0	0.00%	0.00%
Fiscal Year 2013-14	39	6.43%	6.43%
Fiscal Year 2014-15	35	5.77%	5.77%
Fiscal Year 2015-16	57	9.39%	9.39%
Fiscal Year 2016-17	115	18.95%	18.95%
	607	100.00%	40.53%

SDAP has been procuring shuttles since 1991 and the baseline cost for a class 2b or 3 shuttle van is $50k not $80k which can be supported by the most recent quote attached dated 11-2018. Additionally, when procuring a ZEV, the voucher rebates will not support a reduced cost on sales tax, insurance and registration fees as all these cost and fees are derived from the listed purchase cost of the vehicle which creates more cost for a ZEV when compared to conventional fueled vehicles.

VII. OEM CREDITS AND EXEMPTIONS

Based on Volume of Sales, it appears that all existing OEM's on the HVIP list with sales will remain exempt for some time to come ---- further creating additionally concern to fleets. It is time to move this technology into the stage of compliance. Motor carrier operations are at stake and cannot risk product that is not supported or proven. The entire intention is to influence fleets to adopt and ensure confidence – exemptions will not achieve this. Additionally, you have acknowledged that few have expressed interest in the ZAS.

VIII. POWER LEVEL

Power Level illustrated: AC verses DC charging

The Single-Phase AC verses DC Fast Charging is illustrated below, *See appendix.*

This can determine the site capacity and range and capacity and range can be increased with fast charging when available on the vehicle, even with one EVSE installed this can support these increases; but the vehicles power level needs to comport and accept DCFC:

(Assumption: Vehicle efficiency is 1 kWh per mile)

19kW Charger:

100 miles divided by 19 miles per hour = 5.25 hours per day of charging.

50kW Charger:

100 miles divided by 50 miles per hour = 2.0 hours per day of charging.

100kW Charger:

100 miles divided by 100 miles per hour = 1.0 hours per day of charging.

Commercial EV Fleets are already challenged by the Zero Emission vehicle technology whereby with a short range of 100 EV miles or less and with trying to keep its customer demand on its schedule with a short range EV bus or truck of 100 miles VS 300-miles of range, as in the conventional diesel bus or truck is extremely challenging. Moreover, the 19kW AC EVSE charger at 1 kWh per mile will take 5.25 hours to charge one vehicle and for a fleet of 3 vehicles it will take 16 hours of charging on the grid. However, a 50 kW DCFC EVSE will take 2 hours to charge the one vehicle and a 100 kW DCFC will take 1 hour to charge one vehicle.

Essentially the higher power levels create increased capacity on site just with 1 fast DCFC charger, increases the range potential when fast charging allows for the driver to schedule the time of the charging when the power level is high enough and thereby the miles replenished per minute achieve enough range to avoid peak time loading and charging while increasing the range. This illustrates that DCFC is another opportunity to manage charging which supports CPUC 740.12(a)1

part G.

Because several factors benefit fleets when fast power level is accepted and because this is the current advanced technology, and for all the reasons below, fast DCFC should be achieved for all MHD vehicles and it can also be determined that this will avoid the equipment ending up as a stranded asset.

(a) Increases range

(b) Creates higher site capacity

(c) Enables load management

(d) Supports Smart TOU Charging at the lowest CI hourly window

(e) Creates higher grid reliability

(f) Reduces Peak time loading

(g) Reduces losses when transmitting at a higher power level

(h) Reduces Demand fees as you can reduce simultaneous charging

(i) Reduces time on the grid

(j) Supports higher consumption per EVSE

(k) Reduces installation cost for fleets with multiple vehicles.

(l) Has higher efficiency

The ZAS should include a policy toward Advanced and fast DCFC minimum power level development and include higher incentives and funding, as minimum power levels for commercial technology is the future. "Power Level", should support the future technology and should support the newest standards that are now being deployed in order to avoid any stranded assets and which enables the option to charge in a manner consistent with the electric grid conditions. When enough power is supported, this develops a reliable charging infrastructure which is critical to the commercial MHD sector.

IX. CLASS 2B AND CLASS COMMERICAL VAN MARKET SHARE

Not all commercial van chassis have van bodies mounted on them by OEMs. Some are sold as cab chassis and cutaways, which means they need to be upfitted. Many body styles — and an even larger number of equipment types — could be mounted. These commercial van chassis compete in the market with all other vocational truck chassis in their weight class and are ultimately sold as Class 1–3 trucks other than commercial vans. Among hundreds of possible applications, they could be used by local governments as ambulances or by landscape companies to plow snow.

Commercial van market size

Commercial van sales data from the following sources differs from NTEA levels for various reasons. For year-end 2016, GoodCarBadCar said U.S. commercial van sales totaled 463,487 units. The WardsAuto total confirmed this report, citing more than 400,000 units. This would have been true for all sources based on sales by model data. In addition, many vans listed in Figure 1 (see page 2) are purchased by individuals for personal use, and those sales are included in the totals published by some sources. The total published by NTEA is roughly one-third lower than the estimates referenced above as its calculations only encompass commercial vans.

NTEA is a commercial van data source that explicitly excludes cab chassis and cutaway sales from the total. We include these items in the totals calculated for those cab types instead, so our overall sales sum will be less than those published by other sources.

In addition, NTEA's data collection process is intended to only include commercial vans used by businesses as work trucks or buses (see Figure 1 on page 2). In other words, most (if not all) cargo van sales captured by the Association go through an upfit process to have shelves/partitions/racks/bins installed. Almost all passenger van sales will likely be used for commercial transport (such as airport shuttles).

For 2016, NTEA's U.S./Mexico commercial van sales total was 264,164 units. The Canadian total was 27,932 units, so overall North American commercial van sales were 292,096 units. This total will likely increase to about 305,000 units in 2017. The market is segmented by weight class and roof-height in Figure 2. High roof-height vans allow for a worker to stand up inside the van. The term standard roof-height includes anything lower.

The Commercial Van Market, the Class 2b and Class 3 are widely used in commercial applications and for these reasons SDAP shares the following facts in support of the class of vehicles which is a growing market and will continue to be a growing market with the rise of the gig economy market. This information is difficult to obtain due to the various applications and van verses chassis configurations.

In Europe and the U.S., chassis-cab sales are roughly one-half of commercial van sales in the Class 1–3 commercial truck market. On both sides of the Atlantic, this ratio could significantly influence how commercial truck industry companies interact with the van market, in terms of encouraging continued product innovation.

U.S. new business registrations of commercial vans

2016 – Units

Vehicle type	Ford	GM	Mercedes-Benz	Nissan	Ram	Total
Van cargo	33,030	7,426	0	17,934	2	58,392
Van passenger	10,674	0	0	12,316	16,976	39,966
Class 1 total	**43,704**	**7,426**	**0**	**30,250**	**16,978**	**98,358**
Cutaway	2,564	10,225	0	0	803	13,592
Van cargo	90,735	44,162	12,199	18,817	26,941	197,854
Van passenger	36,021	14,167	7,560	4,182	0	61,930
Class 2 total	**129,320**	**68,554**	**19,759**	**17,709**	**27,744**	**263,176**
Cutaway	19,553	11,859	0	0	0	31,412
Van cargo	1,120	0	2,094	0	0	3,214
Van passenger	2,112	0	0	0	0	2,112
Class 3 total	**22,785**	**11,859**	**2,094**	**0**	**0**	**36,738**
Total Classes 1–3	**195,809**	**87,839**	**21,853**	**48,049**	**44,722**	**398,272**
Total minus cutaways	173,692	66,755	21,853	48,049	43,919	353,268
Fleet of one count	49,848	14,551	10,860	18,954	13,482	107,695
Total minus cutaways and fleets of one	**123,844**	**51,204**	**10,993**	**29,095**	**30,437**	**245,573**

Source: IHS Markit

With cutaways and fleets of one removed from IHS Markit data, the bottom line is 245,573 new commercial vans registered in 2016 in the U.S. — within 20,000 units of NTEA's total, providing verification of the commercial van market size. It should be noted that the methodology applied to compare NTEA and IHS Markit numbers is not ideal. Some vans in fleets of one were upfitted and should be counted, and some personal-use vehicles are reported as commercial and vice-versa. In addition, some vans shipped as cutaways are not identified as such by IHS Markit. Lastly, new registrations will never be exactly equal to sales for any vehicle type in any year. Even still, the close match between IHS Markit's new registration total and NTEA's sales total validates the accuracy of both data sets. In short, the U.S. commercial van market was not greater than 400,000 units in 2016 — it was closer to 260,000 units for business registrations.

Figure 2 (see page 4) clarifies that Class 2 accounts for a majority of the commercial van market. Class 1 makes up most of the remainder, while Class 3 remains a small percentage of the total market in the standard and high roof-height segments. In 2016, the standard roof-height market segment was about twice as large as the high roof-height segment.

However, in the last two years, the market has changed significantly. As shown in Figure 3, the high roof-height market has been growing much faster than the standard roof-height segment. In fact, this data indicates the high roof-height segment represents all market growth since 2013. While standard roof-height sales trended down between 2013 and 2016, high roof-height sales more than doubled.

The below fleet use case identifies outstanding issues that need to be addressed for TE in order to eliminate stranded assets, provide supportive rates that are a benefit to adopters and to focus on minimum power level of the make ready and the vehicle that impacts the range and use of the vehicle daily and unlocks the ability to enable managed charging. Integrating battery storage for fleets mitigates additional installation cost, removes demand fees and supports the future TE procurement scalability and reliability at a site for best cost / best benefits results.

1. SDAP FLEET USE CASE –

Example of SDAP's first generation of TE Fleet and why the technology failed for SDAP regardless of the OEM's support.

EV Fleet: Productivity / Behavior (non-managed charging)

A. Driving Productivity = Vehicles Miles Traveled (Short Duty Cycle)

1. Open 24/7
2. 650 miles per day for fleet, *See appendix.*
3. 10-hour driver shifts
4. 125 vehicle miles traveled per shift by each driver
5. EV range = 100 miles
6. 2 drivers at 4am-2pm = 125 miles each
7. 2 drivers at 2pm-Midnight = 125 miles each
8. 1 driver at 10pm-8am = 125 miles

B. Charging Behavior = power level-2 at 14 kW AC and 3 EVSE's on property

1. 4 hours to fill = 100 miles
   - Done at OFF Peak Nightly

2. 2 hours of EV charging = 50 miles of range
   - 12 fills per shift at 10 mins each = 2 hours and 50 miles of range
     - Done at Shift 1

3. 3 hours of EV charging = 75 miles of range
   - 12 fills per shift at 15 mins each = 3 hours and 75 miles of range
     - Done at Shift 2 and at Graveyard

C. Driver Behavior

1. Fill up 10 mins each time back at base
2. 12 fills per day
3. = 2 hours of charging
4. = 50 miles of range generated
5. 2pm, Shift #1 ends
   - 25 miles of range remaining
6. Shift # 2 starts with 25 miles of range at 2pm
   - 12 fills x 15 minutes
     - = 180 mins at 3 hours
     - = 75 miles of range replenished
7. Shift #2 ends at Midnight
   - Driver #2 is empty at end of shift and he is short 25 miles of range.

D. All day long this demonstrates that the business demand does not allot for "scheduled" charging or "managed" charging with Time of Use.

E. Charging Plan and Reserve Capacity of 100-mile range in vehicle:
Use Case: 4 shuttles, 2 drivers per shift = 650 miles daily.

1. Midnight to 4am = Full Charge = 100 miles
   - 3 buses charging at same time
     - = 12 hours daily charging Midnight-4am (= 300 miles)
2. 4am to 2pm = 2 hours of charging = 50 miles
   - Short 10 mins intervals, 12 per shift by each driver
     - 2 buses in this shift
     - = 4 hours daily charging at 4am-2pm (= 100 miles)

3. 2pm to Midnight = 3 hours of charging = 75 miles
   - Short 15 mins intervals, 12 per shift by each driver
     - 2 buses in this shift
     - = 6 hrs daily charging at 2pm-Midnight (=150 miles)

4. 10pm to 8am = 3 hours of charging = 75 miles
   - Short 15 min intervals, 12 per shift by the driver
     - 1 bus on this shift
     - = 3 hours daily charging at 10pm-8am (= 75 miles)

5. Total Hours of daily Charging = 25 hours per day (= 625 miles)

F. RESULTS

1. This use case cannot be accomplished --- due to the amount of time between trips is not possible in order to serve the customer needs --- we do not have 15 mins; therefore, we experience range anxiety in shift 2.

2. New 2nd generation SDAP Electric BEV Fleet use case:

a. kWh use and Cost per Mile with SDGE Rates.
b. Use Case = 4 EV Bus Fleet, 20,000 miles per month, 15,400 kWh per month and 100 kW demand non-coincidental and Peak demand
c. 650 miles per day = 500 kWh per day
    i. 10,000 GVW Class 3 = .77 kWh per mile
d. Electricity Usage Annually = 240,000 Vehicle Fleet Miles
    - = 500% increase in my kWh usage due to EV transportation
    - = $50,000 removed of 13,300 gallons of diesel fossil fuel annually to 185,000 kwh annually.
    - Goal = 25 cents per kWh to be a benefit (out the door kWh)
        - 25 cents per kWh x 185,000 kwh = $46,250 annually (out the door price)

G. Hourly Percentage Usage of Charging Period Windows

1. 26% current on-peak, changed from 19% peak
2. 31% current off-peak, changed from 23% mid-peak
3. 43% current super-off-peak, changed from 58% off-peak

- *Current Time of USE hours changed Jan 2018 in SDGE territory, number of higher kWh hours increased by 32% overall when compared to previous TOU hours and number of hours in each time period. Thereby not only has kWh rates increased, fleets that cannot schedule charging will also be impacted by rates + TOU hours.* *See appendix.*

H. Demand Use = 100 kW of Demand from two fast DCFC depot Chargers

1. Max Demand = 117 kW
2. Non-Coincident Demand = 117 kW
    - 17 kW is generated from the business operation which increases the overall cost for TE.
    - Adding Sub-meter reduces this issue and reduces the demand cost

I. SDGE current Commercial Rates for TE, current comparison

Rates are averaged annually for both Summer and Winter Seasons and are the Out the Door (OTD) price which includes, kWh+kW+customer mo.fee+ taxes.

1. TOU AP Current = 27 cents per kWh, 0% Demand

See appendix.

2. AL TOU Current = 46 cents per kWh, 70% Demand, per kW = $42.29 (117 =Non-coincidental + 117 = peak demand)

See appendix.

J. Diesel Fuel

1. Propel Diesel = 21 cents/mile, $3.75 per gallon (OTD), 18 MPG

See table 6 for EIA history of diesel fuel and tax prices.

The above illustrations are the out the door (OTD) kWh pricing that includes all fees and discounts applied to billing. This factor was important to determine the actual price for kWh in order to compare it to fossil fuels. The price per gallon at the retail pump for fossil fuels will already include all taxes.

II. EV RATES ARE NOT 17 CENTS PER KWH

Legislature

The Legislature recognized the impact of TE and found at 740.12(a)(1), in part:

(G) Deploying electric vehicles should assist in grid management, integrating generation from eligible renewable energy resources, and reducing fuel costs for vehicle drivers who charge in a manner consistent with electrical grid conditions.

(H) Deploying electric vehicle charging infrastructure should facilitate increased sales of electric vehicles by making charging easily accessible and should provide the opportunity to access electricity as a fuel that is cleaner and less costly than gasoline or other fossil fuels in public and private locations.

Demand Rates

To date this process, as recognized in this ruling is still an outstanding key issue that requires commercial TE to have a tariff rate.

The price of the current demand rates will create a negative impact and lacks consistency with the

CPUC Commission's treatment of electric vehicles rates in general and specific to 13-11-007 *Track Two* which was to focus on the development of EV rates, per the Scoping Memo on July 16, 2014 of 13-11-007. Moreover, it was recognized that demand charges could pose a barrier for customers pursuing TE.

The CPUC commission has adopted both temporary commercial rates and recently SCE's EV-8 commercial rate. Previously temporary EV rates for the early TE commercial adopters in each IOU territory were approved as per the following decisions:

- **SCE Resolution E 4514 on 2-13-2012**

  SCE filed AL 2699-E requesting that the CPUC Commission approve its proposal to extend the applicability of Schedule TOU-8, Option A to customers charging zero emissions electric buses. Rather than place these customers on Schedule TOU-8, Option A, this Resolution directs SCE to extend the eligibility of TOU-GS-1, for a period of three years, to government agencies that have purchased or obtained zero emissions electric buses.

- **SCE EV-8 Rate**

  SCE in OP 45 of D. 18-05-040 has created 3 rates for the MHD sector whereby all demand fees will be waived for the first 5 years.

- **PGE Resolution E 4628 on 9-30-13.**

  PG&E filed AL 4292-E requesting that the CPUC Commission approve its proposal to provide service under the time-of-use rate option of PG&E's small general service electric tariff, Electric Rate Schedule A-1, for a period of three years to the San Joaquin Regional Transit District's Electric Bus Charging Load for the purpose of meeting its new electric bus charging load requirements.

- **> PGE CEV Small and Large Rates.**

PGE in D. 18-05-040 was required to file its proposal for the commercial EV rate following the decision. Currently PGE's new rate proposal will be decided as PGE did recently file on 11-5-18 under application number: 18-11-003 its commercial EV rate. This proceeding process could take up to at least another one year to be adopted or longer depending on the status of PGE's entity; thereby, by the time this tariff rate is available to the end user fleets could be well into the future impacting the decision of interested early adopters. Common to SCE's objective, PGE's proposed rate is developed to assist in avoiding demand fees, through a creative design that was developed utilizing subscriptions fees tied to the power level a site would use and then PGE has defined rates for small verses larger fleet size customers defaulting to a lower power level load limit for small size fleets.

- **SDGE Advice Letter 3115-E effective on 10-23-17**

PURPOSED In compliance with Ordering Paragraph 37 of CPUC Commission Decision (D.) 17-08-030, this filing modifies the applicability of SDG&E Schedule TOU-A, General Service – Time of Use, to temporarily exempt small commercial accounts with electric vehicle (EV) fleet charging from the load limitations set forth in the tariff. This exemption will remain in place for three years beginning with the billing cycle one month from the effective date of D.17-08-030, August 24, 2017.

SDGE was ordered in D. 17-08-030 to create a temporary relief from demand charges for small commercial customers with TE in the 2016 GRC as SDGE was found to have never designed a rate for any commercial EV customers, this directed SDGE to offer a 3-year temporary exemption on Small Commercial load limits; however, this exemption is only applicable to small commercial fleets and not available to the Medium or Larger commercial customers.

Kilowatt hour rates – The out the door price

The concept to relieve adopters of EV demand rates is critical to early adoption as currently the kWh rate is not being compared fairly to the rate of a gallon of fuel as motor fuel rates include the tax when at the pump.

Demand Charges are the most expensive in the SDGE Territory when compared to the other IOU's and in order to develop tariff rates that reduce the cost of fuel for TE drivers, the design needs determine the following in each IOU territory:

- Actual cost per mile when driving its fossil fuel comparison model vehicle.
- Many commercial operations will travel beyond one territory to re-fuel. Some operations have multiple locations and thereby will have fueling in multiple territories.
- The kWh electricity price is only "1" part of the billing and thereby the customer is impacted by all items in the billing, which is the "out the door price" (OTDP). These other fees include: *See appendix.*
    - Demand Fees
    - Customer Facility Monthly Charge
    - DWR Bond Charge
    - Franchise Fee on Electric Energy Supplied by Others at 6.88%
        - This is on the DWR Bond Fee
    - State Surcharge Tax at $.000290 per kWh
        - This is on all kWh
    - State Regulatory Fee at $.000460 per KWh

- This is on all kWh
- City Franchise Fee Differential at 5.75%
- This City Tax includes all kWh and the Customer charge.

