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BEFORE THE CALIFORNIA AIR RESOURCES BOARD

THE COMMENTS OF SAN DIEGO AIRPORT PARKING COMPANY, ONE OF SAN DIEGO AIRPORT'S GROUND TRANSPORTATION OPERATORS AND SAN DIEGO'S ONLY ELECTRIC BUS OPERATOR, TO 2016-17 PROPOSED FUNDING PLAN FOR LOW CARBON FUELS AND AIR QUALITY IMPROVEMENT PROGRAM

I. Introduction

San Diego Airport Parking Company ("SDAP") hereby submits the following comments to the Proposed 2016-17 Funding Plan for Low Carbon Fuels and Air Quality Improvement Program. SDAP looks forward to sharing facts related to ZEV fleet use, having identified Critical Barriers ("CB") that could slow down the acceleration of ZEV commercial penetration if the Investor-Owned Utility ("IOU") service territories don't create a tariff with fair kilowatt rates for EV distribution that is specific to benefit adopters of ZEV commercial transportation, or if other advanced renewable charging infrastructure equipment are not funded. Other newer charging technology is available today which provides energy distribution that is off the grid, thereby reducing the cost of a kilowatt rate to zero. The Electric Vehicle Supply Charging Equipment ("EVSE") method has become the standard infrastructure that distributes energy for charging, billed by the IOU as it is 100% connected to the grid. However, due to the amount of power that is generated from commercial charging equipment, this power triggers energy charges that create potent rates for the EV commercial adopter using the grid to charge. Other new charging technology can ensure better costs for adopters of ZEV and can encourage a benefit to both the adopter while helping meet the climate goals. As discussed in the recent Commission hearings and workshops there are issues regarding ZEV Commercial Electrification Transportation that have been raised, and with which all parties need to be familiar. The practicality of the success of EV fleets, focusing specifically on the amount of vehicles miles traveled ("VMT") per day in commercial use, proves that there is carbon value in proactively planning how EV commercial drivers can have a fair cost per mile benefit for EV rates. The EV transportation network is already broadly established: EV vehicles in each class type are provided various levels of EV charging equipment with different draws of power, infrastructure that is grid tied or off the grid technology, significant amount of funding for EV vehicle purchases, and distributed standards in connections of charging. Clearly, this is a technology that already has provisional networking which supports adoption and promotes outreach. It is therefore clear that ZEV commercial electrification can be successfully accelerated, helping meet the climate goals. Moreover, when Heavy Duty over Light Duty is adopted, it is far more impacting as it expedites a higher carbon score. For this reason, mitigating the barriers for commercial use should be a priority. SDAP will address the following ZEV commercial barrier topics and remedies, discussing these topics in greater detail below under *Comments*:

- The amount of commercial *Vehicle Miles Traveled* ("VMT") per shift or per day is not effectively supported by the EV range of miles.
- The *Time it takes to Charge* is a barrier. Differing charging methods and battery sizes affect the time is will take to charge; therefore, examining different infrastructure in commercial charging is needed to be able to identify the best solution for your business.
- Understanding the battery draw capacity of the *Charging Equipment Technology* is unique when compared to light duty use, and depending on the installation and equipment capacity, the solution may be different when considering short haul vs long haul; however, the more power, the more load, the quicker the fill time, which impacts the grid and has other effects on billing rates
- What is the best source of *Energy Distribution* for your charging method: Should it all be generated from EVSE, which is 100% grid tied, or from other new technology and resources that are off the grid, or should it be mixed?

- In EV commercial transportation, you can't compromise the need to charge multiple times a day or multiple vehicles at the same time. Our normal use creates the need to plug in during peak time or to plug in more than one bus at a time, generating the element of peak *Load Use* or maximum load use. EV charging is a complex part of the infrastructure due to the power output, and plugging in as needed should not be a barrier.
- When specifically tied to the grid with the Utility, *Demand Kilowatt Rates* can't be avoided in commercial EVSE, the importance of which needs to be understood as the Demand Rate is not a fair rate, creating a barrier which results in more cost per mile than conventional fuel.
- *Renewable Charging Equipment* reduces the rate of a kilowatt after installing, plus it has the highest carbon credit score, and when integrated delivers a more sustainable grid. But there is no funding available for infrastructure that is Renewable. Along with the identified Renewable charging equipment remedy, there is an opportunity to give back to the grid via Vehicle to Grid technology and battery storage, which is another benefit that supports sustainability.
- *Fast Charging* is another solution for commercial use that works well and, when incorporated with smart technology, will manage the load of the grid. But there is no funding available for infrastructure that is fast charging.
- While EV's are widespread in light duty and residential use, there is much we still do not know about ZEV's in the commercial sector. Therefore, we should implement a *Fleet Pilot Program* that can assist in identifying the best charging methods to pursue, thereby determining a cost effective solution for the various commercial uses.