- The advertised kWh price is not the OTDP and thereby the price of electricity as fuel needs to be considered in the same way that we purchase fuel at the pump. The retail price that we pay at the pump is the OTDP. As such if you are pay $3.60 per gallon, this is also the advertised price. This is not the same in the billing invoices from the Electric Utility providers.
- SDAP's analysis for all ***Other*** fees that make-up the OTDP determines that this equates close to 2¢ more per kWh or 7% more on the price of the kWh as is depicted on SDAP's invoice and thereby results in an increase of the following calculation:
  - 15,400 kWh x 2¢ per kWh or the rate/kwh of $0.022 = $308 more per month on the billing or $3,700 per year

IOU Rate Impact illustrated – 3 Use cases

- SDAP has illustrated the kWh cost with each IOU. The tariff rate impact by each of the large IOU's are in detail and include: SDGE, PGE and SCE to determine the results based on the OTDP and real world data for 3 different fleet use cases: SDAP Class-3 Bus fleet with 240,000 annual VMT, Class-5 Bus fleet with 660,000 annual VMT, and Class-6 Truck Fleet with 1.25 million annual VMT and compared the use cases to real world data of conventional fuel or low Carbon fuel prices such as Propane and CNG that is used by many fleet operators today and since 2010. *See appendix.*

  - **SDAP Class-3 Bus Use Case:**

SDGE AL-TOU kWh rate = 46 cents per kWh, w/ Sub-meter = 27 cents per kWh

PGE CEV kWh rate = 21 cents per kWh

SCE EV-8 kWh rate = 21 cents per kWh

  - **Class-5 Bus Use Case:**

SDGE AL-TOU kWh rate = 36 cents per kWh, w/ Sub-meter = 22 cents per kWh

PGE CEV kWh rate = 19 cents per kWh

SCE EV-8 kWh rate = 20 cents per kWh

  - **Class-6 Truck Use Case:**

SDGE AL-TOU kWh rate = 31 cents per kWh, w/ Sub-meter = 28 cents per kWh

PGE CEV kWh rate = 15 cents per kWh

SCE EV-8 kWh rate = 14 cents per kWh

- This determines that a CEV Rate can be a benefit with the newly designed rates by PG&E and SCE where the demand fees are removed; however, in the SDGE territory, where there currently is no Commercial EV rate available--- if Sub-metering is installed and the Peak demand kW fees are removed, then this also proves to make each of these uses cases a benefit.
- When Sub-metering is NOT installed it results in a negative impact to the fleets.

III. SUB-METERING AND PEAK DEMAND

By removing the amount of demand fees used by the business property including the peak demand fees, this can result in a benefit for EV adopters, as illustrated above and in *See appendix.*

The AL-TOU SDGE use case scenarios were compared, for the purposes of illustrating the cost per mile rate impact for Bus or Truck vocations including Small, Medium and Large EV fleet utilization. The purpose was to demonstrate the results of each scenario when each use case is sub-metered and was only charged for non-coincidental demand fees with no peak demand fees.

This process identifies that when sub-metering and only charging one demand fee, it can produce a positive result in many use cases with the existing Large Commercial Price plans, which is demonstrated by the most expensive territory which is SDG&E.

IV. FUEL DISPLACED

A. Fleets will displace thousands of gallons to kWh and thereby the sales forecast revenue from EV usage will at minimum increase the consumption by over 100% to over 1,000% per site. The average household kWh consumption is doubled with an EV vehicle and for SDAP, the consumption will increase by 500% with an all-Electric Fleet.

B. Current cost of Tax on Motor fuel in California:

Diesel Fuel Tax and Gasoline Tax prices are the highest in the Country in California.

1. Diesel fuel tax is 93 ¢ per gallon, ***See appendix.***
2. Gasoline is 68 ¢

Thereby when comparing kWh to the price of fuel this can impact the results.

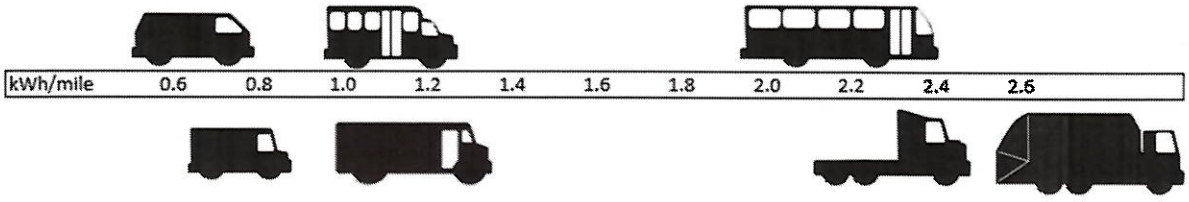
Difference if EV rate is more. Example of 8 ¢ per mile more.

Fleet of 10 = 25,000 VMT/ year x 10 = $20,000 more / year with KWh

Fleet of 25 = 25,000 VMT/ year x 25 = $50,000 more / year with KWh

Fleet of 50 = 25,000 VMT/ year x 50 = $100,000 more / year with KWh

EV Commercial Vehicle Fleet Efficiency



The kWh per mile of the EV vehicle closely impacts the maximum range, the cost per mile of fuel, the charging time required, the number of EVSE's necessary to support the TE fleet. EV Fleet energy consumption needs to support the use case and the property where EV dispensing will take place when displacing from Fossil fuel or comparing results to other options that reduce tail pipe emissions such as Propane, CNG, Renewable diesel, Ethanol, B-20 fuel etc. Considering cost impacts to savings results for a typical fleet business depends on these factors to declare if a business case is feasible.

C. HOURLY WINDOWS

Increased peak hours and impact

SDGE 2016 GRC Adopted new Time of Use Hour Periods in D. 17-08-030 on 8-24-17.

This has had a significant impact on large commercial customers and especially when combined with rate impacts. In the 2016 GRC the Time of Use period changed eliminating all weekend and holiday hours as Off peak and instead created more higher cost hours. The following is a comparison which negatively impacts large commercial customers beyond the demand fees or the kWh rate which also impacts the cost of driving electric vehicles, *See appendix* for details of impact.

Peak hours are increased by 547 hours annually at a 30% increase

Mid Peak hours are increased by 861 hours annually at a 24% increase

Off Peak hours are decreased by 1,408 hours annually at a 42% decrease

TOTAL: 2,816 higher cost hours resulting in a 32% overall increase

Carbon Intensity Hourly Windows

The carbon intensity values for smart charging or smart electrolysis for a given time period is determined using the California Average Grid Electricity CI and the normalized marginal emission rates for that period. The calculated California grid average electricity CI for the 2019 reporting period is 81.49 gCO_2e/MJ. This calculation gives the estimated average carbon intensity for electricity as a result of shifting EV charging or electrolysis to a specific hourly window during a given quarter. The carbon intensity values calculated for smart charging or smart electrolysis pathways in 2019 are shown in *Table 18.*

These values are designed to reflect the decreasing CI of the California grid electricity driven by rapidly increasing contributions from renewables in the California electricity mix due to mandates driven by the Renewable Portfolio Standard (RPS), the inclusion of Cap-and-Trade carbon pricing in dispatch models, as well as other structural or systemic changes. This directly addresses a solution for developing "Green Tariff Low CI" rates when the grid supply CI value is Low. This mitigates the cost of a kWh rate and supports the best emissions savings for charging on the grid during a time that is best.

Develop a Consistent Policy that is Reliable and ensures fleets that adopt TE technology, that there is a benefit and it can be scalable.

SDAP's recommendation is for this Board to achieve a consistent TE policy that is supported with harmonized EV commercial rate across all IOU's during this early introduction period, the same as has been done for the light duty cars and the residential customer.

When taking into consideration all the bill impacts, forecasted sales pressure, renewables and TE, SDAP's recommendation provides an immediate efficient price signal that will support accelerated adoption. Additionally, as per the deployment process and upfront expenses, the TE scalability potential is limited, will take time to grow, the inventory is nascent, the future technology is yet to come, sites have limited capacity. As such, it is the duty of the IOU's to provide a program that will encourage greater interest.

Fleet customers need to be provided a rate choice that supports immediate interest toward EV adoption. Without a design to develop a CEV rate that is closely aligned to the SCE EV8 rate, fleets currently have no solution for the adverse effects of the cost per mile when driving EV's when there are High Demand Fees based on the amount of load from charging vehicles that require 3-phase power. SDAP would have never considered it's second generation of more EV adoption if not for the SB350 legislation support and the current wavier for small commercial customers that SDAP was instrumental in contributing to the decision. A further delay of a CEV rate will contribute to adverse impacts as many fleets travel along more than one corridor and in more than one territory, early adopters are ultimately being denied a choice

which has continued to defer interested adopters and or TE fleets into more EV adoption.

CONNECTION STANDARDS

Connection Standards, SAE: *See Table 19 for Industry Statements Testimony*

SAE High Power Charging connections - Current

SAE J-1772 CCS, to 1000 V, 350 A and 350 kW

SAE J-3068, 3- Phase AC, 480 V, 160 A and 133 kW

SAE J-2954-2, Wireless Inductive Charging, currently 11 kW with heavy duty specification being drafted at 22 kW up to 500 kW

SAE J-3105, inverted and roof-mounted overhead charging systems up to 500 kW

Increasing Power levels: *See Table 20*

(1) J1772 new standard 400A and 1,000V

https://www.sae.org/standards/content/j1772_201710/preview/

The SAE standards group has officially updated the J1772 standard to change DC Level 2 fast charging from its previous limit of 50-500 volts at 200 amps to 0-1,000 volts at 400 amps. The update specification was published October 2017.

(2) J3068 new standard 1,000V

https://www.sae.org/standards/content/j3068_201804/

The J3068 Standard was issued 4-2018. This Electric Vehicle Power Transfer System uses a Three-Phase Capable Coupler and was developed from existing international standards, which were extended to cover higher North American grid voltages and ultra-higher power levels. J3068 allows vehicles to fully utilize three-phase AC power where it is available and preferred, such as commercial and industrial locations. J3068 was developed in a consensus process by SAE International's Medium and Heavy-Duty Vehicle Conductive Charging Task Force Committee, which today is comprised of over 100 global experts from the automotive industry, utilities, charging equipment manufacturers, national laboratories, and academia.

The actual international specifications are all aligning to support 400 amps at 1,000 volts which is a peak theoretical 400 kW. Actual vehicles currently and typically charge at lower rates determined by their battery configuration and design. But, the typical charging voltages for the MHD currently starts at 50kW and most commercial trucks and buses of the future will range from 300-600 volts or more.

The CHAdeMO standards group in Japan updated their DC charge coupler specification to support 500 volts at 400 amps (200 kW) from its previous limit of 500 volts at 125 amps (62.5 kW). Efforts are under way to increase that again to 1,000 volts at 400 amps which will match the new SAE J1772 limits. China has their own AC and DC charging standards commonly called GB/T. The

GB/T DC coupler already supports 1,000 volts at 400 amps.

Some new charger products from ABB and ChargePoint document support for DC charging at 500A under some configurations and currently EVgo has a 150-kW charger in Baker, California. These charger products are being introduced that directly support the MHD Trucks and Buses for the commercial sector and can support Ultra high-power levels which are just beginning to be delivered and installed and are mainly being introduced through the Electrify America deployment. The supplier companies are: ABB, BTC Power, Efacec and Signet. These depots include 'certified cooled-cable 150/350 kilowatt (kW) DC Fast Charger technology. They are equipped with the same features, like a CHAdeMO (50kW) connector, plus additional dual-handle chargers with SAE CCS1 (50 to 150kW or 350 kW) connectors. Currently, there are not many vehicle passenger models that would accept anything beyond 100 kW, but, for the commercial sector, this is just the beginning and soon it will also be common for the high-end luxury passenger car market (150 kW) as manufacturers such as Audi, Jaguar, Porsche, Tesla and more are designing for this ultra-high power.

Specifically, in the Commercial MHD sector the battery sizes are larger which creates a demand for faster charging. And even now, in the newest passenger EV's batteries, they are three or four times the size of those original electric vehicles, making the fast, convenient and flexible charging essential to EV ownership and specifically to ensure fleets stay on the road and enable the option to manage the load and the time of charging. This new high-power level is just one way to ensure fleets can stay on the road and can have the flexibility that they will need in order to schedule charging while it also increases the scalability of EV adoption for a site. EVSE companies are working closely with many vehicle OEMs and suppliers to push the technology to where it needs to go in order to meet the needs for a robust, higher and faster charging network. This will not only meet the needs of fleets, it will support accelerated adoption as the technology barrier for range is removed and now with fast charging capability --- it keeps pace with the longer distances traveled by fleets.

Power Level illustrated: AC verses DC charging

The Single-Phase AC verses DC Fast Charging is illustrated below. *See appendix.*

This can determine the site capacity and capacity can be increased with fast charging, even with one EVSE installed:

(Assumption: Vehicle efficiency is 1 kWh per mile)

19kW Charger:

100 miles divided by 19 miles per hour = 5.25 hours per day of charging.

50kW Charger:

100 miles divided by 50 miles per hour = 2.0 hours per day of charging.

<u>100kW Charger</u>:

100 miles divided by 100 miles per hour = 1.0 hours per day of charging.

Commercial EV Fleets are already challenged by the Zero Emission vehicle technology whereby with a short range of 100 EV miles or less and with trying to keep its customer demand on its schedule with a short range EV bus or truck of 100 miles VS 300-miles of range, as in the conventional diesel bus or truck is extremely challenging. Moreover, the 19kW AC EVSE charger at 1 kWh per mile will take 5.25 hours to charge one vehicle and for a fleet of 3 vehicles it will take 16 hours of charging on the grid. However, a 50 kW DCFC EVSE will take 2 hours to charge the one vehicle and a 100 kW DCFC will take 1 hour to charge one vehicle.

Essentially the higher power levels create capacity on site just with 1 fast DCFC charger and allows for the driver to schedule the time of the charging when the power level is high enough and thereby the miles replenished per minute achieve enough range to avoid peak time loading and charging. This illustrates that DCFC is another opportunity to manage charging which supports 740.12(a)1 part G.

In D. 18-05-040 in Ordering Paragraph 24, it states that the Make Ready infrastructure is to support at least 150 kW power level for the EVSE.

Because several factors benefit fleets when fast power level is installed and because this is the current advanced technology, and for all the reasons below, a Make Ready power level should be determined to avoid Make Ready that is a stranded asset.

(m)Increases range

(n) Creates higher site capacity

(o) Enables load management

(p) Supports Smart TOU Charging at the lowest CI hourly window

(q) Creates higher grid reliability

(r) Reduces Peak time loading

(s) Reduces losses when transmitting at a higher power level

(t) Reduces Demand fees as you can reduce simultaneous charging

(u) Reduces time on the grid

(v) Supports higher consumption per EVSE

(w)Reduces installation cost for fleets with multiple vehicles.

(x) Has higher efficiency

A policy should be developed for the commercial MHD vehicles that require a minimum power level at commercial sites. "Power Level", should support the future technology and should support the newest standards that are now being deployed in order to avoid any stranded assets and which enables the option to charge in a manner consistent with the electric grid conditions. When enough power is supported, this develops a reliable charging infrastructure which is critical to the commercial MHD sector and increases the range.

III. CONCLUSION

SDAP has shared facts in the foregoing comments and has provided evidence from the EV fleet end user experience that supports the need for compliance by all modes and the effects of the cost impacts in CARB's analysis --- which is not correct--- as the cost of a kWh is not compared to the cost of fuel without the tax. Currently the lack of policy, regulations and standards to support the EV commercial MHD technology to move beyond the prototype phase needs to be considered as fleets adopting need a cost-effective solution that improves the technology and ensures fleets that it is reliable for the same useful life as that of fossil fuel vehicles. The current HVIP MHD Sales to date only total 607 sales since 2009 with 365 sales by extinct OEM's that no longer exist and determines that the highest number of OEM sales by the existing OEM's is 58 by one OEM. SDAP expects a benefit with a reliable product and other fleets when adopting expect and require the same. Addressing the emerging technology changes and lessons learned can only be comprehended by actual on the ground experience. SDAP specifically request all classes of vehicles at the airport should be required to meet the measure with all vehicles should be ZEV certified.

Respectfully submitted,

/s/ Lisa McGhee
Lisa McGhee, Policy Manager
San Diego Airport Parking Company
2771 Kurtz St., San Diego, CA. 92110
Tel: 714-881-4856, E-mail: sdapparking@gmail.com

Dated: February 21, 2019

Appendix:

Table 1: 2018 SDGE CURRENT AL-TOU TARIFF RATE

- **Note the rate of Demand Fees (see yellow highlights)**
- **SDGE has both a Non-coincidental and Peak Demand and when EV's go thru the Reserve they cannot "Manage or Schedule Charging" to avoid Peak Demand time of use.**

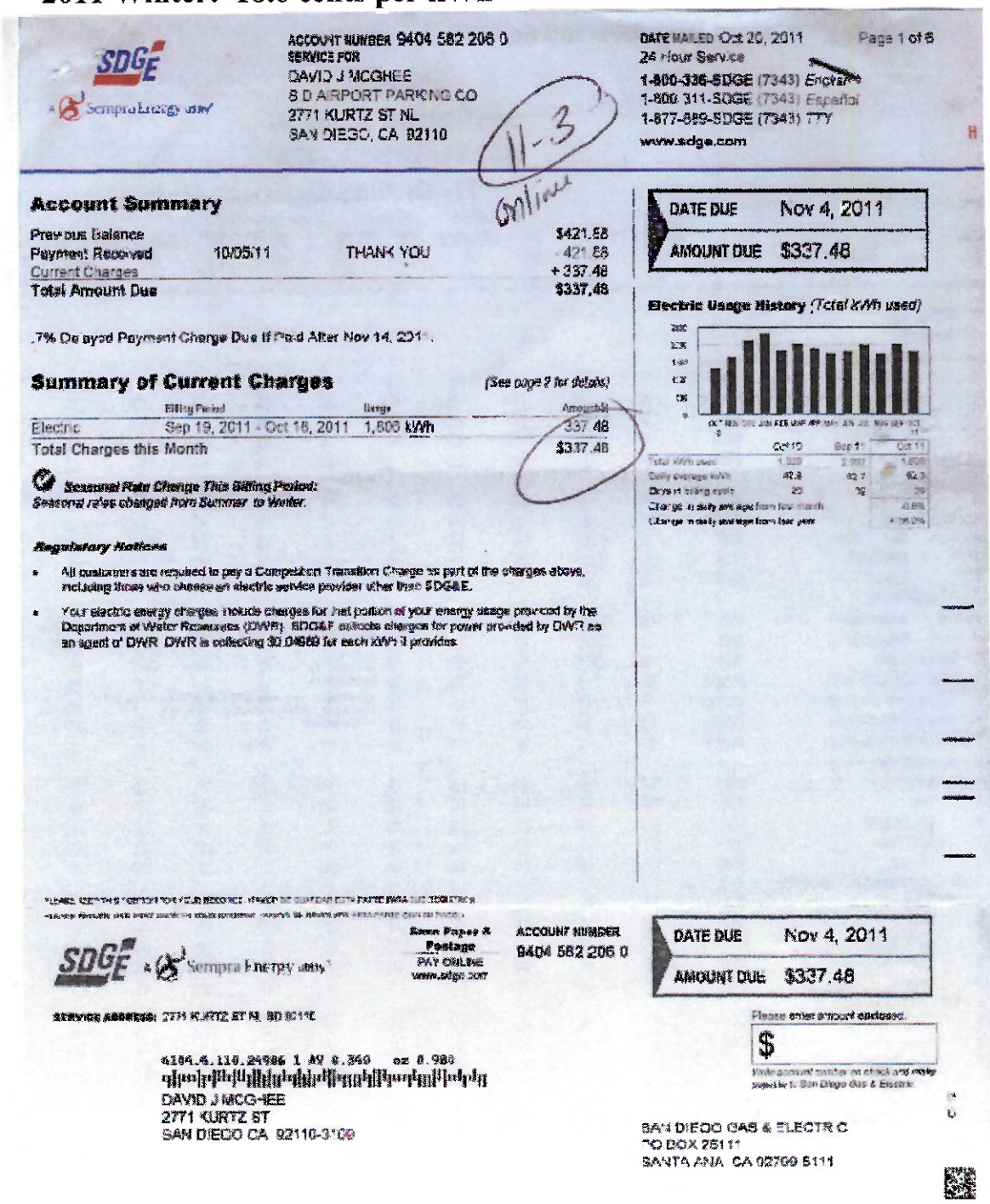
ATTACHMENT A
Current Electric Rates as of January 1, 2018
SAN DIEGO GAS AND ELECTRIC COMPANY
2019 SALES UPDATE FILING

LINE NO.	DESCRIPTION (A)	UNITS (B)	TRANSMISSION RATE (C)	DISTRIBUTION RATE (D)	PPP RATE (E)	NUCLEAR DECOMMISSION RATE (F)	CPC RATE (G)	LGC RATE (H)	RS RATE (I)	TRAC RATE (J)	TOTAL UDC RATE (K)	DWR BOND RATE (L)	EECC RATE (M)	DWR CREDIT (N)	TOTAL RATE (O)
1	SCHEDULE AL-TOU														
2	Basic Service Fee														
3	Less than or equal to 500 kW														
4	Secondary	$/Month	0.00	136.73	0.00	0.00	0.00	0.00	0.00	0.00	136.73	0.00	0.00	0.00	136.73
5	Primary	$/Month	0.00	37.68	0.00	0.00	0.00	0.00	0.00	0.00	37.68	0.00	0.00	0.00	37.68
6	Secondary Substation	$/Month	0.00	17,129.02	0.00	0.00	0.00	0.00	0.00	0.00	17,129.02	0.00	0.00	0.00	17,129.02
7	Primary Substation	$/Month	0.00	17,129.02	0.00	0.00	0.00	0.00	0.00	0.00	17,129.02	0.00	0.00	0.00	17,129.02
8	Transmission	$/Month	0.00	203.21	0.00	0.00	0.00	0.00	0.00	0.00	203.21	0.00	0.00	0.00	203.21
9	Greater than 500 kW														
10	Secondary	$/Month	0.00	558.89	0.00	0.00	0.00	0.00	0.00	0.00	558.89	0.00	0.00	0.00	558.89
11	Primary	$/Month	0.00	44.83	0.00	0.00	0.00	0.00	0.00	0.00	44.83	0.00	0.00	0.00	44.83
12	Secondary Substation	$/Month	0.00	17,129.02	0.00	0.00	0.00	0.00	0.00	0.00	17,129.02	0.00	0.00	0.00	17,129.02
13	Primary Substation	$/Month	0.00	17,129.02	0.00	0.00	0.00	0.00	0.00	0.00	17,129.02	0.00	0.00	0.00	17,129.02
14	Transmission	$/Month	0.00	813.05	0.00	0.00	0.00	0.00	0.00	0.00	813.05	0.00	0.00	0.00	813.05
15	Greater than 12 MW														
16	Secondary Substation	$/Month	0.00	28,955.21	0.00	0.00	0.00	0.00	0.00	0.00	28,955.21	0.00	0.00	0.00	28,955.21
17	Primary Substation	$/Month	0.00	28,955.89	0.00	0.00	0.00	0.00	0.00	0.00	28,955.89	0.00	0.00	0.00	28,955.89
18	Transmission Multiple Bus	$/Month	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.00	0.00	0.00	0.00	3,000.00
19	Distance Adjustment Fee OH - Sec. Sub.	$/Foot/Month	0.00	1.23	0.00	0.00	0.00	0.00	0.00	0.00	1.23	0.00	0.00	0.00	1.23
20	Distance Adjustment Fee UG - Sec. Sub.	$/Foot/Month	0.00	3.17	0.00	0.00	0.00	0.00	0.00	0.00	3.17	0.00	0.00	0.00	3.17
21	Distance Adjustment Fee OH - Pri. Sub.	$/Foot/Month	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	1.22
22	Distance Adjustment Fee UG - Pri. Sub.	$/Foot/Month	0.00	3.13	0.00	0.00	0.00	0.00	0.00	0.00	3.13	0.00	0.00	0.00	3.13
23	Non-Coincident Demand														
24	Secondary	$/kW	12.22	6.86	0.00	0.00	0.00	0.00	0.01	0.00	21.09	0.00	0.00	0.00	21.09
25	Primary	$/kW	11.90	6.81	0.00	0.00	0.00	0.00	0.01	0.00	20.82	0.00	0.00	0.00	20.82
26	Secondary Substation	$/kW	12.22	0.56	0.00	0.00	0.53	0.00	0.01	0.00	13.74	0.00	0.00	0.00	13.74
27	Primary Substation	$/kW	11.90	0.56	0.00	0.00	0.53	0.00	0.01	0.00	13.32	0.00	0.00	0.00	13.32
28	Transmission	$/kW	11.75	0.56	0.00	0.00	0.53	0.00	0.01	0.00	13.27	0.00	0.00	0.00	13.27
29	Non-Coincident Demand w/ Super Off-Peak Exemption														
30	Secondary	$/kW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	Primary	$/kW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	Secondary Substation	$/kW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Primary Substation	$/kW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	Transmission	$/kW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	Maximum On-Peak Demand, Summer														
36	Secondary	$/kW	2.69	13.54	0.00	0.00	0.00	0.00	0.00	0.00	16.63	0.00	10.89	0.00	27.52
37	Primary	$/kW	2.58	13.67	0.00	0.00	0.00	0.00	0.00	0.00	16.46	0.00	10.94	0.00	27.40
38	Secondary Substation	$/kW	2.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.69	0.00	10.99	0.00	13.68
39	Primary Substation	$/kW	2.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.58	0.00	10.94	0.00	13.52
40	Transmission	$/kW	2.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.58	0.00	10.47	0.00	13.05
41	Maximum On-Peak Demand, Winter														
42	Secondary	$/kW	0.56	16.05	0.00	0.00	0.00	0.00	0.00	0.00	16.61	0.00	0.00	0.00	16.61
43	Primary	$/kW	0.54	15.98	0.00	0.00	0.00	0.00	0.00	0.00	16.52	0.00	0.00	0.00	16.52
44	Secondary Substation	$/kW	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.56

Table 2: Historical SDGE Rate Increases on SDAP Business.

- **2011, 20016, 2017, 2018 TOU-AP SMALL BUSINESS TARIFF RATE (currently there are no demand fees for small business EV fleets).**

2011 Winter: 18.6 cents per kWh



SDGE
A Sempra Energy utility

ACCOUNT NUMBER 9404 582 206 0
SERVICE FOR
DAVID J MCGHEE
S D AIRPORT PARKING CO
2771 KURTZ ST NL
SAN DIEGO, CA 92110

DATE MAILED Oct 20, 2011 Page 1 of 8
24 Hour Service
1-800-336-SDGE (7343) English
1-800-311-SDGE (7343) Español
1-877-889-SDGE (7343) TTY
www.sdge.com

11-3 online

Account Summary

Previous Balance			$421.68
Payment Received	10/05/11	THANK YOU	-421.68
Current Charges			+ 337.48
Total Amount Due			$337.48

.7% Delayed Payment Charge Due If Paid After Nov 14, 2011.

DATE DUE Nov 4, 2011
AMOUNT DUE $337.48

Electric Usage History *(Total kWh used)*

	Oct 10	Sep 11	Oct 11
Total kWh used	1,320	2,160	1,600
Daily average kWh	42.6	72.0	51.6
Billing cycle days	31	30	31
Change in daily average from last month			-28.3%
Change in daily average from last year			+21.2%

Summary of Current Charges *(See page 2 for details)*

	Billing Period	Usage	Amount
Electric	Sep 19, 2011 - Oct 18, 2011	1,600 kWh	337.48
Total Charges this Month			$337.48

Seasonal Rate Change This Billing Period:
Seasonal rates changed from Summer to Winter.

Regulatory Notices

- All customers are required to pay a Competition Transition Charge as part of the charges above, including those who choose an electric service provider other than SDG&E.
- Your electric energy charges include charges for that portion of your energy usage provided by the Department of Water Resources (DWR). SDG&E collects charges for power provided by DWR as an agent of DWR. DWR is collecting $0.04889 for each kWh it provides.

SDGE
A Sempra Energy utility

Save Paper & Postage
PAY ONLINE
www.sdge.com

ACCOUNT NUMBER
9404 582 206 0

DATE DUE Nov 4, 2011
AMOUNT DUE $337.48

SERVICE ADDRESS: 2771 KURTZ ST NL SD 92110

Please enter amount enclosed.
$

4184.4.110.24986 1 AV 0.360 02 0.980
DAVID J MCG-IEE
2771 KURTZ ST
SAN DIEGO CA 92110-3109

SAN DIEGO GAS & ELECTR C
PO BOX 25111
SANTA ANA CA 92799 5111

U 2 40000440458220630000337480000033748

2016 Summer: 21.7 cents per kWh

SDGE
A Sempra Energy utility

ACCOUNT NUMBER 9404 562 206 0
SERVICE FOR
DAVID J MCGHEE
S D AIRPORT PARKING CO
2771 KURTZ ST
SAN DIEGO, CA 92110

DATE MAILED Aug 15, 2016 Page 1 of 4
www.sdge.com
1-800-336-SDGE (7343) English
1-800-311-SDGE (7343) Español
1-877-889-SDGE (7343) TTY
M-F, 7am-6pm, Sat, 7am-6pm
24 Hour Emergency Service

You may have rate options. Please call us at 1-800-336-7343(SDGE) or visit our website at sdge.com.

DATE DUE Aug 30, 2016
AMOUNT DUE $2,004.22

Account Summary

Previous Balance			$1,991.96
Payment Received	07/08/16	THANK YOU	- 1,991.96
Current Charges			+ 2,004.22
Total Amount Due			$2,004.22

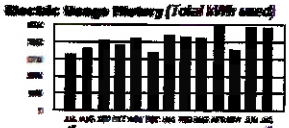
.7% Delayed Payment Charge Due If Paid After Sep 8, 2016.

Summary of Current Charges

(See page 2 for details)

	Billing Period	Usage	Amount
Electric	Jun 16, 2016 - Jul 18, 2016	9,211 kWh	2,004.22
Total Charges this Month			$2,004.22

Electric Usage History (Total kWh used)



	Jul 15	Jun 16	Jul 16
Total kWh used	8,988	9,121	9,211
Daily average kWh	289.4	304.0	297.0
Days in billing cycle	31	30	31
Change in daily average from last month			- 7.0%
Change in daily average from last year			+ 48.0%
Max monthly demand	28.1	28.1	32.5
Max annual demand			28.1

Regulatory Notices

- All customers are required to pay a Competition Transition Charge as part of the charges above, including those who choose an electric service provider other than SDG&E.

See Time of Use - Electricity Information on page 2.

PLEASE KEEP THIS PORTION FOR YOUR RECORDS. (FAVOR DE GUARDAR ESTA PARTE PARA SUS REGISTROS.)
PLEASE RETURN THIS PORTION WITH YOUR PAYMENT. (FAVOR DE DEVOLVER ESTA PARTE CON SU PAGO.)

SDGE A Sempra Energy utility

Save Paper & Postage
PAY ONLINE
www.sdge.com

ACCOUNT NUMBER
9404 562 206 0

DATE DUE Aug 30, 2016
AMOUNT DUE $2,004.22

SERVICE ADDRESS: 2771 KURTZ ST SD 92110

Please enter amount enclosed.
$

Write account number on check and make payable to San Diego Gas & Electric.

DAVID J MCGHEE
2771 KURTZ ST
SAN DIEGO CA 92110-3109

SAN DIEGO GAS & ELECTRIC
PO BOX 25111
SANTA ANA CA 92799-5111

0 2 20000940562206000020042200002004422

2017 Summer: 24.5cents per kWh

SDGE
A Sempra Energy utility®

ACCOUNT NUMBER 9404 582 206 0
SERVICE FOR
DAVID J MCGHEE
S D AIRPORT PARKING CO
2771 KURTZ ST
SAN DIEGO, CA 92110

DATE MAILED Jul 20, 2017 Page 1 of 4
www.sdge.com
1-800-336-SDGE (7343) *English*
1-800-311-SDGE (7343) *Español*
1-877-889-SDGE (7343) *TTY*
M-F, 7am-8pm, Sat, 7am-6pm
24 Hour Emergency Service

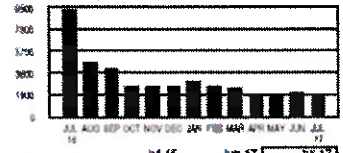
Account Summary

Previous Balance			$506.59
Payment Received	07/17/17	THANK YOU	- 506.59
Current Charges			+ 479.36
Total Amount Due			$479.36

.7% Delayed Payment Charge Due If Paid After Aug 14, 2017.

DATE DUE	Aug 4, 2017
AMOUNT DUE	$479.36

Electric Usage History *(Total kWh used)*



	Jul 16	Jun 17	Jul 17
Total kWh used	9,211	2,099	1,960
Daily average kWh	287.8	65.6	65.3
Days in billing cycle	32	32	30
Change in daily average from last month			- 0.5%
Change in daily average from last year			- 77.3%
Max monthly demand	32.5	18.3	10.9
Max annual demand			34.6

Summary of Current Charges

(See page 2 for details)

	Billing Period	Usage	Amount($)
Electric	Jun 18, 2017 - Jul 18, 2017	1,960 kWh	479.36
Total Charges this Month			$479.36

Regulatory Notices

- All customers are required to pay a Competition Transition Charge as part of the charges above, including those who choose an electric service provider other than SDG&E

See Time of Use - Electricity information on page 3.

PLEASE KEEP THIS PORTION FOR YOUR RECORDS (FAVOR DE GUARDAR ESTA PARTE PARA SUS REGISTROS.)
PLEASE RETURN THIS PORTION WITH YOUR PAYMENT. (FAVOR DE DEVOLVER ESTA PARTE CON SU PAGO.)

SDGE A Sempra Energy utility®

Save Paper & Postage
PAY ONLINE
www.sdge.com

ACCOUNT NUMBER
9404 582 206 0

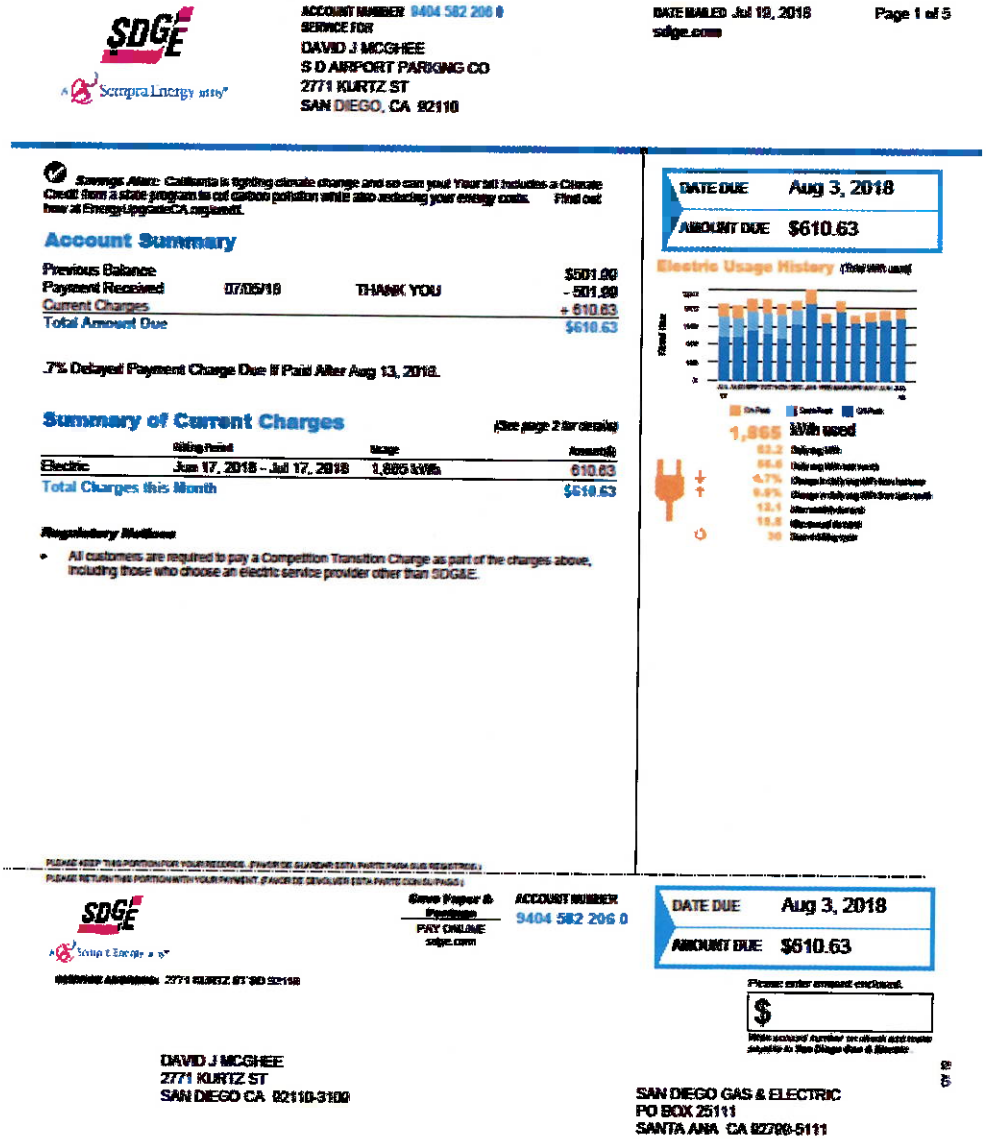
DATE DUE	Aug 4, 2017
AMOUNT DUE	$479.36

SERVICE ADDRESS: 2771 KURTZ ST SD 92110

Please enter amount enclosed.
$

Write account number on check and make payable to San Diego Gas & Electric

2018 Summer: 32.7 cents per kWh



SDGE
A Sempra Energy utility

ACCOUNT NUMBER 9404 582 206 0
SERVICE FOR
DAVID J MCGHEE
S D AIRPORT PARKING CO
2771 KURTZ ST
SAN DIEGO, CA 92110

DATE MAILED Jul 19, 2018
sdge.com

Page 1 of 5

Savings Alert: California is fighting climate change and so can you! Your bill includes a Climate Credit from a state program to cut carbon pollution while also reducing your energy costs. Find out how at EnergyUpgradeCA.org/credit.

Account Summary

Previous Balance			$501.99
Payment Received	07/05/18	THANK YOU	- 501.99
Current Charges			+ 610.63
Total Amount Due			$610.63

.7% Delayed Payment Charge Due If Paid After Aug 13, 2018.

Summary of Current Charges

(See page 2 for details)

	Billing Period	Usage	Amount($)
Electric	Jun 17, 2018 - Jul 17, 2018	1,865 kWh	610.63
Total Charges this Month			$610.63

Regulatory Notices

- All customers are required to pay a Competition Transition Charge as part of the charges above, including those who choose an electric service provider other than SDG&E.

DATE DUE Aug 3, 2018
AMOUNT DUE $610.63

Electric Usage History

1,865 kWh used

PLEASE KEEP THIS PORTION FOR YOUR RECORDS. / PARA USO DE SUS REGISTROS.
PLEASE RETURN THIS PORTION WITH YOUR PAYMENT. / FAVOR DE DEVOLVER ESTA PARTE CON SU PAGO.

SDGE

Save Paper & Postage
PAY ONLINE
sdge.com

ACCOUNT NUMBER
9404 582 206 0

DATE DUE Aug 3, 2018
AMOUNT DUE $610.63

Please enter amount enclosed.
$

DAVID J MCGHEE
2771 KURTZ ST
SAN DIEGO CA 92110-3109

SAN DIEGO GAS & ELECTRIC
PO BOX 25111
SANTA ANA CA 92799-5111

0 2 20000940458220600000610630000061063

Table 3: SDGE DETAIL OF FEES IN INVOICE

- All fees in the Invoice determines the Average kWh rate in the invoice. This is the ***Total Current Charges*** divided by ***Total Usage of kWh*** in the month.

- All "4" "out the door fee prices" impact the "kWh rate" and thereby increases the "Average" kWh rate by 7% or close to an additional 2 cents more per kWh.

- These fees include the following itemized fees:

  See circled items 1-4 in red font, in the following page ***"Detail of Current Charges"***

  1) Customer monthly charge
  2) DWR Bond Charge
  3) Franchise Fees & State Taxes
  4) EV-Commercial will include Demand kW fees.

- All kWh Delivery and Generation fees are impacted by these additional fees on top of the kWh energy rates and thereby increases the Advertised kWh Rates that are typically illustrated by the IOU's. Thereby this does not determine the correct kWh and cost per mile when compared to the price of a gallon of gas.

- Utilizing the "out the door" price illustrates the real-world price per mile for EV miles. Additionally, this is an Apples to Apples comparison with the price of a gallon of fuel as all fuel prices already include the fuel taxes and any other fees in the advertised price for a gallon of fuel.

- The ***Detail of Current Charges*** page demonstrates this impact and the details of each of these fees that are on SDAP's invoice.