II. Comments

SDAP has operated ZEV Transportation vehicles for one year, becoming an early adopter as of May 2015, purchasing the Zenith Motors medium duty bus with HVIP funding. SDAP believes that the CPUC workshops were an opportunity to help share the barriers that are unique in commercial use when compared to light duty or residential use. Concerns have been raised in these hearings, helping illustrate the urgent need to keep the cost per mile below conventional fuel costs, and to promote acceleration with other fleets.

1. The following ***Critical Barriers*** exist:

1. Vehicles Miles Traveled (VMT): EV range does not meet VMT per shift or day.
2. EVSE Commercial: High powered outputs create a load on the grid during charging.
3. Charging at 11am-6pm or 5pm-8pm: Peak-time of day kW use at high demand rates.
4. Charging more than one bus at one time: Maximum kW use at highest demand rate.
5. Time to Charge: Depending on the power, it takes 4 hours for Level 2 charging.
6. Charging over 20 kWh: Eliminates the customer from the small business price plan.
7. Medium Business Price Plan: Tariff plan with high demand rates.
8. Demand kW rate: The kW cost per mile is more expensive than conventional fuel.
9. Price per Mile: There is no EV rate for fleets.
10. EV Meter Accounting: No program exists to install EV sub metering equipment.
11. Aggregated EV kW consumption: All business electricity is commingled into one billing.
12. Commingled Billing: Increases overall billing. The business is forced into higher total demand consumption, which is at the highest kW rate.
13. Infrastructure Funding: Zero, there is no funding for commercial Medium Duty EVSE.
14. Cost benefit: There is no direct cost benefit in commercial adoption. After securing a reduction of GHG, there should be a cost benefit.

15. Fleet EV Rates: Without special attention paid to alleviating commercial fleet electrification barriers, conversion will not accelerate.

2. The following Remedies exist:

1. EV Flat Rate: Adoption would be encouraged by implementing a rate schedule similar to the design SMUD has incorporated.
2. Off Grid Solar Charging: Sunshine provides free kilowatts.
3. Battery Storage Charging: Vehicle to Grid connection gives back to the grid.
4. Smart Grid Communication: Incorporates programming to manage loads.
5. Infrastructure Funding: Diversity reduces load time & shaves kW cost.
6. Fleet Pilot Program: Learn what we do not know about other methods and technology. Include an EV rate term to be incorporated with Fast Charging, and a requirement to reduce loads from installing Renewable Infrastructure equipment.

3. The following SDAP Bus Operation & Drive Cycle Assumptions are applied in SDAP Comments to understand the amount of vehicles miles per shift in commercial short haul use along with charging time:

1. SDAP Use: Airport parking customer taking shuttle bus from parking lot to airport.
2. Open 24 hours per day, 365 days per year.
3. Fleet size: 5 Medium Duty Buses.
4. Annual Miles: 240,000 vehicle miles.
5. Monthly Miles: 20,000 vehicle miles.
6. Emissions saved per year: 286,000 lbs. of GHG saved annually in ZEV.
7. Max on-board vehicle battery charger: 62 kW of vehicle charging capacity.
8. EV Range: 100 miles.
9. Vehicle Miles per Shift: 126 Miles (14 trips).
10. Short Haul Trip Distance: 9 miles round trip.
11. EV Miles per Kilowatt: 2 miles (average).
12. Driver Shifts per day: 3 shifts per day, of 9 to 10 hours apiece.
13. Start Times for each Shift: 1) 4am@9 hrs; 2) 1pm@10 hrs; 3) 9pm@10 hrs.
14. Charge Time per Shift: 126 minutes, charging 9 mins at base between each trip.
15. EVSE Level 2 Charger: 13 kWh, yielding 26 miles per hour of charging

16. Time and Range of Charge: 14 charges for 9 minutes apiece produce 126 minutes of charge for 55 miles of range.
17. Range at end of shift no. 1: 30 miles.
18. Shift no.2 starts at 1pm: Charging at 1pm equals peak-time load rates in Summer.
19. Range at start of shift no.2: 30 miles, while still needing to complete 126 VMT.
20. Charging time needed: 3.5 hours at 13 kWh, yielding 96 miles.
21. 15 mins of charging at base (14 trips) yields 3.5 hrs of charging (210 minutes).
22. 3.5 hours of charging produces 48kW, yielding 96 miles.
23. Shift no.2 will not have enough time to complete 15 mins of charging at base.
24. Shift no.2 is 30 mins short of charging time, putting it 13 miles short.
25. Therefore, Driver in shift no. 2 cannot complete all 126 miles.