- This is an invoice from 8-15-2016 when SDAP was using 3 EV's Shuttles and achieved 15,000 EV miles in this billing. (see orange highlights)
  - On Peak kWh use = 1,740
  - Semi Peak kWh use = 2,111
  - Off Peak kWh use = 5,360

Detail of Current Charges

Electric Service

Rate: Time of Use Plus - TOU-A-P-Commercial **Climate Zone:** Coastal

Billing Period: 6/16/16 - 7/18/16 **Total Days:** 32

Meter Number: 06169184 *(Next scheduled read date Aug 17, 2016)* **Cycle:** 12

Meter Constant: 1.000 **Billing Voltage Level:** Secondary

Billing Period:

Total Usage: 9,211 *(Usage based on interval data)*

1)

ELECTRIC CHARGES **Amount($)**

Customer Charge 20.00

Electricity Delivery 9,211 kWh
(Details below)

SUMMER USAGE	On-Peak		Semi-Peak		Off-Peak		
kWh used	1,740		2,111		5,360		
Rate/kWh	$.12285		$.12285		$.12285		
Charge	$213.75	+	$259.34	+	$658.48	=	1,131.57

2)

DWR Bond Charge 9,211 kWh x $.00539 49.65

Electricity Generation *(Details below)* 9,211 kWh

SUMMER USAGE	On-Peak		Semi-Peak		Off-Peak		
kWh used	1,740		2,111		5,360		
Rate/kWh	$.10865		$.08501		$.05989		
Charge	$189.05	+	$179.46	+	$321.01	=	689.52

DWR Revenue Adjustment -1.93

3)

TAXES & FEES ON ELECTRIC CHARGES **Amount ($)**

City of San Diego Franchise Fee Differential	1,841.09 x 5.78%	106.41
Franchise Fees on Electric Energy Supplied by Others	47.72 x 6.88%	3.29
State Surcharge Tax	9,211 kWh x $.000290	2.67
State Regulatory Fee	9,211 kWh x $.000330	3.04
Total Taxes & Fees on Electric Charges		**$115.41**

Total Electric Service $2,004.22
Total Current Charges $2,004.22

Total Electric Charges $1,888.81

Circuit: 0491
Your circuit is currently not subject to rotating outage.
However, this is subject to change without notice.

Rate Change This

There was a rate change on day 19 of your Billing Period. Therefore, your charges for the first 18 days were at Rate 1,and the remaining 14 days were at Rate 2.

Summer kWh

On-Peak	1,740	11am-6pm weekdays	= 19%
Semi-Peak	2,111	6am-11am & 6pm-10pm weekdays	= 23%
Off-Peak	5,360	10pm-6am weekdays, plus Sat/Sun/Holidays	= 58%
Total	**9,211**		

4) **Demand Fees when over 20 kW**

Table 4: 1-23-19 , HVIP MHD Mapping Tool Results

- **607 Total MHD Sales since 2009**
- **365 Sales are from Extinct OEM's that no longer exist (see red font)**
- **The most sales by any one OEM per the list of current active OEM's in the HVIP list is "58" sales**

Uploaded on 1-23-19 — HVIP Data updated last on 12-1-2018 — https://www.californiahvip.org/eligible-technologies/

Fiscal Year Sales

1	Fiscal Year 2009-10	1	0.16%	
2	Fiscal Year 2010-11	305	50.25%	
3	Fiscal Year 2011-12	55	9.06%	
4	Fiscal Year 2012-13	0	0.00%	0.00%
5	Fiscal Year 2013-14	39	6.43%	6.43%
6	Fiscal Year 2014-15	35	5.77%	5.77%
7	Fiscal Year 2015-16	57	9.39%	9.39%
8	Fiscal Year 2016-17	115	18.95%	18.95%
8	Total over 8 Years	607	100.00%	40.53%
		246	Last 5 Years	

Vehicle Class Sales

1	LDA	51	8.40%
2	Class 2	0	0.00%
3	Class 3	98	16.14%
4	Class 4	8	1.32%
5	Class 5	110	18.12%
6	Class 6	234	38.55%
7	Class 7	16	2.64%
8	Class 8	90	14.83%
8	Total Z	607	100.00%

Vehicle Vocation Sales

1	Beverage Delivery	29	4.78%
2	Parcel Delivery	200	32.95%
3	Other Truck	207	34.10%
4	Other Bus	22	3.62%
5	School Bus	10	1.65%
6	Shuttle Bus	87	14.33%
7	Urban Bus	52	8.57%
7	Total Vehicle Vocation Sales	607	100.00%
	Bus Sales	171	28.17%

Vehicle OEM Sales

1	BYD Motors	45	7.41%
2	Chanje	20	3.29%
3	EVI (First Priority)	112	18.45%
4	Ford	51	8.40%
5	Lion Bus	6	0.99%
6	Motiv Powers	10	1.65%
7	Navistar (Workhors	34	5.60%
8	New Flyer	0	0.00%
9	Orange EV	26	4.28%
10	Phoenix MotorCars	43	7.08%
11	Proterra	23	3.79%
12	Smith Electric (Chi	168	27.68%
13	Zenith Motors	58	9.56%
14	Workhorse AMP / T	1	0.16%
15	Lightning Systems	3	0.49%
16	Eldoardo National	5	0.82%
17	Blue Bird	2	0.33%
	Total EV ZEV Sa	607	100.00%

OEM Sales 12-1-2017, Increase since 12-1-17

1	BYD Motors	40	5	(Bus/Truck)
2	Chanje	0	20	(Truck)
3	Lion Bus	0	6	(Bus)
4	Motiv Powers	10	0	(Truck/Bus)
5	New Flyer	0	0	(Bus)
6	Orange EV	0	26	(Truck)
7	Phoenix MotorCar	42	1	(Bus/Truck)
8	Proterra	10	13	(Bus)
9	Zenith Motors	43	15	(Bus/Truck)
10	Workhorse AMP /	0	1	(Truck)
11	Lightning Systems	0	3	(Bus/Turck)
12	Eldoardo National	0	5	(Bus)
13	Blue Bird	0	2	(Bus)
	Total EV ZEV Sales		97	

New OEM's with Sales

1	BYD	45	7.41%
2	Chanje	20	3.29%
3	Lion Bus	6	0.99%
4	Motive Powers	10	1.65%
5	Orange EV	26	4.28%
6	Phoenix MotorCars	43	7.08%
7	Proterra	23	3.79%
8	Zenith Motors	58	9.56%
9	Workhorse AMP	1	0.16%
10	Lightning Systems	3	0.49%
11	Eldoardo National	5	0.82%
12	BlueBird	2	0.33%
		242	39.87%

Shuttle / Bus ZEV OEM Sales

1	BYD Motors	45	26.16%	All Class 7 (10) and rest Class 8
2	Lion Bus	6	3.49%	All Class 8
3	Motiv Powers	5	2.91%	
4	New Flyer	0	0.00%	
5	Phoenix MotorCars	41	23.84%	
6	Proterra	23	13.37%	All Class 8
7	Zenith Motors	43	25.00%	
8	Lightning Systems	2	1.16%	
9	Eldoardo Nation	5	2.91%	All Class 8
10	Blue Bird	2	1.16%	
	Total Bus Sales	172	29.34%	

SHUTTLES: HD verses MD

81	Heavy Duty =	47.09%
91	Medium Duty =	52.91%

Extinct OEM's

1	EVI	18.45%	112	Fiscal Year 2010-11
2	Ford (LDA)	8.40%	51	Fiscal Year 2010-11
3	Navistar	5.60%	34	Fiscal Year 2010-11
4	Smith Electric	27.68%	168	Fiscal Year 2010-11 and 2011-12
		60.13%	365	

Overall Total ZEV Sales 607 100.00%

HVIP Funding = $37.7 Million to date for ZEV's

California needs 150,000 Trucks to Meet Emission Reduction Goal

Table 5: **August 2018, US Energy Information Administration (EIA), State by State Fuel Tax**

- **Gasoline Fuel Tax: $0.68 Cents per Gallon (orange highlights)**
- **Diesel Fuel Tax: $0.93 Cents per Gallon (yellow highlights)**

eia

Federal and state motor fuels taxes[1] **Resource: https://www.eia.gov/tools/faqs/faq.php?id=10&t=10**

Updated August 2018

	Gasoline			Diesel		
	Excise	LUST Fee	Total	Excise	LUST Fee	Total
Federal	$0.183	$0.001	$0.184	$0.243	$0.001	$0.244

	Gasoline				Diesel			
	State tax	Other taxes & Fees[2]	Total State[3]	State & Federal	State tax	Other taxes & Fees[2]	Total State[3]	State & Federal
California[4]	0.417	0.0816	0.4986	0.6826	0.36	0.3316	0.6916	0.9356

1 This list includes rates of general application (including, but not limited to, excise taxes, environmental taxes, special taxes, and inspection fees), exclusive of county and local taxes. Rates are also exclusive of any state taxes based on gross or net receipts. **The information included in this document is for general informational purposes only and should not be construed as legal, tax, or other advice. Contact the appropriate state agencies for official information or guidance about motor fuel taxes and fees.** State rates in effect as of July 1, 2018. Sources: State and Territorial statutes and government agencies.

2 May include sales and/or use taxes, inspection fees, environmental fees, or other charges.

3 Average of Total State taxes may not equal the sum due to rounding.

4 Local option taxes (LOTS) are allowed.

Table 6: Diesel Retail Prices per Gallon, 1-28-19 EIA.gov

- **Diesel Price Per gallon: $3.75 per Gallon includes Tax (yellow highlights)**
- **This is the "Out the Door Price"**

California No 2 Diesel Retail Prices (Dollars per Gallon)

Resource: EIA https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2D_PTE_SCA_DPG&f=M

Release Date: 1/28/2019

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1995							1.266	1.271	1.294	1.307	1.313	1.322
1996	1.322	1.277	1.276	1.529	1.615	1.529	1.471	1.44	1.467	1.486	1.471	1.435
1997	1.427	1.509	1.475	1.486	1.376	1.304	1.267	1.337	1.357	1.347	1.39	1.34
1998	1.286	1.226	1.174	1.217	1.222	1.163	1.157	1.158	1.167	1.172	1.169	1.123
1999	1.11	1.104	1.237	1.404	1.314	1.392	1.415	1.468	1.401	1.393	1.466	1.447
2000	1.505	1.536	1.629	1.57	1.524	1.509	1.58	1.713	1.94	1.904	1.882	1.816
2001	1.659	1.618	1.593	1.61	1.609	1.612	1.561	1.514	1.651	1.475	1.384	1.27
2002	1.269	1.289	1.394	1.444	1.411	1.427	1.428	1.484	1.597	1.557	1.532	1.524
2003	1.579	1.725	1.818	1.65	1.543	1.581	1.635	1.725	1.656	1.622	1.639	1.681
2004	1.677	1.809	1.897	2.171	2.284	2.056	2.098	2.128	2.164	2.361	2.348	2.137
2005	2.059	2.244	2.455	2.59	2.45	2.469	2.578	2.945	3.125	3.16	2.668	2.504
2006	2.63	2.703	2.738	2.932	3.222	3.192	3.104	3.193	3.053	2.721	2.679	2.906
2007	2.803	2.886	2.885	2.985	2.964	3.019	3.123	3.049	3.024	3.267	3.608	3.475
2008	3.423	3.488	4.014	4.265	4.673	4.968	4.965	4.542	4.087	3.568	2.832	2.345
2009	2.297	2.26	2.139	2.336	2.354	2.697	2.734	2.85	2.837	2.856	2.962	2.913
2010	2.997	2.938	3.058	3.206	3.205	3.102	3.124	3.164	3.144	3.214	3.305	3.408
2011	3.56	3.804	4.187	4.4	4.362	4.213	4.106	4.009	4.057	4.059	4.245	NA
2012	4.103	4.251	4.474	4.419	4.316	4.027	3.917	4.24	4.456	4.376	4.17	4.076
2013	4.083	4.325	4.245	4.134	4.04	4.023	4.068	4.138	4.209	4.134	4.048	4.073
2014	4.082	4.084	4.092	4.089	4.119	4.101	4.11	4.085	4.054	3.938	3.813	3.542
2015	3.212	3.11	3.182	3.098	3.254	3.192	3.115	2.935	2.85	2.814	2.768	2.644
2016	2.526	2.335	2.387	2.459	2.636	2.782	2.785	2.722	2.749	2.817	2.82	2.851
2017	2.932	2.957	2.935	2.938	2.922	2.895	2.876	2.959	3.168	3.172	3.587	3.559
2018	3.639	3.68	3.654	3.773	3.941	3.982	3.957	3.94	3.973	4.086	4.018	3.858
2019	3.753											

Table 7: August 2018 Daily Driver Production Report, Shuttle # 905 – Diesel

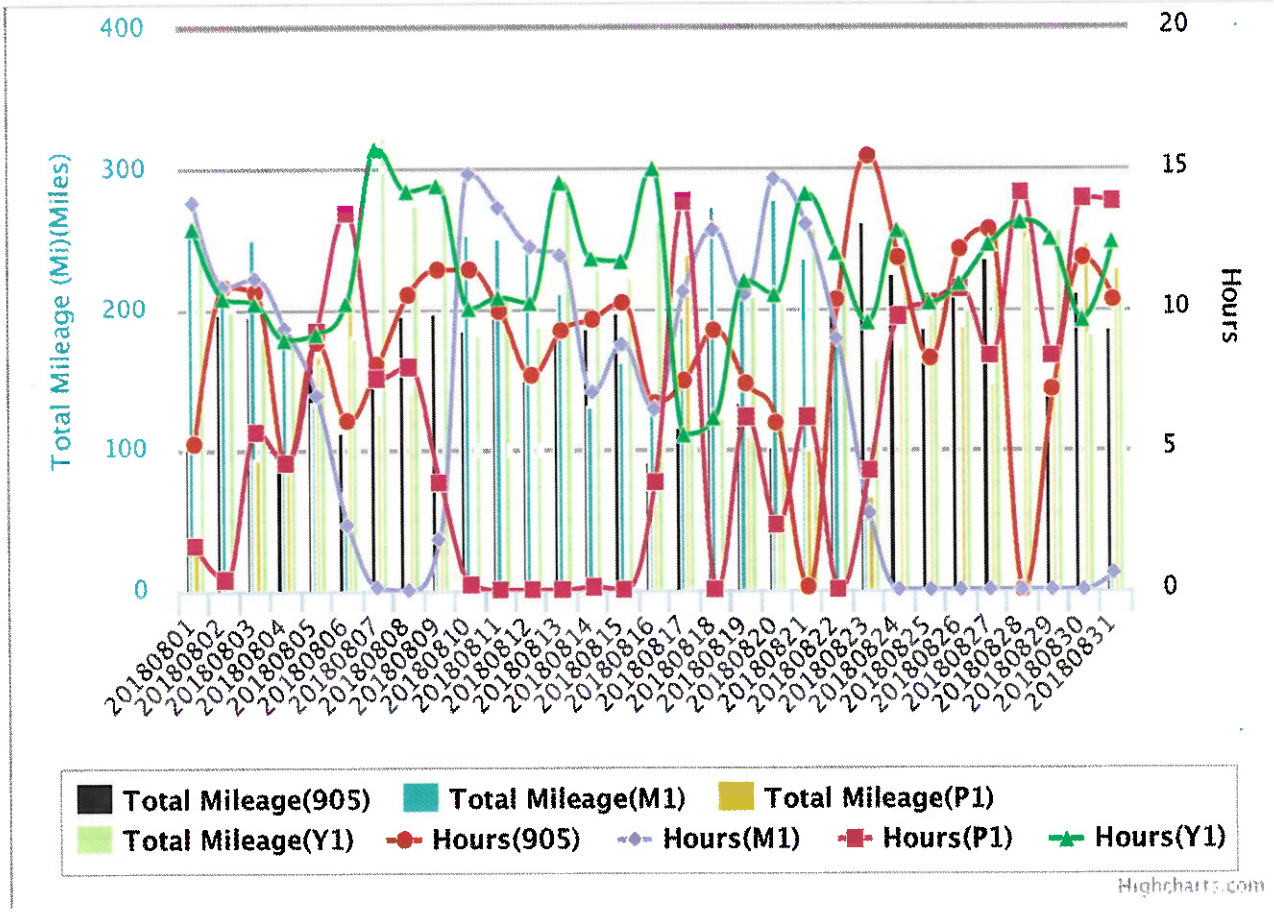
- **Average MPG in Diesel for SDAP fleet is 18 MPG**

		2012-Mercedes-Benz-Sprinter		
Lic.# : 905		Group : SD AIRPORT PARKING		
Date : 2018/08/01 to 2018/08/31		TARGET MPG		28.3
Date	**Miles**	**Fuel**	**Hours**	**MPG**
1-Aug	100.6	5.5	5:13:55	18.1
2-Aug	197.0	10.7	10:46:48	18.4
3-Aug	195.7	10.2	10:33:37	19.3
4-Aug	87.6	4.3	4:30:41	20.3
5-Aug	169.7	9.0	8:48:06	18.8
6-Aug	112.4	6.7	6:00:04	16.7
7-Aug	152.6	8.2	8:02:47	18.5
8-Aug	195.7	10.7	10:29:23	18.2
9-Aug	197.0	10.7	11:24:28	18.3
10-Aug	184.3	11.0	11:26:24	16.8
11-Aug	196.6	10.1	9:52:54	19.5
12-Aug	155.0	7.8	7:35:07	19.9
13-Aug	180.5	9.3	9:12:24	19.4
14-Aug	185.7	9.5	9:36:28	19.6
15-Aug	197.6	10.6	10:09:55	18.6
16-Aug	91.8	6.2	6:37:53	14.8
17-Aug	116.2	7.1	7:22:41	16.4
18-Aug	182.9	9.2	9:09:44	19.9
19-Aug	133.0	6.7	7:20:05	19.8
20-Aug	101.3	5.3	5:55:46	19.3
21-Aug	0.0	0.0	0:04:47	0.0
22-Aug	202.0	10.1	10:17:31	20.0
23-Aug	262.3	14.8	15:23:03	17.7
24-Aug	224.9	11.3	11:47:29	19.8
25-Aug	186.5	9.4	8:09:27	19.9
26-Aug	220.4	11.5	12:05:45	19.2
27-Aug	236.1	12.8	12:45:48	18.5
28-Aug	0.0	0.0	0:00:00	0.0
29-Aug	142.8	7.5	7:08:17	19.0
30-Aug	211.9	12.1	11:47:44	17.5
31-Aug	186.8	10.5	10:17:15	17.8
Total	5006.9	268.9	269:56:16	18.6

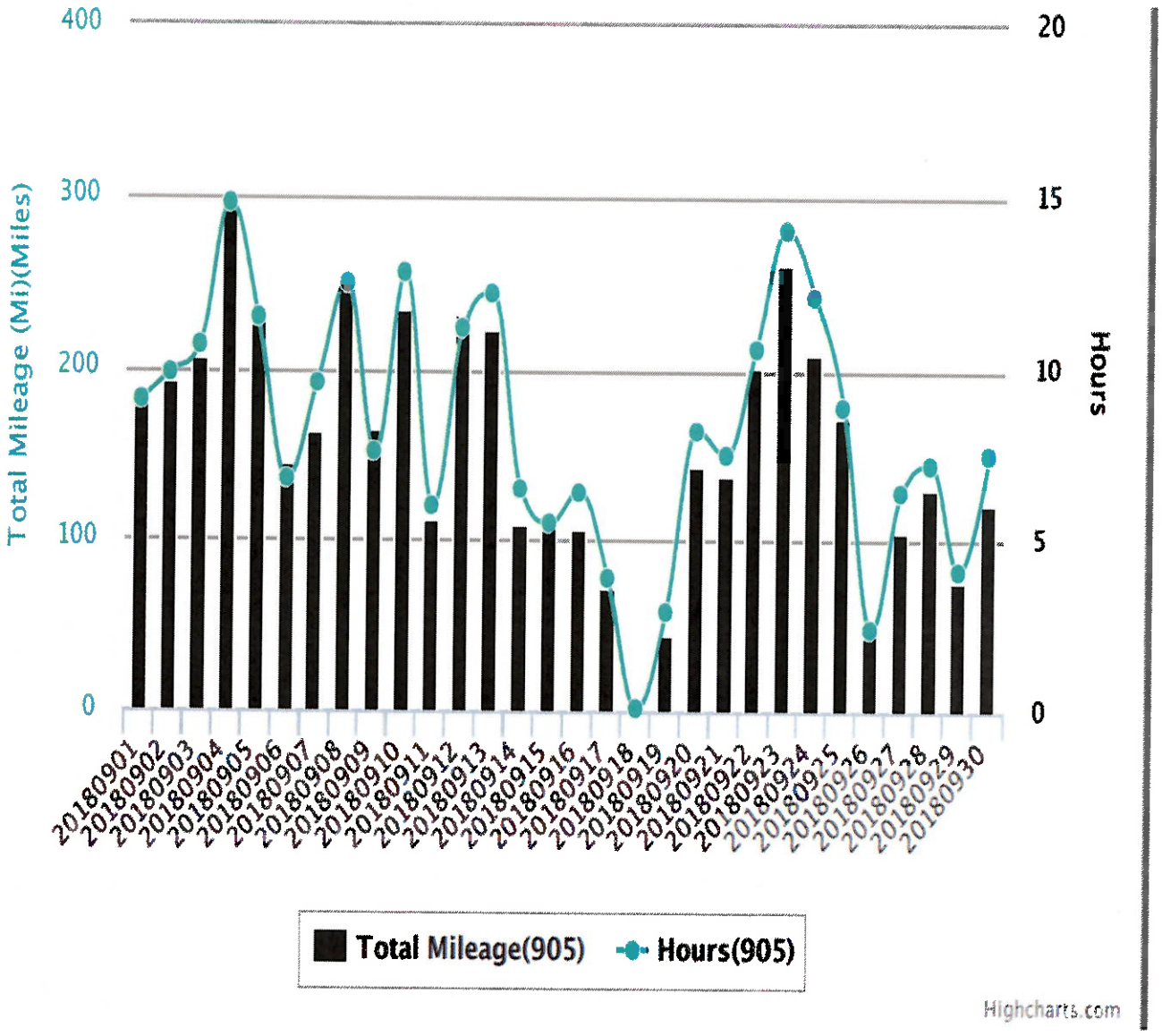
Table 8: SDAP Daily VMT and Hours – Diesel Fleet