4. The following are the details of the mainstream battery charging method of Electric Vehicle Supply Equipment (EVSE) and the maximum battery charging capacity that is generated from the on-board vehicle battery. Understanding the various methods of EVSE limitations and charging loads is a significant barrier. It is not well understood since most charging stations deployed today support Light Duty for home use or work place. This does not have the same impact on loads when charging with the much more powerful commercial batteries. Medium Duty and Heavy Duty battery charging is much bigger, much faster and much more powerful in order to propel commercial vehicles that have a Gross Vehicle Weight (GVW) far in excess of Light Duty. SDAP Comments address why this barrier impacts commercial use.

The battery capacity of the standard EV light duty passenger car (Ford Focus) on the road today has 6 to 8 kWh. The medium duty bus (Zenith) has a 62 kWh battery capacity. The heavy duty bus (Proterra) has over 100 kWh battery capacity. The standard light duty passenger cars travel 40 miles per day, and drivers typically have plenty of time while at home, charging the vehicle overnight so that it is fully charged at the start of the next day. The standard drive cycle for the medium duty or heavy duty bus is 125 miles per 9-hour shift, with a bus range of 100 miles. Therefore, the bus would need to be charged throughout the shift in order to have enough charge to complete the 125 miles.

A standard home EVSE allows you to connect the light duty passenger car to the electric network at home to supply and charge the vehicle with the AC current. However, for quicker charging (13kW – 300 kW), which is typical for Commercial EVSE, the equipment and installation is a more advanced technology, which generally requires electric upgrading and can be installed with a variety of methods in order to produce a higher maximum supply of power.

Commercial EV driving cycles do not always allow time to charge overnight or due to a combination of vehicle range and VMT in commercial use. Charging throughout the shift is a necessity, which is just the opposite of light duty EV driving cycles. Since commercial drive cycles must charge throughout the shift, charging at 1pm during Summer Season peak-time or at 5pm Winter Season peak-time is appropriate in the commercial application. Defining all of the ingredients tied to commercial charging is challenging, since the platform for electrification requires equipment hardware and installation of the station, all of which is very complex. As such, understanding the scope of EV operations and adoption is very technical. One element that cannot be changed is the length of charge time, which is a barrier that has to be managed in concert with the EV transportation range. More importantly, making the correct decision for the method of charging equipment and the power that you need to supply your fleet is a critical factor in time management: Time to charge, time traveling on the road, time back at base, time available for charging, time of day that charging occurs. These factors all dictate whether you can successfully stay on the road for the driving cycles and distance travelled. Additionally, the time of day at which charging takes place can have a dramatic effect on the billing rates. The ability to charge as needed is determined by the power output distributed from the engineering and installation method and the power output available from the charging equipment. These factors determine how long it takes to fully charge the vehicle. Alternatively, the average petroleum pump delivers 5,000 kilowatts (kW) and will fill the average vehicle in less than 5 minutes, yielding a range of 200 to 300 miles.

The two tables below depict the details involved in EVSE installations. The tables display the amount of time it takes to fully charge an EV vehicle with a range of 40 to 100 miles. The application in each EV installation produces a different amount of power that determines the difference in the amount of time it takes to charge; moreover, when compared to conventional petroleum pumping, it can be reasonably understood why it is significantly slower. The installation design of the specific *power of output* when combined with the type of *wiring* produces different charging times.

Table 1: **Power Output from Electrical Engineering design with EVSE Equipment**

50 Mile Range = Charge time	***Power Supply Wiring***	***EVSE Power Output***	***Voltage***	***Max. Current Breaker***
6–8 hours	Single phase	3.3 kW	230 Vac	16 A
3–4 hours	Single phase	7.4 kW	230 Vac	32 A
2–3 hours	Three phase	10 kW	400 Vac	16 A
1–2 hours	Three phase	22 kW	400 Vac	32 A
20–30 minutes	Three phase	43 kW	400 Vac	63 A
20–30 minutes	Direct current	50 kW	400–500 V DC	100–125 A
10 minutes	Direct current	120 kW	300–500 V DC	300–350 A