- **Note the production of Hours daily by each shuttle.**
- **Note the daily vehicle Miles traveled goes beyond the range of the EV; thereby *Managed Charging* can only be accomplished by "3-Phase speed" and Battery storage)**

SDAP Fleet August 2018, Daily VMT and Hours of Production



SDAP Shuttle #905 August 2018 Daily VMT and Hours of Production



SDAP Shuttle #M1 September 2018 Daily VMT and Hours of Production

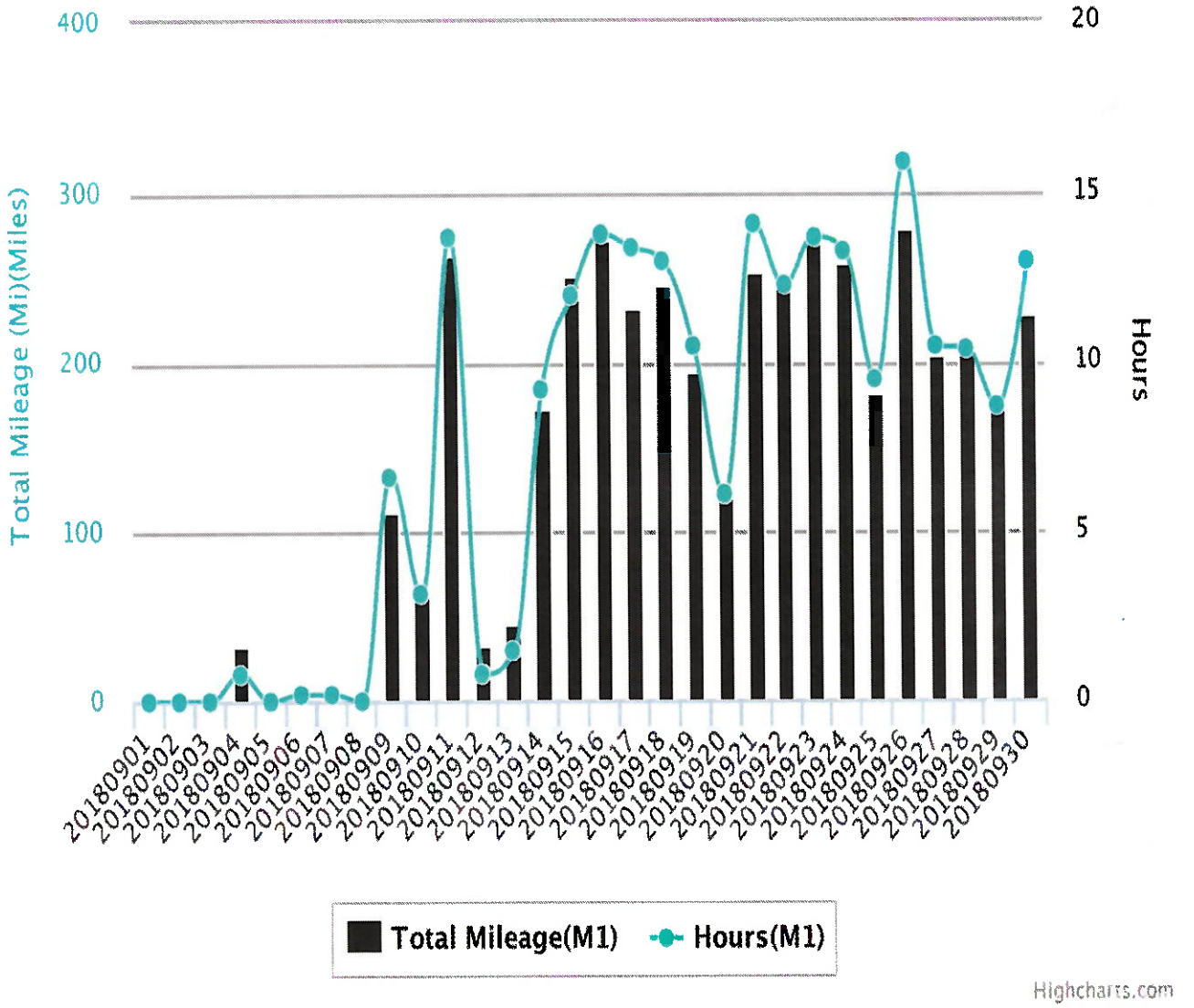


Table 9: Current EV Commercial Rates, SCE

SCE Existing EV Rates

TOU-EV-3-A Rate Schedule
Commercial
EV-Only

On-Peak		Hour	Summer Prices ($/kWh)	Winter Prices ($/kWh)
	Start	Noon	0.36	0.16
	End	6:00PM		
Mid-Peak				
	8:00am-noon		0.17	0.14
	6:00pm-11:00pm			
Off-Peak				
	All other hours		0.09	0.10
Customer Charge (cents/day)			0.836	

SCE Existing EV Rates (continued)

TOU-EV-4 Rate Schedule
Commercial 20kW-500kW/month
EV-Only

On-Peak		Hour	Summer Prices ($/kWh)	Winter Prices ($/kWh)
	Start	Noon	0.29	0.11
	End	6:00PM		
Mid-Peak				
	8:00am-noon		0.12	0.09
	6:00pm-11:00pm			
Off-Peak				
	All other hours		0.05	0.06
Demand Charge ($/kW/month)			$13.20	
Customer Charge ($/month)			$198.79	

SCE Recently-Approved Commercial EV-TOU Rates

TOU-EV-8

Large Power with Monthly Max Demand between 21 - 500 kW

EV-Only

TOU Period		2019-2023 All Energy Rate Year 5	2024 Year 6	2025 Year 7	2026 Year 8	2027 Year 9	2028 Year 10	2029+ Full FRD Rate Year 11
Summer On - $/kWh	4-9pm weekdays	$0.41816	$0.41131	$0.40447	$0.39762	$0.39077	$0.38393	$0.25882
Summer Mid - $/kWh	4-9pm weekends	$0.27718	$0.27034	$0.26349	$0.25664	$0.24980	$0.24295	$0.20051
Summer Off - $/kWh	All except 4-9pm all days	$0.12550	$0.11866	$0.11181	$0.10496	$0.09812	$0.09127	$0.10135
Winter Mid - $/kWh	4-9pm all days	$0.27801	$0.27116	$0.26432	$0.25747	$0.25062	$0.24378	$0.20134
Winter Off - $/kWh	9pm-8am all days	$0.13206	$0.12522	$0.11837	$0.11152	$0.10467	$0.09783	$0.11078
Winter Super-Off- $/kWh	8am-4pm all days	$0.08133	$0.07448	$0.06764	$0.06079	$0.05394	$0.04710	$0.05837
Customer Charge ($/Month)		$106.75	$106.75	$106.75	$106.75	$106.75	$106.75	$106.75
FRD ($/kW)		$0.00	$1.99	$3.99	$5.98	$7.97	$9.97	$11.96
% of Final FRD		0	16.67%	33.33%	50.00%	66.67%	83.33%	100.00%
FRD % Increase By Year			16.67%	16.67%	16.67%	16.67%	16.67%	16.67%

Illustrative rates as proposed in SCE's Electric Transportation (TE) Application (A.17-01-021) for implementation in early 2019

Rate levels reflect Jan. 1, 2017 revenue requirement and current 2015 GRC Phase 2 revenue allocations

NOTES:

Yr1 – Yr5: Energy only; No Demand Charges

Yr6 – Yr10: Phase-in Demand Charges

Yr11+: Return to Energy and Demand Charges (The distribution grid component after the 10-yr period will reflect only 60%, rather than 100%, of distribution costs, with the balance of distribution costs recovered through energy charges.

Table 10:

ILLUSTRATION OF SDAP FLEET kWh COST WITH SDGE, PGE & SCE RATES

- **This illustrates the "Out the Door" price.**
- **Includes Taxes and other Fees.**
- **See Comparison Fuel Cost.**
- **Property Demand kW use impacts results.**
- **See Percent % of Energy Use for each Time of Use window, as this is derived on the Fleet vocation, EV range, Charging Speed, kWh per mile from vehicle.**
- **Daily Charging Hours --- is impacted by VMT, Range of Vehicle, Available hours to Night time Charge and Available Daytime Charging when Dwelling.**
- **The EV Fleet must achieve the Hours of Charging based on all elements to achieve the VMT for the fleet's daily normal use without impeding the business use case.**

SDAP on SDGE AL TOU

AL TOU, YEAR 1, GRCP2, 5 Summer Mos. - SDAP Fleet, 4 Buses, 60k Miles ea.

Select Rate Tariff and Season	
Rate Tariff	SDGE AL-TOU
Season	Annual Ave.

Usage summary	
daily energy used (kWh)	513
Max power (kW)	117
On-Peak demand power	117

Demand Power, KW		Property Demand
Max Demand power	117	17
On-Peak demand power	117	

Electricity Costs - Invoice		
total bill	7,029	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.46	

	Energy usage per month, KWh and Percentage TOU	
26%	on-peak	4,004
31%	mid-peak	4,774
43%	off-peak	6,622
100%		15,400

Details		
% demand charge	70%	$42.29
energy cost	1,942	
demand cost	4,948	

Fuel Cost per month, per mile	
Tot kilowatt hours	15,400
kWh per Mile	0.77
Miles per Mo.	20,000
$$ Cost Per Mile	0.35

COMPARISON: "Diesel" Fuel Cost per month, per mile	
Total Gallons	1,111
Miles per Gallon	18
Miles per Mo.	20,000
Retail Price per Gallon	$3.75
$$ Cost Per Mile	0.21

Daily Charging Fleet Hours	
EVSE kW output	50
Charging capacity of Miles per hour	65
Daily Fleet Miles	667
Total Daily Hours Charging Fleet	10
Number of EVSE's on Meter	2
Daily Charging Hours per EVSE	5.1

Daily Managed Charging Hours		
Nighttime Charging Hours Available	4	
Miles from Nighttime Charging	519	
Max Fleet Range of Nighttime Charging	400	# vehicles x Range
Miles from Nighttime Charging	400	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	267	
Daytime Charging Hours Required	4.1	
Daytime Charging Hours per EVSE	2.1	
Miles from Daytime Charging	267	

SDAP on SDGE AL TOU W/ Sub-Meter and No Peak Demand

AL TOU, YEAR 1, GRCP2, 5 Summer Mos. - SDAP Fleet, 4 Buses, 60k Miles ea. W/ SUB-METER

Select Rate Tariff and Season

Rate Tariff	SDGE AL-TOU
Season	Annual Ave.

Demand Power, KW

Max Demand power	100
On-Peak demand power	

Energy usage per month, KWh and Percentage TOU

26%	on-peak	4,004
31%	mid-peak	4,774
43%	off-peak	6,622
100%		15,400

Fuel Cost per month, per mile

Tot kilowatt hours	15,400
kWh per Mile	0.77
Miles per Mo.	20,000
$$ Cost Per Mile	0.21

Daily Charging Fleet Hours

EVSE kW output	50
Charging capacity of Miles per hour	65
Daily Fleet Miles	667
Total Daily Hours Charging Fleet	10
Number of EVSE's on Meter	2
Daily Charging Hours per EVSE	5.1

Usage summary

daily energy used (kWh)	513
Max power (kW)	100
On-Peak demand power	0

Electricity Costs - Invoice

total bill	4,190	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.27	

Details

% demand charge	50%	$42.29
energy cost	1,942	
demand cost	2,109	

COMPARISON: "Diesel" Fuel Cost per month, per mile

Total Gallons	1,111
Miles per Gallon	18
Miles per Mo.	20,000
Retail Price per Gallon	$3.75
$$ Cost Per Mile	0.21

Daily Managed Charging Hours

Nighttime Charging Hours Available	4	
Miles from Nighttime Charging	519	
Max Fleet Range of Nighttime Charging	400	# vehicles x Range
Miles from Nighttime Charging	400	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	267	
Daytime Charging Hours Required	4.1	
Daytime Charging Hours per EVSE	2.1	
Miles from Daytime Charging	267	

SDAP on AP-TOU SDGE Small Business Rate W/ Demand Waiver

TOU AP, YEAR 1, GRCP2, 5 Summer Mos.

Fleet, 4 Buses, 60k Miles ea.

Select Rate Tariff and Season	
Rate Tariff	
Season	Annual Ave.

Demand Power, KW		Property Demand
Max Demand power	117	17
On-Peak demand power	117	

	Energy usage per month, KWh and Percentage TOU	
26%	on-peak	4,004
0%	mid-peak	0
74%	off-peak	11,396
100%		15,400

Fuel Cost per month, per mile	
Tot kilowatt hours	15,400
kWh per Mile	0.77
Miles per Mo.	20,000
$$ Cost Per Mile	0.21

Daily Charging Fleet Hours	
EVSE kW output	50
Charging capacity of Miles per hour	65
Daily Fleet Miles	667
Total Daily Hours Charging Fleet	10
Number of EVSE's on Meter	2
Daily Charging Hours per EVSE	5.1

Usage summary	
daily energy used (kWh)	513
Max power (kW)	117
On-Peak demand power	117

Electricity Costs - Invoice		
total bill	4,126	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.27	

Details		
% demand charge	0%	$0.00
energy cost	4,110	
demand cost	0	

COMPARISON: "Diesel" Fuel Cost per month, per mile	
Total Gallons	1,111
Miles per Gallon	18
Miles per Mo.	20,000
Retail Price per Gallon	$3.75
$$ Cost Per Mile	0.21

Daily Managed Charging Hours		
Nighttime Charging Hours Available	4	
Miles from Nighttime Charging	519	
Max Fleet Range of Nighttime Charging	400	# vehicles x Range
Miles from Nighttime Charging	400	Use G32 or G33 depending on Answer. Which is less?
Daytime Charging Miles Required	267	
Daytime Charging Hours Required	4.1	
Daytime Charging Hours per EVSE	2.1	
Miles from Daytime Charging	267	

SDAP on PGE Small CEV Rate

PGE E-CEV-Small, 6 Summer Mos. - SDAP Fleet, 4 Buses, 60k Miles ea.

Select Rate Tariff and Season	
Rate Tariff	
Season	Annual Ave.

Demand Power, KW		Demand Use
Max Demand power	10	100
On-Peak demand power		

	Energy usage per month, KWh and Percentage TOU	
26%	on-peak	4,004
31%	mid-peak	4,774
43%	off-peak	6,622
100%		15,400

Fuel Cost per month, per mile	
Tot kilowatt hours	15,400
kWh per Mile	0.77
Miles per Mo.	20,000
$$ Cost Per Mile	0.15

Daily Charging Fleet Hours	
EVSE kW output	50
Charging capacity of Miles per hour	65
Daily Fleet Miles	667
Total Daily Hours Charging Fleet	10
Number of EVSE's on Meter	2
Daily Charging Hours per EVSE	5.1

Usage summary	
daily energy used (kWh)	513
Max power (kW)	10
On-Peak demand power	0

Electricity Costs - Invoice		
total bill	2,980	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.19	

Details		
% demand charge	8%	$25.10
energy cost	2,729	
demand cost	251	

COMPARISON: "Diesel" Fuel Cost per month, per mile	
Total Gallons	1,111
Miles per Gallon	18
Miles per Mo.	20,000
Retail Price per Gallon	$3.75
$$ Cost Per Mile	0.21

Daily Managed Charging Hours		
Nighttime Charging Hours Available	4	
Miles from Nighttime Charging	519	
Max Fleet Range of Nighttime Charging	400	# vehicles x Range
Miles from Nighttime Charging	400	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	267	
Daytime Charging Hours Required	4.1	
Daytime Charging Hours per EVSE	2.1	
Miles from Daytime Charging	267	

SDAP on PGE Large CEV Rate

PGE E-CEV-Large, 6 Summer Mos. - SDAP Fleet, 4 Buses, 60k Miles ea.

Select Rate Tariff and Season

Rate Tariff	
Season	Annual Ave

Usage summary

daily energy used (kWh)	513
Max power (kW)	3
On-Peak demand power	0

Demand Power, KW

Max Demand power	3	101
On-Peak demand power		

Demand Use

Electricity Costs - invoice

total bill	3,221	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.21	

Energy usage per month, KWh and Percentage TOU

26%	on-peak	4,004
31%	mid-peak	4,774
43%	off-peak	6,622
100%		15,400

Details

% demand charge	17%	$183.86
energy cost	2,669	
demand cost	552	

Fuel Cost per month, per mile

Tot kilowatt hours	15,400
kWh per Mile	0.77
Miles per Mo.	20,000
$$ Cost Per Mile	0.16

COMPARISON: "Diesel" Fuel Cost per month, per mile

Total Gallons	1,111
Miles per Gallon	18
Miles per Mo.	20,000
Retail Price per Gallon	$3.75
$$ Cost Per Mile	0.21

Daily Charging Fleet Hours

EVSE kW output	50
Charging capacity of Miles per hour	65
Daily Fleet Miles	667
Total Daily Hours Charging Fleet	10
Number of EVSE's on Meter	2
Daily Charging Hours per EVSE	5.1

Daily Managed Charging Hours

Nighttime Charging Hours Available	4	
Miles from Nighttime Charging	519	
Max Fleet Range of Nighttime Charging	400	#vehicles x Range
Miles from Nighttime Charging	400	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	267	
Daytime Charging Hours Required	4.1	
Daytime Charging Hours per EVSE	2.1	
Miles from Daytime Charging	267	

SDAP on SCE EV-8 Rate

SCE TOU EV-8, 4 Summer Mos. - SDAP Fleet, 4 Buses, 60k Miles ea.

Select Rate Tariff and Season

Rate Tariff	
Season	Annual Ave.

Demand Power, KW

Max Demand power	100
On-Peak demand power	

Energy usage per month, KWh and Percentage TOU

26%	on-peak	4,004
31%	mid-peak	4,774
43%	off-peak	6,622
100%		15,400

Fuel Cost per month, per mile

Tot kilowatt hours	15,400
kWh per Mile	0.77
Miles per Mo.	20,000
$ Cost Per Mile	0.16

Daily Charging Fleet Hours

EVSE kW output	50
Charging capacity of Miles per hour	65
Daily Fleet Miles	667
Total Daily Hours Charging Fleet	10
Number of EVSE's on Meter	2
Daily Charging Hours per EVSE	5.1

Usage summary

daily energy used (kWh)	513
Max power (kW)	100
On-Peak demand power	0

Electricity Costs - Invoice

total bill	3,228	Includes Energy + Demand + Customer Mo. Charge
$ per kWh	0.21	

Details

% demand charge	0%	$0.00
energy cost	3,121	
demand cost	0	

COMPARISON: "Diesel" Fuel Cost per month, per mile

Total Gallons	1,111
Miles per Gallon	18
Miles per Mo.	20,000
Retail Price per Gallon	$3.75
$ Cost Per Mile	0.21

Daily Managed Charging Hours

Nighttime Charging Hours Available	4	
Miles from Nighttime Charging	519	
Max Fleet Range of Nighttime Charging	400	# vehicles x Range
Miles from Nighttime Charging	400	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	267	
Daytime Charging Hours Required	4.1	
Daytime Charging Hours per EVSE	2.1	
Miles from Daytime Charging	267	

Table 11:

ILLUSTRATION, CLASS-5 BUS FLEET kWh COST - SDGE, PGE & SCE RATES

SDGE AL TOU

AL TOU, YEAR 1, GRCP2, 5 Summer Mos. - Class 5, 10 Buses, 65k miles ea.