Table 2: **EVSE Charging Power Levels Based in Part on SAE Standard J1772**

Power Level Types	**Charger Location**	**Typical Use**	**Energy Supply Interface**	**Expected Power Level**	**Charging Time**	**Vehicle Technology**
Level 1 (Opportunity) 120 Vac (US) 230 Vac (EU)	On-board 1-phase	Charging at home or office	Convenience outlet (NEMA 5- 15R/20R)	1.4kW (12A) 1.9kW (20A)	4-11 hours 11-36 hours	EVs 16-50kWh
Level 2 (Primary) 240 Vac (US) 400 Vac (EU)	On-board 1- or 3-phase	Charging at private, public outlets or commercial	Dedicated EVSE	4kW (17A) 8kW (32A) 19.2 kW (80A)	1-4 hours 2-6 hours 2-3 hours	EVs 16-30kWh EVs 3-50kWh
Level 3 (Fast) 208-600 Vdc	Off-Board 3-phase	Commercial, analogous to a filling station	Dedicated EVSE	50kW 100kW	0.4-1 hour 0.2-0.5 hour	EVs 20-50kWh

Ultimately, even if the supply of power is increased because you want to fill up faster, batteries cannot accept a charge at greater than their maximum charge rate capacity. The bigger the battery size of the on-board battery in the vehicle, the more power supply can be generated, which determines your available maximum supply of power. However, in order to take advantage of the power supply available, the design connection installation and battery size of the EVSE equipment ultimately determines the final output. Therefore, understanding the time it takes to charge your fleet based on the installation becomes an essential element of time management.

The ***On-Board Commercial Vehicle Battery*** is much BIGGER than the standard light duty passenger car; this is required in commercial vehicles in order to be able to accommodate the gross vehicle weight (GVW) which affects the vehicle range and power to propel the vehicle. See table 3.

Table 3: **On-Board Vehicle Battery**

Vehicle GVW	Vehicle Make & Model	On-Board Vehicle Power Output (kWh)
4,000 GVW:	Ford Focus, Nissan Leaf	6 -11 kWh
10,000 GVW:	Zenith Bus (SDAP Fleet)	62 kWh
40,000 GVW:	Proterra Transit Bus	150 kWh up to 500 kWh

EVSE Commercial Charging Equipment is also much FASTER due to the power supply needed to support the bigger on-board vehicle batteries. But with more power output from commercial charging equipment comes quicker fill times and much higher equipment cost. See table 4.

Table 4: **EVSE Charging Equipment**

EVSE Level	Use Type	EVSE Power Output (kWh)	EVSE Equipment Cost
Level 1:	standard home use	Starts at 1.5 kWh	$500
Level 2:	standard home use	6 kWh	$1,000
Level 2:	commercial use	Starts at 13 kWh – 25 kWh	$3,000-$10,000
Fast Chargers:	home use	Starts at 35 kWh – 50 kWh	$10,000-$30,000
Fast Chargers:	commercial use	Starts at 55 kWh – 500 kWh	$50,000-300,000

Commercial fast charging equipment cost starts at $50,000 and goes up with more power, and in some properties, fast charging installation may not be an available option.

EVSE commercial charging equipment and installation can be very complex. Commercial use requires more power which has many options when deciding on the charging infrastructure that is best for your use. You must consider and decide on all of the following in your planning:

Charging equipment Level	Power output (kWh)	Single or Three phase wiring
AC or DC Amps	Voltage	Interface Connection
Circuit Breaker	Time to charge	Equipment Cost
Location	Trenching distance	Installation Cost

In additional to the equipment and installation, there are other elements of charging complexity that still need to be understood, such as how best to support the use of the advanced technology of the on-board battery and how best to implement maintenance and driving standard practices by the EV commercial driver, protecting the longevity and life of the battery and extending the range and overall performance capacity:

1. It is recommended to charge when not in use. Usually the charging automatically slows when the fill level is at the last remaining 10%. This actively ensures that all of the battery cells are being balanced to maximize the battery capacity.
2. Regenerative braking extends the range, depending on traffic conditions or driver route. This advanced technology can extend the range from 10% to 40%, which is determined by the terrain that is driven and the driver's behavior.
3. Under cold temperatures the battery's heater automatically turns on when the outside temperature falls below a specific level that will affect the battery capacity. It will continue to turn on and off in increments to prevent any dimension of battery capacity. The same is true for extreme heat; however, heat has a more moderate impact on the dimension of battery capacity.
4. The low battery warning alert comes up quickly and can have harsh consequences if the EV driver is not aware of the effects that the outside temperature will have on the performance of the vehicle, thereby diminishing the range of distance in

miles that can be typically traveled. This is a pertinent issue for the EV commercial driver to be aware of; due to the change in range of VM that creates a new limited and shorter range.