Select Rate Tariff and Season	
Rate Tariff	SDGE AL-TOU
Season	Annual Ave

Usage summary	
daily energy used (kWh)	1,986
Max power (kW)	330
On-Peak demand power	330

Demand Power, KW		Property Demand
Max Demand power	330	80
On-Peak demand power	330	

Electricity Costs - Invoice		
total bill	21,605	Includes Energy + Demand + Customer Mo Charge
$$ per kWh	0.36	

	Energy usage per month, KWh and Percentage TOU	
26%	on-peak	15,487
31%	mid-peak	18,465
43%	off-peak	25,613
100%		59,565

Details		
% demand charge	65%	$42.29
energy cost	7,510	
demand cost	13,955	

Fuel Cost per month, per mile	
Tot kilowatt hours	59,565
kWh per Mile	1.10
Miles per Mo.	54,150
$$ Cost Per Mile	0.40

COMPARISON: "Propane" Fuel Cost per month, per mile	
Total Gallons	5,415
Miles per Gallon	10
Miles per Mo.	54,150
Retail Price per Gallon	$2.50
$$ Cost Per Mile	0.25

Daily Charging Fleet Hours	
EVSE kW output	50
Charging capacity of Miles per hour	45
Daily Fleet Miles	1,805
Total Daily Hours Charging Fleet	40
Number of EVSE's on Meter	5
Daily Charging Hours per EVSE	7.9

Daily Managed Charging Hours		
Nighttime Charging Hours Available	5	
Miles from Nighttime Charging	1,136	
Max Fleet Range of Nighttime Charging	1,000	# vehicles x Range
Miles from Nighttime Charging	1,000	Use G32 or G33 depending on Answer. Which is less?
Daytime Charging Miles Required	805	
Daytime Charging Hours Required	17.7	
Daytime Charging Hours per EVSE	3.5	
Miles from Daytime Charging	805	

SDGE AL TOU W/ Sub-Meter and No Peak Demand

AL TOU, YEAR 1, GRCP2, 5 Summer Mos. - Class 5, 10 Buses, 65k miles ea. W/ SUB-METER

Select Rate Tariff and Season	
Rate Tariff	SDGE AL-TOU
Season	Annual Ave.

Demand Power, KW	
Max Demand power	250
On-Peak demand power	

	Energy usage per month, KWh and Percentage TOU	
26%	on-peak	15,487
31%	mid-peak	18,465
43%	off-peak	25,613
100%		59,565

Fuel Cost per month, per mile	
Tot kilowatt hours	59,565
kWh per Mile	1.10
Miles per kilo.	54,150
$$ Cost Per Mile	0.24

Daily Charging Fleet Hours	
EVSE kW output	50
Charging capacity of Miles per hour	45
Daily Fleet Miles	1,805
Total Daily Hours Charging Fleet	40
Number of EVSE's on Meter	5
Daily Charging Hours per EVSE	7.9

Usage summary	
daily energy used (kWh)	1,986
Max power (kW)	250
On-Peak demand power	0

Electricity Costs - Invoice		
total bill	12,923	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.22	

Details		
% demand charge	41%	$42.29
energy cost	7,510	
demand cost	5,273	

COMPARISON: "Propane" Fuel Cost per month, per mile	
Total Gallons	5,415
Miles per Gallon	10
Miles per Mo.	54,150
Retail Price per Gallon	$2.50
$$ Cost Per Mile	0.25

Daily Managed Charging Hours		
Nighttime Charging Hours Available	5	
Miles from Nighttime Charging	1,136	
Max Fleet Range of Nighttime Charging	1,000	# vehicles x Range
Miles from Nighttime Charging	1,000	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	805	
Daytime Charging Hours Required	17.7	
Daytime Charging Hours per EVSE	3.5	
Miles from Daytime Charging	805	

PGE Large CEV Rate

PGE E-CEV-Large, 6 Summer Mos. - Class 5, Bus Fleet, 10 Buses, 65k miles ea.

Select Rate Tariff and Season	
Rate Tariff	
Season	Annual Ave.

Usage summary	
daily energy used (kWh)	1,986
Max power (kW)	6
On-Peak demand power	0

Demand Power, KW		Demand Use
Max Demand power	6	250
On-Peak demand power		

Electricity Costs - Invoice		
total bill	11,406	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.19	

	Energy usage per month, KWh and Percentage TOU	
26%	on-peak	15,487
31%	mid-peak	18,465
43%	off-peak	25,613
100%		59,565

Details		
% demand charge	10%	$183.86
energy cost	10,303	
demand cost	1,103	

Fuel Cost per month, per mile	
Tot kilowatt hours	59,565
kWh per Mile	1.10
Miles per Mo.	54,150
$$ Cost Per Mile	0.21

COMPARISON: "Propane" Fuel Cost per month, per mile	
Total Gallons	5,415
Miles per Gallon	10
Miles per Mo.	54,150
Retail Price per Gallon	$2.50
$$ Cost Per Mile	0.25

Daily Charging Fleet Hours	
EVSE kW output	50
Charging capacity of Miles per hour	45
Daily Fleet Miles	1,805
Total Daily Hours Charging Fleet	40
Number of EVSE's on Meter	5
Daily Charging Hours per EVSE	7.9

Daily Managed Charging Hours		
Nighttime Charging Hours Available	5	
Miles from Nighttime Charging	1,136	
Max Fleet Range of Nighttime Charging	1,000	# vehicles x Range
Miles from Nighttime Charging	1,000	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	805	
Daytime Charging Hours Required	17.7	
Daytime Charging Hours per EVSE	3.5	
Miles from Daytime Charging	805	

SCE EV-8 Rate

SCE TOU EV-8, 4 Summer Mos. - Class 5, Bus Fleet, 10 Buses, 65k miles ea.

Select Rate Tariff and Season	
Rate Tariff	
Season	Annual Ave

Demand Power, KW	
Max Demand power	250
On-Peak demand power	

	Energy usage per month, KWh and Percentage TOU	
26%	on-peak	15,487
31%	mid-peak	18,465
43%	off-peak	25,613
100%		59,565

Fuel Cost per month, per mile	
Tot kilowatt hours	59,565
kWh per Mile	1.10
Miles per Mo.	54,150
$$ Cost Per Mile	0.22

Daily Charging Fleet Hours	
EVSE kW output	50
Charging capacity of Miles per hour	45
Daily Fleet Miles	1,805
Total Daily Hours Charging Fleet	40
Number of EVSE's on Meter	5
Daily Charging Hours per EVSE	7.9

Usage summary	
daily energy used (kWh)	1,986
Max power (kW)	250
On-Peak demand power	0

Electricity Costs - Invoice		
total bill	12,179	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.20	

Details		
% demand charge	0%	$0.00
energy cost	12,072	
demand cost	0	

COMPARISON: "Propane" Fuel Cost per month, per mile	
Total Gallons	5,415
Miles per Gallon	10
Miles per Mo.	54,150
Retail Price per Gallon	$2.50
$$ Cost Per Mile	0.25

Daily Managed Charging Hours		
Nighttime Charging Hours Available	5	
Miles from Nighttime Charging	1,136	
Max Fleet Range of Nighttime Charging	1,000	# vehicles x Range
Miles from Nighttime Charging	1,000	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	805	
Daytime Charging Hours Required	17.7	
Daytime Charging Hours per EVSE	3.5	
Miles from Daytime Charging	805	

Table 12:

ILLUSTRATION OF CLASS 6 TRUCK FLEET kWh COST - SDGE, PGE & SCE RATES

SDGE AL TOU

AL TOU, YEAR 1, GRCP2, 5 Summer Mos. - 50 Truck Fleet, 25k Annual Miles ea.

Select Rate Tariff and Season	
Rate Tariff	SDGE AL-TOU
Season	Annual Ave.

Usage summary	
daily energy used (kWh)	4,167
Max power (kW)	1,050
On-Peak demand power	100

Demand Power, KW		Property Demand
Max Demand power	1,050	100
On-Peak demand power	100	

Electricity Costs - Invoice		
total bill	38,862	Includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.31	

	Energy usage per month, KWh and Percentage TOU	
0%	on-peak	0
25%	m d-peak	31,250
75%	off-peak	93,749
100%		124,999

Details		
% demand charge	62%	$42.29
energy cost	14,458	
demand cost	24,264	

Fuel Cost per month, per mile	
Tot kilowatt hours	124,999
kWh per Mile	1.20
Miles per Mo.	104,166
$$ Cost Per Mile	0.37

COMPARISON: "CNG" Fuel Cost per month, per mile	
Total Gallons	11,574
Miles per Gallon	9
Miles per Mo.	104,166
Retail Price per Gallon	$2.50
$$ Cost Per Mile	0.28

Daily Charging Fleet Hours	
EVSE kW output	19
Charging capacity of Miles per hour	16
Daily Fleet Miles	3,472
Total Daily Hours Charging Fleet	219
Number of EVSE's on Meter	50
Daily Charging Hours per EVSE	4.4

Daily Managed Charging Hours		
Nighttime Charging Hours Available	8	
Miles from Nighttime Charging	6,333	
Max Fleet Range of Nighttime Charging	3,150	# vehicles x Range
Miles from Nighttime Charging	3,150	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	322	
Daytime Charging Hours Required	20.3	
Daytime Charging Hours per EVSE	0.4	
Miles from Daytime Charging	322	

SDGE AL TOU W/ Sub-Meter and No Peak Demand

AL TOU, YEAR 1, GRCP2, 5 Summer Mos. - 50 Truck Fleet, 25k Annual Miles ea. W/ SUB-METER

Select Rate Tariff and Season	
Rate Tariff	SDGE AL-TOU
Season	Annual Ave.

Demand Power, KW	
Max Demand power	950
On-Peak demand power	0

	Energy usage per month, KWh and Percentage TOU	
0%	on-peak	0
25%	mid-peak	31,250
75%	off-peak	93,749
100%		124,999

Fuel Cost per month, per mile	
Tot kilowatt hours	124,999
kWh per Mile	1.20
Miles per Mo.	104,166
$$ Cost Per Mile	0.33

Daily Charging Fleet Hours	
EVSE kW output	19
Charging capacity of Miles per hour	16
Daily Fleet Miles	3,472
Total Daily Hours Charging Fleet	219
Number of EVSE's on Meter	50
Daily Charging Hours per EVSE	4.4

Usage summary	
daily energy used (kWh)	4,167
Max power (kW)	950
On-Peak demand power	0

Electricity Costs - Invoice		
total bill	34,633	includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.28	

Details		
% demand charge	58%	$42.29
energy cost	14,458	
demand cost	20,036	

COMPARISON: "CNG" Fuel Cost per month, per mile	
Total Gallons	11,574
Miles per Gallon	9
Miles per Mo.	104,166
Retail Price per Gallon	$2.50
$$ Cost Per Mile	0.28

Daily Managed Charging Hours		
Nighttime Charging Hours Available	8	
Miles from Nighttime Charging	6,333	
Max Fleet Range of Nighttime Charging	3,150	# vehicles x Range
Miles from Nighttime Charging	3,150	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	322	
Daytime Charging Hours Required	20.3	
Daytime Charging Hours per EVSE	0.4	
Miles from Daytime Charging	322	

PGE Large CEV Rate

PGE E-CEV-Large, 6 Summer Mos. - 50 Truck Fleet, 25k Annual Miles ea.

Select Rate Tariff and Season	
Rate Tariff	
Season	Annual Ave.

Usage summary	
daily energy used (kWh)	4,167
Max power (kW)	20
On-Peak demand power	0

Demand Power, KW		Demand Use
Max Demand power	20	950
On-Peak demand power		

Electricity Costs - Invoice		
total bill	18,216	includes Energy + Demand + Customer Mo. Charge
$$ per kWh	0.15	

	Energy usage per month, KWh and Percentage TOU	
0%	on-peak	0
25%	mid-peak	31,250
75%	off-peak	93,749
100%		124,999

Details		
% demand charge	20%	$183.86
energy cost	14,539	
demand cost	3,677	

Fuel Cost per month, per mile	
Tot kilowatt hours	124,999
kWh per Mile	1.20
Miles per Mo.	104,166
$$ Cost Per Mile	0.17

COMPARISON: "CNG" Fuel Cost per month, per mile	
Total Gallons	11,574
Miles per Gallon	9
Miles per Mo.	104,166
Retail Price per Gallon	$2.50
$$ Cost Per Mile	0.28

Daily Charging Fleet Hours	
EVSE kW output	19
Charging capacity of Miles per hour	16
Daily Fleet Miles	3,472
Total Daily Hours Charging Fleet	219
Number of EVSE's on Meter	50
Daily Charging Hours per EVSE	4.4

Daily Managed Charging Hours		
Nighttime Charging Hours Available	8	
Miles from Nighttime Charging	6,333	
Max Fleet Range of Nighttime Charging	3,150	# vehicles x Range
Miles from Nighttime Charging	3,150	Use G32 or G33 depending on Answer. Which is less?
Daytime Charging Miles Required	322	
Daytime Charging Hours Required	20.3	
Daytime Charging Hours per EVSE	0.4	
Miles from Daytime Charging	322	

SCE EV-8 Rate

SCE TOU EV-8, 4 Summer Mos. - 50 Truck Fleet, 25k Annual Miles ea.

Select Rate Tariff and Season

Rate Tariff	
Season	Annual Ave.

Demand Power, KW

Max Demand power	950
On-Peak demand power	

Energy usage per month, KWh and Percentage TOU

0%	on-peak	0
25%	mid-peak	31,250
75%	off-peak	93,749
100%		124,999

Fuel Cost per month, per mile

Tot kilowatt hours	124,999
kWh per Mile	1.20
Miles per Mo.	104,166
$ Cost Per Mile	0.17

Daily Charging Fleet Hours

EVSE kW output	19
Charging capacity of Miles per hour	16
Daily Fleet Miles	3,472
Total Daily Hours Charging Fleet	219
Number of EVSE's on Meter	50
Daily Charging Hours per EVSE	4.4

Usage summary

daily energy used (kWh)	4,167
Max power (kW)	950
On-Peak demand power	0

Electricity Costs - Invoice

total bill	17,375	Includes Energy + Demand + Customer Mo. Charge
$ per kWh	0.14	

Details

% demand charge	0%	$0.00
energy cost	17,268	
demand cost	0	

COMPARISON: "CNG" Fuel Cost per month, per mile

Total Gallons	11,574
Miles per Gallon	9
Miles per Mo.	104,166
Retail Price per Gallon	$2.50
$ Cost Per Mile	0.28

Daily Managed Charging Hours

Nighttime Charging Hours Available	8	
Miles from Nighttime Charging	6,333	
Max Fleet Range of Nighttime Charging	3,150	# vehicles x Range
Miles from Nighttime Charging	3,150	Use G32 or G33 depending on Answer. Which is Less?
Daytime Charging Miles Required	322	
Daytime Charging Hours Required	20.3	
Daytime Charging Hours per EVSE	0.4	
Miles from Daytime Charging	322	

Table 13:

ILLUSTRATION OF CURRENT TARIFF RATE PRICE DETAILS: SDGE, PGE AND SCE

SDGE AL TOU Rate / kWh price details

Summer Winter Annual AL-TOU Rate (YEAR 1, GRCP)

AL TOU Rate

energy charge kWh	Summer	Winter	Annual
on-peak	0.16	0.14	0.15
mid-peak	0.14	0.12	0.13
off-peak	0.11	0.11	0.11

demand charge per kw			
Max demand	21.09	21.09	21.09
on-peak plus-up	27.62	16.61	21.20
mid-peak plus-up			
off-peak plus-up			

monthly fee (0-500kw=139.72, if >500kw demand=558.89)			
Meter charge	139.72	139.72	139.72

Summer rates per kWh — 5 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		SDGE Advertised kW Rate
on-peak	0.16220	0.137204	0.025	on-peak	0.14
off-peak	0.14065	0.11565	0.025	mid-peak	0.12
Super Off Peak	0.11363	0.08863	0.025	off-peak	0.09

Winter rates per kWh — 7 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		SDGE Advertised kW Rate
on-peak	0.13521	0.11621	0.019	on-peak	0.12
mid-peak	0.12270	0.1037	0.019	mid-peak	0.10
off-peak	0.10882	0.08982	0.019	off-peak	0.09

SDGE AP-TOU Rate / kWh price details (Small business price plan)

	Summer	Winter	Annual	TOU AP Rate (YEAR 1, GRCP)

energy charge kWh	Summer	Winter	Annual
on-peak	0.41	0.24	0.31
mid-peak	0.29	0.22	0.25
off-peak	0.29	0.22	0.25

demand charge per kw			
Max demand	0	0	0
on-peak plus-up	0	0	0.00
mid-peak plus-up			
off-peak plus-up			

monthly fee (0-20kw=16.00, if >500kw demand=558.89)			
Meter charge	16	16	16

Summer rates per kWh — 5 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		SDGE Advertised kW Rate
on-peak	0.41013	0.38513	0.025	on-peak	0.39
off-peak	0.28295	0.26795	0.015	mid-peak	0.27
Super Off Peak	0.28295	0.26795	0.015	off-peak	0.27

Winter rates per kWh — 7 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		SDGE Advertised kW Rate
on-peak	0.23553	0.21653	0.019	on-peak	0.22
mid-peak	0.22335	0.20435	0.019	mid-peak	0.20
off-peak	0.22335	0.20435	0.019	off-peak	0.20

PGE Small CEV Rate / kWh price details

	Summer	Winter	Annual	PGE CEV-S, Rate (YEAR 1)

energy charge kWh	Summer	Winter	Annual
on-peak	0.33	0.32	0.32
mid-peak	0.14	0.14	0.14
off-peak	0.12	0.11	0.11

demand charge per kw				
Max demand	25.1	25.1	25.1	
on-peak plus-up	0	0	0.00	25.10
mid-peak plus-up				
off-peak plus-up				

monthly fee (0-100kw=0.00, if >500kw demand=558.89)			
Meter charge	0	0	0

Summer rates per kWh — 6 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		Advertised kW Rate
on-peak	0.32797	0.30297	0.025	on-peak	0.30
off-peak	0.14300	0.118	0.025	mid-peak	0.12
Super Off Peak	0.11766	0.09266	0.025	off-peak	0.09

Winter rates per kWh — 6 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		Advertised kW Rate
on-peak	0.32197	0.30297	0.019	on-peak	0.30
mid-peak	0.13700	0.118	0.019	mid-peak	0.12
off-peak	0.11166	0.09266	0.019	off-peak	0.09

PGE Large CEV Rate / kWh price details

Summer	Winter	Annual	PGE CEV-L Rate (YEAR 1)

energy charge kWh	Summer	Winter	Annual
on-peak	0.33	0.32	0.32
mid-peak	0.14	0.13	0.13
off-peak	0.11	0.11	0.11

demand charge per kw				
Max demand	183.86	183.86	183.86	
on-peak plus-up	0	0	0.00	183.86
mid-peak plus-up				
off-peak plus-up				

monthly fee (0-500kw=0.00, if >500kw demand=558.89)			
Meter charge	0	0	0

Summer rates per kWh — 6 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		Advertised kW Rate
on-peak	0.32767	0.30267	0.025	on-peak	0.30
off-peak	0.13579	0.11079	0.025	mid-peak	0.11
Super Off Peak	0.11320	0.0882	0.025	off-peak	0.09

Winter rates per kWh — 6 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		Advertised kW Rate
on-peak	0.32167	0.30267	0.019	on-peak	0.30
mid-peak	0.12979	0.11079	0.019	mid-peak	0.11
off-peak	0.10720	0.0882	0.019	off-peak	0.09

SCE EV-8 Rate/ kWh price details

Summer	Winter	Annual	SCE Rate (YEAR 1)

energy charge kWh	Summer	Winter	Annual
on-peak	0.44	0.30	0.35
mid-peak	0.30	0.15	0.20
off-peak	0.15	0.10	0.12

demand charge per kw				
Max demand	0	0	0	
on-peak plus-up	0	0	0.00	0.00
mid-peak plus-up				
off-peak plus-up				

monthly fee (0-500kw=106.75, if >500kw demand=558.89)			
Meter charge	106.75	106.75	106.75

Summer rates per kWh — 4 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		Advertised kW Rate
on-peak	0.44316	0.41816	0.025	on-peak	0.42
off-peak	0.30218	0.27718	0.025	mid-peak	0.28
Super Off Peak	0.15050	0.1255	0.025	off-peak	0.13

Winter rates per kWh — 8 Months

	Total	Energy Usuage	Bond Charge, State Tax & Fees on Electric Charges = 7% average		Advertised kW Rate
on-peak	0.29701	0.27801	0.019	on-peak	0.28
mid-peak	0.15106	0.13206	0.019	mid-peak	0.13
off-peak	0.10033	0.08133	0.019	off-peak	0.08

Table 14:
2018 SDGE AL TOU Seasons and Hours

- **Summer Season, 5 Months, June – Oct = Yellow Highlights**

- **Winter Season, 7 Months, Nov – May = Green Highlights**

- **Week-End Days = Blue Highlights**
  - **Summer = 44 Weekend Days**
  - **Winter = 60 Weekend Days**

- **Holiday Days = Pink Highlights = 7 Days**
  - **Summer = 2 Holiday Days**
  - **Winter = 5 Holiday Days**

- **The number of Time-of-Use-Hours in the following "Window Detail" charts illustrates "changes" can increase the average kWh price. The component of an increase in the number of higher kWh hours --- impacts the rate, resulting in an overall increase, this is regardless of a kWh price change.**

- **The following will demonstrate the increase of 32%. This is determined by a higher number of kWh of both Peak and Mid Peak hours and a lower number of Super Off-Peak hours. See gray highlighted field in last chart.**
  - **Peak Hours increased = 547 hours (red cells)**
  - **Mid-Peak Hours increase = 861 hours (mustard cells)**
  - **Super Off-Peak Hours decrease = 1,408 (blue cells)**
  - **TOTAL number of hours changed = 2,816**

SDGE 2018 AL TOU - Seasonal Period details

2018 Calendar Year - Days in each Season (CURRENT Season: 5 Summer / 7 Winter)

Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Week-Ends Summer	Week-Ends Winter	Holidays
1	1	1	1	1	1	1	1	1	1	1	1	2	2	1
2	2	2	2	2	2	2	2	2	2	2	2	2	1	
3	3	3	3	3	3	3	3	3	3	3	3	1	3	1
4	4	4	4	4	4	4	4	4	4	4	4	1	3	1
5	5	5	5	5	5	5	5	5	5	5	5	1	1	
6	6	6	6	6	6	6	6	6	6	6	6	1	2	
7	7	7	7	7	7	7	7	7	7	7	7	2	2	
8	8	8	8	8	8	8	8	8	8	8	8	2	2	
9	9	9	9	9	9	9	9	9	9	9	9	2	1	
10	10	10	10	10	10	10	10	10	10	10	10	1	3	
11	11	11	11	11	11	11	11	11	11	11	11	1	3	
12	12	12	12	12	12	12	12	12	12	12	12	1	1	
13	13	13	13	13	13	13	13	13	13	13	13	1	2	
14	14	14	14	14	14	14	14	14	14	14	14	2	2	
15	15	15	15	15	15	15	15	15	15	15	15	2	2	
16	16	16	16	16	16	16	16	16	16	16	16	2	1	
17	17	17	17	17	17	17	17	17	17	17	17	1	3	
18	18	18	18	18	18	18	18	18	18	18	18	1	3	
19	19	19	19	19	19	19	19	19	19	19	19	1	1	1
20	20	20	20	20	20	20	20	20	20	20	20	2	2	
21	21	21	21	21	21	21	21	21	21	21	21	2	2	
22	22	22	22	22	22	22	22	22	22	22	22	1	2	1
23	23	23	23	23	23	23	23	23	23	23	23	2	1	
24	24	24	24	24	24	24	24	24	24	24	24	1	3	
25	25	25	25	25	25	25	25	25	25	25	25	1	3	1
26	26	26	26	26	26	26	26	26	26	26	26	1	1	
27	27	27	27	27	27	27	27	27	27	27	27	1	2	
28	28	28	28	28	28	28	28	28	28	28	28	2	2	1
29		29	29	29	29	29	29	29	29	29	29	2	2	
30		30	30	30	30	30	30	30	30	30	30	2	1	
31		31		31		31	31		31	31		0	1	
Total:	*28*	*31*	*30*	*31*	*30*	*31*	*31*	*30*	*31*	*31*	*30*	*44*	*60*	*7*

7 Winter Month: 212 Days
Weekdays, less Holiday 207

5 Summer Mon 153 Days
Weekdays, less Holiday 151

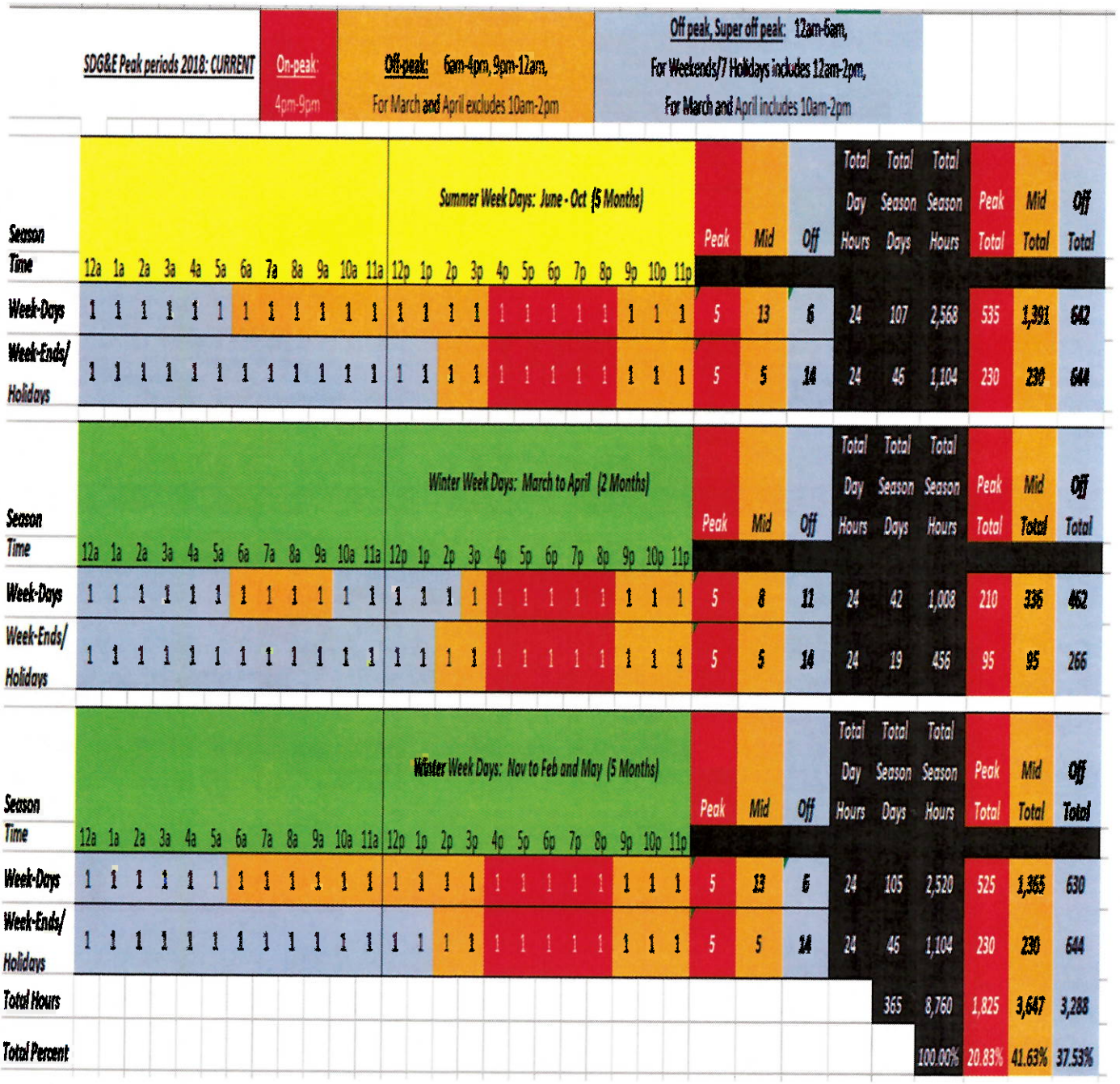
Weekends = 104

Holidays = 2
Holidays = 5

Holiday Days:

Jan 1 (New Year's), Feb 19 (Presidents' Day), May 28 (Memorial Day), July 4 (Independence Day), Sept 3 (Labor Day), Nov 22 (Thanksgiving), Dec 25 (Christmas)

SDGE 2018 AL TOU kWh - Hourly Window details



SDG&E Peak periods 2018: CURRENT	On-peak: 4pm-9pm	Off-peak: 6am-4pm, 9pm-12am, For March and April excludes 10am-2pm	Off peak, Super off peak: 12am-6am, For Weekends/7 Holidays includes 12am-2pm, For March and April includes 10am-2pm

Summer Week Days: June - Oct (5 Months)																								Peak	Mid	Off	Total Day Hours	Total Season Days	Total Season Hours	Peak Total	Mid Total	Off Total
Season																																
Time	12a	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p								
Week-Days	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	13	6	24	107	2,568	535	1,391	642
Week-Ends/ Holidays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	14	24	46	1,104	230	230	644

Winter Week Days: March to April (2 Months)																								Peak	Mid	Off	Total Day Hours	Total Season Days	Total Season Hours	Peak Total	Mid Total	Off Total
Season																																
Time	12a	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p								
Week-Days	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	8	11	24	42	1,008	210	336	462
Week-Ends/ Holidays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	14	24	19	456	95	95	266

Winter Week Days: Nov to Feb and May (5 Months)																								Peak	Mid	Off	Total Day Hours	Total Season Days	Total Season Hours	Peak Total	Mid Total	Off Total
Season																																
Time	12a	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p								
Week-Days	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	13	6	24	105	2,520	525	1,365	630
Week-Ends/ Holidays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	14	24	46	1,104	230	230	644
Total Hours																													365	8,760	1,825	3,647	3,288
Total Percent																														100.00%	20.83%	41.63%	37.53%

SDGE 2016 - Hourly Window details

- **Bottom of this chart depicts the "comparison", see gray highlighted field.**

SDG&E Peak periods 2016: OLD	On-peak: Summer: 11am-6pm, Winter: 5pm-8pm	Off-peak: Summer: 6am-11am, 6pm-10pm, Winter: 6am-5pm, 8pm-10pm	Off peak, Super off peak: Summer & Winter: 10pm-6am nights, For Weekends/7 Holidays all hours 12am-11:59pm

Season	Summer Week Days: May - Oct (6 Months)																							Peak	Mid	Off	Total Day Hours	Total Season Days	Total Season Hours	Peak Total	Mid Total	Off Total
Time	12a	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p									
Week-Days	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	9	8	24	129	3,096	903	1,161	1,032
Week-Ends/ Holidays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	24	24	55	1,320	0	0	1,320

Season	Winter Week Days: November to April (6 Months)																							Peak	Mid	Off	Total Day Hours	Total Season Days	Total Season Hours	Peak Total	Mid Total	Off Total
Time	12a	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p									
Week-Days	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	13	8	24	125	3,000	375	1,625	1,000
Week-Ends/ Holidays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	24	24	56	1,344	0	0	1,344
Total Hours																													365	8,760	1,278	2,786	4,696
Total Percent																														100.00%	14.59%	31.80%	53.61%

Total Change of Hours results when Current Hours are compared to Old TOU:			547 / 861 / -1,408
Total number of Higher Hours increased: Peak and Mid Peak			1,408
Total Number of Hours Changed:			2,816
Total Percent impact of Change in Hours (increase of higher kWh hours)			32%

Table 15:

SDGE ADVICE LETTER on EV Charging for Small Business Fleets

-

- **Charging accounts for over 20 kW; thereby Small Business Fleets will be exempted for 3 years from the expensive barrier of Demand Fees when utilizing more than 20 kW.**

September 22, 2017

ADVICE LETTER 3115-E
(U902-E)
PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

SUBJECT: **MODIFICATION TO ELECTRIC SCHEDULE TOU-A TO IMPLEMENT A THREE-YEAR TEMPORARY EXEMPTION FROM LOAD LIMITATIONS FOR SMALL COMMERCIAL ACCOUNTS WITH ELECTRIC VEHICLE FLEET CHARGING**

San Diego Gas & Electric Company (SDG&E) hereby submits for approval by the California Public Utilities Commission (Commission) modifications to its electric tariffs, as shown in Attachment A.

PURPOSE

In compliance with Ordering Paragraph 37 of Commission Decision (D.) 17-08-030, this filing modifies the applicability of SDG&E Schedule TOU-A, General Service – Time of Use, to temporarily exempt small commercial accounts with electric vehicle (EV) fleet charging from the load limitations set forth in the tariff. This exemption will remain in place for three years beginning with the billing cycle one month from the effective date of D.17-08-030, August 24, 2017.

DISCUSSION

On April 13, 2015, SDG&E filed Application (A).15-04-012 with the Commission to establish marginal costs, allocate revenues, and electric rate design for service provided to its customers for the period 2016 – 2018 (2016 GRC Phase 2). The original application was amended and refiled on February 9, 2016. On August 24, 2017, the Commission issued D.17-08-030 adopting SDG&E's GRC Phase 2 application and requiring, among other things, for SDG&E to address small commercial EV fleet charging. The decision determined that because transportation electrification is a critical aspect of meeting California's climate goals, temporary relief from demand charges is needed and, without some relief, it will be very challenging for small commercial customers to make a business case for electrification.[1] Thus, the decision directs SDG&E to offer a three-year temporary exemption on the small commercial load limit to current small commercial customers with electric fleet charging.

Based on the guidance provided in D.17-08-030[2] and pursuant to OP 37 SDG&E has modified the applicability section of Schedule TOU-A, such that current small commercial customers with EV fleet charging that comprises at least 50 percent of the customer's maximum load may

[1] D.17-08-030, pp. 60-62
[2] Id. Also, Conclusion of Law 25

Table 16:

SDGE ADVICE LETTER on GSP Modification requesting more DCFC

- **DCFC utilization is required to effectively support Airport EV Shuttles in the GSP SDGE PR Pilots, thereby a modification was requested for more DCFC and no Level-2 Charging for the Airport Shuttle use case.**

January 14, 2019

ADVICE LETTER 3332-E
(U 902-E)

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

SUBJECT: Modification to the Green Shuttle Project in Compliance with Decision 18-01-024

PURPOSE

Decision (D.) 18-01-024 approved San Diego Gas & Electric Company's (SDG&E's) Green Shuttle Priority Review Project ("Green Shuttle" or "the Project"). SDG&E has faced implementation challenges with this project, and as such it is requesting a modification to effectively implement the Project and transition customers to electric shuttles.

With respect to implementation, D.18-01-024 ordered the following:

> "[t]he utilities should finalize implementation details for the approved projects based on feedback from its PAC. If a utility identifies any modifications necessary to effectively implement the programs approved in this decision, it should propose those modifications via a Tier 2 Advice Letter after reviewing the changes with their PAC."[1]

In accordance with D.18-01-024, SDG&E discussed the modification to the Project at a PAC meeting on September 25, 2018. There were no protests or objections from the PAC members to the proposed modification. SDG&E hereby submits the same modification proposal presented at that PAC meeting in this Advice Letter. SDG&E believes that the proposed modification to the Project, described below, will support an effective implementation of the Project, further California's greenhouse gas reduction goals, demonstrate the viability of Electric Vehicles (EVs), and accelerate EV adoption.

PROPOSED MODIFICATION TO SDG&E's GREEN SHUTTLE PROJECT

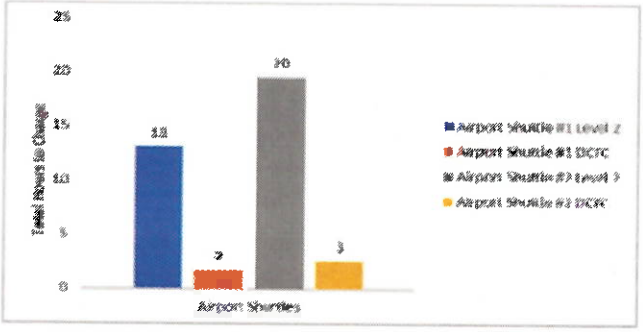
SDG&E proposes to modify an aspect of the Green Shuttle Project as approved in D.18-01-04. The modification will help SDG&E better serve site host needs, which will enable the EV market. SDG&E proposes to modify the program to increase the number of Electric Vehicle Supply Equipment (EVSE) it can provide for site hosts in order to better meet the site host's business needs. The table below outlines the authorized EVSE for each site and SDG&E's modification request, which is based on customer input.

[1] D.18-01-040 page 94.

Modification	Decision	Detailed Modification Request
Site Design	SDG&E is authorized to install two Level 2 EVSEs and up to one DCFC at up to five (5) sites.	Airport Shuttle Sites: two (2) DCFCs for each site for a total of six (6) DCFCs
		Workplace: total of six (6) Level 2 EVSEs at one site

The original site design proposed by SDG&E in A.17-01-020 was designed to support a variety of EV types, including Class 1, 2, and 3 vehicles, by installing two Level 2 (L2) chargers and up to one DC Fast Charging (DCFC) at each site[2]. The decision modified the types of vehicles to focus on, but not the charging infrastructure or site design to support these vehicles. SDG&E is asking to modify the number and type of EVSEs per site to meet the needs of the site hosts operating electric shuttles, which have different charging requirements and duty cycles than Class 1 light-duty vehicles. To demonstrate the need for this modification, SDG&E will provide descriptions of two use cases represented by SDG&E's current site hosts: airport shuttles and workplace shuttles.

Airport shuttles, which include both offsite airport parking shuttles and a shuttle at the San Diego International Airport (SDIA), have predictable duty cycles with very little down time for charging. Even though these shuttles can accommodate both L2 and DCFC EVSE, the size of the battery and their duty cycles mean that a shuttle charged with a L2 EVSE will not receive a sufficient charge in its limited down time. To illustrate, one shuttle has an onboard AC charger that charges at a rate of 6.6kW. The DC fast charge accepts a connection up to 50kW. Using a L2 EVSE at a power level of 6.6kW for a shuttle that has a 129kWh battery would take up to 13 hours of charging time to get a full charge. The chart below illustrates the dramatic differences between a L2 and DCFC when it comes to charging speeds.[3]



Airport shuttle operations are nearly 24 hours a day, with the longest downtime being from 1:00 – 4:00am. Due to this limited time frame, the only way these shuttle operators can keep their

[2] US Department of Energy, Vehicle Weight Classes and Categories, https://www.afdc.energy.gov/data/10380

[3] Airport Shuttle #1 is based on a shuttle with a battery size of 86kWh and Airport Shuttle #2 is based on a shuttle with a battery size of 129kWh.

shuttles on the road and provide flexibility to avoid charging during peak times would be to charge with DCFCs. One of SDG&E's goals for this project is to demonstrate the viability of managed charging. Without DCFCs for their airport shuttles, shuttle operators will not be able to fully charge their vehicles during off-peak hours and the shuttles' limited down time, resulting in a poor user experience which could discourage them from adopting electric shuttles. Additionally, it might not make business sense for these customers to convert to EVs if the ability to charge in a certain, limited, timeframe is not possible.

The second use case is a workplace shuttle for a San Diego based company ("Workplace Shuttle"). The Workplace Shuttle customer has 6 shuttles operating daily on fixed routes. These shuttles are different from the airport shuttles mentioned above because they have a longer downtime period and the shuttles do not accommodate DCFCs. The Workplace Shuttles are used primarily during business hours (6:30am-5:00pm), which allow for longer charging times in the off-peak periods. However, the site host seeks six L2 chargers, or a 1x1 ratio of charger to shuttle so that the workplace can charge their vehicles during super off-peak hours. Without a dedicated charger for each shuttle the Workplace Site customer would need to charge during on-peak hours and through the night (starting at 5:00 PM – 7:00 AM) to get a full charge—this would cut into their driving time. Therefore, the workplace site requires a 1x1 charger to shuttle ratio to meet its business needs and managed charging goals.

As ordered in the Decision, SDG&E is working with project participants to design sites that best meet the shuttle companies' needs.[4] The modification, requested herein, is to offer customers up to two DCFCs at the airport shuttle sites and six high powered L2s at the Workplace Shuttle site. The previously approved budget can accommodate the proposed modification, which is designed to meet the needs of the program participants and will facilitate an increase adoption and utilization of EVs in their fleet thereby reducing GHG emissions. Additionally, approving the modification will allow the program participants to operate in a way that provides a better customer experience, thereby demonstrating the viability of EVs in this sector.

EFFECTIVE DATE

This submittal is subject to Energy Division disposition and is classified as Tier 2 (effective after staff approval) pursuant to GO 96-B and D.18-01-024. SDG&E respectfully requests that this advice letter become effective on February 13, 2019, 30 days from the date of this filing.

PROTEST

Anyone may protest this Advice Letter to the California Public Utilities Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. The protest must be made in writing and must be received no later than February 4, 2019, which is more than 20 days from the date this Advice Letter was filed with the Commission. There is no restriction on who may submit a protest. The address for mailing or delivering a protest to the Commission is:

CPUC Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102

[4] D.18-01-040, Ordering Paragraph 8

Table 17:

DCFC CHARGING RESULTS

(increased capacity of kWh range, see columns D & H)

- **Efficiency of EV vehicle impacts the results on Cost per Mile and Range Maximum of EV vehicle, see column F & G.**
- **DCFC enables Managed Charging.**
- **Charging Connector, see column E. Note of these 5 illustrated, there are "5" different Connectors.**

	A	B	C	D	E	F	G	H	I	J
3		OEM	kWh Battery Capacity, for Range potential	DCFC kW Charging Level, Speed Acceptance	Charging Connection / Receptacle Plug	Average KWh per Mile, for efficiency which impacts cost per mile & results in Range Maximum.	Range	Average Miles per one hour of Charging	SDGE AL TOU kWh Average Rate (out the door kWh rates illustrated).	Cost Per Mile Illustration.
4	1	Lightning Systems Passenger Shuttle	80	50	SAE CCS, 50 kW, DCFC	0.66	121.21	33	0.46	0.30
5	2	Phoenix MotorCars E450 Shuttle	105	50	Chadmo, 50 KW, DCFC	1.1	95.45	55	0.36	0.40
6	3	Green Power EV Star Shuttle	100	50	SAE CCS, 50 KW, DCFC	0.77	129.87	38.5	0.46	0.35
7	4	BYD Motors -C6 Shuttle	135	0	BYD EVSE, Level-3 AC, 80 kW (7-pin Inlet plug Connector BYD proprietary for EV).	1.1	122.73	0	0.36	0.40
8	5	Motiv Power Systems E-450 Shuttle	106	0	Meltric Plug, Level-2 AC, 19 kW (208V, 80amp 3-phase Proprietary for EV).	1.2	88.33	0	0.36	0.43
9		DCFC CHARGING ILLUSTRATION - RATES AND SHUTTLE COST PER MILE ILLUSTRATED								

AC CHARGING RESULTS

(reduced capacity of kWh range, see columns D & H)

- **Efficiency of EV vehicle impacts the results on Cost per Mile and Range Maximum of EV vehicle, see column F & G.**
- **Charging Connector, see column E. Note of these 5 illustrated, there are "5" different Connectors.**

	A	B	C	D	E	F	G	H	I	J
11		OEM	kWh Battery Capacity, for Range potential	AC kW Charging Level, Speed Acceptance	Charging Connection / Receptacle Plug	Average KWh per Mile, for efficiency which impacts cost per mile & results in Range Maximum.	Range	Average Miles per one hour of Charging	SDGE AL TOU kWh Average Rate (out the door kWh rates illustrated).	Cost Per Mile illustration.
12	1	Lightning Systems Passenger Shuttle	80	6.6	J1772 AC at 6.6 kW	0.66	121.21	4.36	0.46	0.30
13	2	Phoenix MotorCars E450 Shuttle	105	13	J1772 AC at 13kW	1.1	95.45	14.3	0.36	0.40
14	3	Green Power EV Star Shuttle	100	10	J1772 AC at 10 kW	0.77	129.87	7.7	0.46	0.35
15	4	BYD Motors -C6 Shuttle	135	80	BYD EVSE, Level-3 AC, 80 kW (7-pin Inlet plug Connector BYD proprietary for EV).	1.1	122.73	88	0.36	0.40
16	5	Motiv Power Systems E-450 Shuttle	106	19	Meltric Plug, Level-2 AC, 19 kW (208V, 80amp 3-phase Proprietary for EV).	1.2	88.33	22.8	0.36	0.43
17		AC CHARGING ILLUSTRATION -- RATES AND SHUTTLE COST PER MILE ILLUSTRATED								

Table 18:
LOW CARBON INTENSITY VALUES BY HOURLY WINDOW

- **Create Green Tariff Rates to support Renewables and Smart Charging**
- **https://www.arb.ca.gov/fuels/lcfs/ca-greet/ca-greet.htm**

Smart Charging or Smart Electrolysis

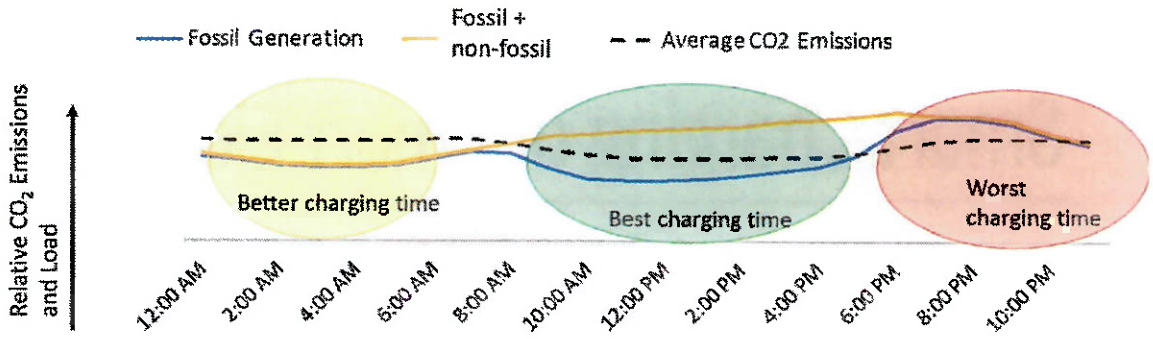
CI Table for 2019 (gCO_2e/MJ)

Hourly Window	Q1 CI	Q2 CI	Q3 CI	Q4 CI
1	87.06	86.91	86.87	90.25
2	87.06	85.91	86.80	88.55
3	87.06	87.20	86.77	87.80
4	87.06	87.03	86.72	87.91
5	87.63	91.45	87.17	90.98
6	94.46	105.76	95.77	105.08
7	110.98	94.28	92.09	122.40
8	105.79	2.48	88.39	109.22
9	86.35	1.96	89.39	94.27
10	58.66	2.92	91.09	90.26
11	57.80	50.25	93.23	89.84
12	56.52	53.31	97.87	91.17
13	55.97	55.12	104.23	92.03
14	56.50	58.67	110.13	93.36
15	56.53	63.57	115.76	95.25
16	57.80	26.45	123.91	104.30
17	92.45	48.57	131.52	136.96
18	125.85	120.79	146.52	156.40
19	144.90	151.38	155.70	153.00
20	127.62	150.96	140.27	141.37
21	114.50	122.63	118.35	130.78
22	95.55	93.62	100.45	115.22
23	88.25	88.12	91.21	102.03
24	87.07	87.12	88.57	93.34

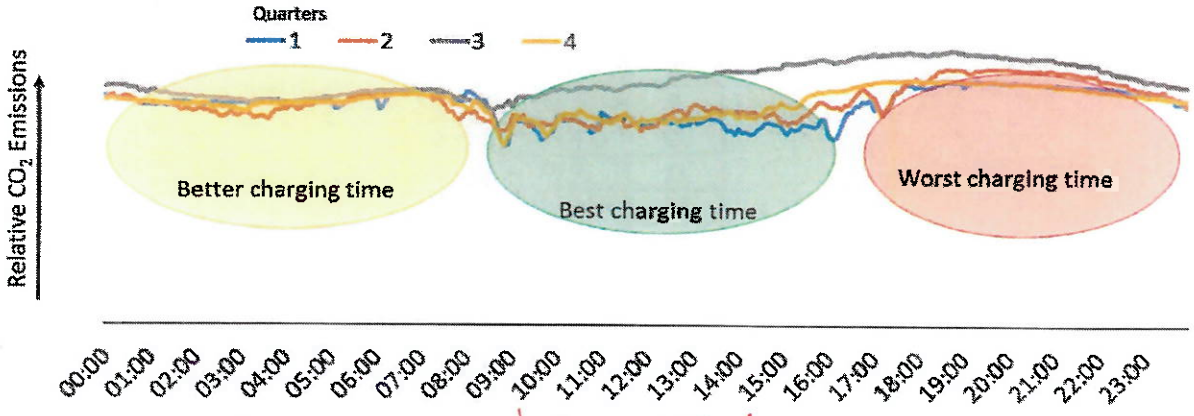
Smart Charging (1 of 2)

Goals:

- Recognize the potential benefits of flexible EV load for integration of intermittent renewable supply



Smart Charging (2 of 2)



Emission Savings

10am – 3pm

Charging Window	Quarter 1 emission savings (gCO_2e/MJ)	Quarter 2 emission savings (gCO_2e/MJ)	Quarter 3 emission savings (gCO_2e/MJ)	Quarter 4 emission savings (gCO_2e/MJ)
9:00 AM – 3:00 PM	26	45.4	NA	11.4
Midnight – 9:00 AM	NA	NA	7.5	NA

CALIFORNIA POWER MIX - Electric Generation 2016 to 2017

https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

	2016 CEC[4]		2017 CEC[5]	
	% Mix	GWh	% Mix	GWh
Residual oil	0.15%	431	0.15%	442
Natural Gas	50.87%	147,817	42.93%	125,332
Coal	4.13%	12,006	4.13%	12,075
Nuclear	9.18%	26,670	9.08%	26,519
Biomass	2.25%	6,553	2.35%	6,874
Hydro	11.87%	34,477	17.41%	50,854
Geothermal	4.38%	12,717	4.35%	12,705
Wind	9.06%	26,321	9.40%	27,442
Solar	8.11%	23,574	10.20%	29,796
Total	100%	290,567	100%	292,039
CI (gCO2e/MJ)	93.75		81.49	

Table 19:

INTERNATIONAL CONNECTOR TYPE STANDARDS ARE NEEDED FOR COMMERCIAL TE BUS AND TRUCKS

- ***State leaders could set infrastructure standards and efficiency metrics for key areas as soon as possible.***

Industry participants stressed the need for government standard-setting—in consultation with industry—in a handful of areas critical to the promotion of efficient technologies: electric vehicle and equipment plug sizes; electric vehicle and equipment charging speeds; and smart and autonomous vehicle communication protocols.

Vehicle and equipment electrification and autonomous vehicle technologies topped nearly every participant's list of necessary technological developments, as well as industry participants' lists of developments already underway. Each of these technologies will necessarily interact with centralized infrastructure or otherwise require cross-industry compatibility in order to be fully functional.

For example, electrified trucks will be produced by dozens of manufacturers, but will need to be able to charge at shared stations along public highways. But charging station technology is also being developed by multiple companies that may use different physical plug formats (think of the different household wall outlet shapes in the U.S. and Europe), and different charging speeds (such as the Level 1, Level 2 and DC fast charging formats currently available for passenger electric vehicles) that may not be compatible with every vehicle. While market forces could eventually determine one dominant technology to which all manufacturers adapt, such as the now-ubiquitous USB port present in all personal computers,[89] it would save both time and money if state leaders, together with industry representatives, could select formats around which all manufacturers could focus their development efforts.

"We need to set standards for charging infrastructure such as connectors and voltage. Standards will speed innovation as well as ensure interoperability for freight trucks that visit a variety of facilities."

- Elizabeth Fretheim, Walmart

Case Study in Standardization:
Electric Vehicle Charging

Currently, three main options exist for passenger electric vehicle charging. Level 1 charging uses 120-volt outlets found in most homes and can add about five miles of range per hour. Level 2 charging involves 240-volt current that can add about 25 miles of range per hour but usually requires new wiring within a home. DC fast-charging can charge a vehicle up to 90 miles of range in 30 minutes and requires installation of dedicated charging infrastructure. Since each technology has its own charging protocols and outlet designs, some vehicle models can only charge where the right charging stations are located. While electric trucks will likely rely on their own, separate charging infrastructure, a similar situation would severely limit their range and economic viability.

Table 20:
STANDARD CONNECTORS

SAE High Power Charging Documents

Manual DC connection at high power- SAE J-1772 CCS

An existing document that will make provisions for the higher power (1000V, 350A, 350 kW) needs of the buses

Manual 3 phase AC at high power- SAE J-3068

Recently published document that is getting good acceptance

Wireless connection at high power- SAE J-2954-2

A developing document that will make provisions for the higher power needs of the buses

Automatic Charging at high power- SAE J-3105

Document planned to be published in early 2019

EPRI

Example – Power Table

SAE INTERNATIONAL

Continuous (A)	277VAC 1Φ (kW)	208VAC 3Φ (kW)	480VAC 3Φ (kW)	Breaker (A)* [NEC]
16	4.4	5.8	13.3	20
20	5.5	7.2	16.6	25
32	8.9	11.5	26.6	40
63	17.5	22.7	52.4	80
80	22.2	28.8	66.5	100
100	27.7	36.0	83.1	125
120	33.2	43.2	99.8	150
140	38.7	50.4	116.4	175
160	44.3	57.6	133.0	200

*NEC 240.6 Fuses and Fixed-Trip Circuit Breakers. The standard ampere ratings for fuses and inverse time circuit breakers shall be considered: 15, 20, 25, 30, 35, 40, 45, 50, 70, 80, 90, 100, 110, 125, 150, 175, 200, ...

*NEC 625, EV loads are considered continuous loads and the breakers rated at 125%. Breakers in other counties are differently rated.

Table 21: Ford Transit Van Class 3 Shuttle Quote 11-2017

- **Purchase price $50,280**
- **See GVWR – page 2 of quote.**

Fritts Ford
8000 Auto Drive, Riverside, California, 925044193
Office: 951-687-2121

2019 Transit-350, High Roof HD Ext. Passenger Van
High Roof HD Ext. Passenger Van 147.6" WB DRW XLT(U4X)
Price Level: 920

Selected Equipment & Specs

Dimensions

- Exterior length: 266.1"
- Exterior height: 107.7"
- Front track: 68.5"
- Turning radius: 23.9'
- Rear legroom: 33.7"
- Front headroom: 56.6"
- 3rd row headroom: 65.2"
- Rear hiproom: 69.6"
- Front shoulder room: 67.9"
- 3rd row shoulder room: 67.0"
- Maximum cargo volume: 515.0cu.ft.
- Exterior width: 81.3"
- Wheelbase: 147.6"
- Rear track: 65.7"
- Front legroom: 39.7"
- 3rd row legroom: 35.6"
- Rear headroom: 65.2"
- Front hiproom: 67.5"
- 3rd row hiproom: 67.3"
- Rear shoulder room: 71.4"
- Cargo volume: 112.0cu.ft.

Powertrain

- 275hp 3.7L DOHC 24 valve V-6 engine with Ti-VCT variable valve control, SMPI
- ULEV II
- Rear-wheel drive
- Fuel Economy Highway: N/A
- Recommended fuel : regular unleaded
- 6 speed automatic transmission with overdrive
- Fuel Economy City: N/A
- Capless fuel filler

Suspension/Handling

- Front independent strut suspension with anti-roll bar, HD shocks
- Hydraulic power-assist rack-pinion Steering
- LT195/75SR16 CBSW AS front and rear tires
- Rear rigid axle leaf spring suspension with HD shocks
- Front and rear 16 x 7 silver forged aluminum wheels
- Dual rear wheels

Body Exterior

- 3 doors
- Driver and passenger power remote heated, power folding door mirrors with turn signal indicator
- Black door mirrors
- Running boards
- Front and rear 16 x 7 wheels
- Sliding right rear passenger
- Turn signal indicator in mirrors
- Black bumpers
- Clearcoat paint
- 1 rear tow hook(s)

Convenience

- Manual air conditioning
- Auxiliary rear heater
- Power front windows
- Remote power door locks with 2 stage unlock and illuminated entry
- Manual telescopic steering wheel
- 1 1st row LCD monitor
- Dual illuminated visor mirrors
- Driver and passenger door bins
- Rear HVAC
- Cruise control with steering wheel controls
- Driver 1-touch down
- Manual tilt steering wheel
- Day-night rearview mirror
- Front and rear cupholders
- Full overhead console
- Rear door bins

Seats and Trim

- Seating capacity of 14
- 4-way driver seat adjustment
- 4-way passenger seat adjustment
- Driver and passenger armrests
- Front bucket seats
- Manual driver lumbar support
- Manual passenger lumbar support
- Fixed rear bench seat

Prepared by: John Wiltsey Date 11/07/2018

Selected Equipment & Specs (cont'd)

- Fixed 3rd row split-bench seat
- Removable 5th row split-bench seat
- Metal-look instrument panel insert
- Fixed 4th row split-bench seat
- Cloth seat upholstery

Entertainment Features

- AM/FM stereo radio
- CD-MP3 decoder
- 8 speakers
- Single CD player
- Auxiliary audio input
- Fixed antenna

Lighting, Visibility and Instrumentation

- Halogen aero-composite headlights
- Variable intermittent front windshield wipers
- Rear window defroster
- Deep tinted windows
- Tachometer
- Trip computer
- Trip odometer
- Fully automatic headlights
- Rain sensing wipers
- Fixed rearmost windows
- Front and rear reading lights
- Camera(s) - rear
- Parking sensors
- Lane departure

Safety and Security

- 4-wheel ABS brakes
- 4-wheel disc brakes
- ABS and driveline traction control
- Dual seat mounted side impact airbag supplemental restraint system
- Airbag supplemental restraint system occupancy sensor
- Manually adjustable front head restraints
- Brake assist with hill hold control
- AdvanceTrac w/Roll Stability Control Electronic stability control
- Dual front impact airbag supplemental restraint system
- Safety Canopy System curtain 1st, 2nd and 3rd row overhead airbag supplemental restraint system
- Power remote door locks with 2 stage unlock and panic alarm
- Manually adjustable rear head restraints

Dimensions

General Weights

Curb	7219 lbs.	GVWR	10360 lbs.
Payload	3480 lbs.		

Front Weights

Front GAWR	4130 lbs.	Front curb weight	3350 lbs.
Front axle capacity	4130 lbs.	Front spring rating	4130 lbs.
Front tire/wheel capacity	4298 lbs.		

Rear Weights

Rear GAWR	6720 lbs.	Rear curb weight	3869 lbs.
Rear axle capacity	7275 lbs.	Rear spring rating	6720 lbs.
Rear tire/wheel capacity	8156 lbs.		

General Trailering

Towing capacity	3800 lbs.	GCWR	11200 lbs.

Fuel Tank type

Capacity	24.99 gal.	Capless fuel filler	Yes

Off Road

Load floor height	28 "

Fritts Ford
8000 Auto Drive, Riverside, California, 925044183
Office: 951-687-2121

2019 Transit-350, High Roof HD Ext.
Passenger Van
High Roof HD Ext. Passenger Van 147.6" WB
DRW XLT(U4X)
Price Level: 520

Selected Options (cont'd)

Code	Description	MSRP
Emissions		
425	50-State Emissions System	N/C
	Standard equipment on all non-FFV vehicles including the 3.5L EcoBoost V6 and 3.2 I-5 diesel engines. Required for 3.7L Ti-VCT engines shipped to California emission state dealers (CA, CT, DE, MA, MD, ME, NJ, NY, OR, PA, RI, VT, WA). Optional for 3.7 Ti-VCT engines shipped to cross border state dealers (AZ, DC, ID, NH, NV, OH, VA, WV) and fleet orders.	
Interior Colors		
CB_02	Charcoal Black	N/C
Primary Colors		
YZ_01	Oxford White	N/C
SUBTOTAL		$48,885.00
Destination Charge		$1,395.00
TOTAL		$50,280.00