As indicated in the foregoing tables, the electrification technology application for commercial use is not as easy as the light duty charging platform. In order to get the best capacity output to support the commercial vehicle's on-board battery, the components of the hardware and installation require a complex design and installation upgrade, including other maintenance and performance measures that must be addressed in respect to drivers.

5. The following SDG&E Business Price Plans are derived from SDAP's small operational use that has existed for 25 years with SDG&E. However, after adopting a fleet of ZEV, SDAP's business is being forced into the Medium Business Price Plan due to the use of more than 20 kW at one time. Both the Small and Medium Business Price Plans have been examined, including the impact they have had to SDAP's business and the results are included below:

1. **Small Business Price Plan**
    a. For those who do NOT use more than 20 kW at one time
    b. SDAP has been in this price plan for 25 years
    c. Price per kW = .18 to .28 cents
    d. Winter Rates VS Summer Rates
    e. Peak Time Rates
    f. Monthly service Fee $50
    g. No Demand Rates
    h. Reduce Your Use Day Rates on emergency days
2. **Medium Business Price Plan**
    a. For those using MORE than 20 kW at one time.
    b. All EV's commercial bus users will be on this plan, since charging more than two buses at one time is more than 20 kW.
    c. Price per kW = .08 to .12 cents
    d. Winter Rates VS Summer Rates
    e. Peak Time Rates

f. Monthly service Fee $466 (when over base of 500 kW per month)
   i. Two Demand Rates:
      1. Non-Coincident: $22 per kW
         a. This is the highest maximum use in the month
      2. On Peak: $7 - $19 per kW (depending on Season)
         a. This is the maximum used in the month at Peak Time of day
   ii. Reduce Your Use Day rates for emergency days
         a. The number of RDU days is expected to increase.
         b. Average RDU days per year = 5 to 18 days
         c. Price per kW on these days goes from .24 cents to $1.41.
         d. This will also increase the price per mile.

3. Seasonal Rates:
   a. 6 months each Season
      i. Summer: May through October
      ii. Winter: November through April

4. Peak Rates at specific times of day:
   i. Summer: 11am to 6pm
   ii. Winter: 5pm to 8pm

EV Transportation forces each commercial EV transportation operator into the Medium Business Price Plan or the next higher level plan, simply due to the EVSE charging loads. All EV fleets will consume more than 20 kW at one time with this method of charging. The barrier of the price plan change is the initiation of demand rates which pose potent kilowatt rates which are further explored in the SDAP comments below.

6. In order to present how the EV cost per mile rate has been found to be more expensive than conventional fuel, SDAP Comments hereby recreated a comparison of the utility pricing plan details that determine the results of the cost per mile for the ZEV transportation fleet vs. the cost per mile for conventional diesel fuel. Two different levels of EVSE charging are assumed in order to capture the effects of two different loads and the demand rates from these two different loads of charging. Both of these levels of EVSE charging are standard in commercial use.

1. Assumption of monthly fleet miles traveled:

    a. 20,000 miles per month or 10,000 kilowatts per month
    b. 1 kilowatt = 2 miles
    c. In this example, the kW rate = Summer time, Peak-Rates
    d. **Scenario 1:** Four Level-2 EVSE chargers@ 13 kWh ea. = 52 kWh of Demand Use
    e. **Scenario 2:** Two Fast chargers@ 55 kWh ea. = 110 kWh of Demand Use

2. Comparison of Price per mile cost:

    f. Diesel Fuel Price per Mile
        a. 1,111 Diesel Gallons per month = 20k miles
        b. $2.50 per gallon
        c. 18 miles per gallon
        d. Total = $2,778 per month
        e. Price per Mile = .14 cents
    g. Kilowatt pricing on small business price plan
        a. 10,000 kW per month = 20k miles
        b. 28 cents per kW
        c. $2,800 per month
        d. $50 monthly service fee
        e. Total = $2,850 per month
        f. Price per Mile = .14 cents

RESULTS = No savings or difference when compared to diesel fuel.

h. kW pricing on medium business price plan (**<u>Scenario 1</u>** – level 2 charging)

   a. 10,000 kW per month = 20k miles
   b. .12 cents per kW
   c. $1,200 per month
   d. $1,144 Non-Coincident Demand Fees *

      = 52 kWh x $22 per kW
   e. $988 On-Peak Demand Fees *

      = 52 kWh x $19 per kW
   f. $466 monthly service fee *
   g. Total = $3,798 per month
   h. Price per Mile = .19 cents

RESULTS = 30% increase at .04 cents more per mile or $950 more per month.

i. kW pricing on medium business price plan (**<u>Scenario 2</u>** – fast charging)

   a. 10,000 kW per month = 20k miles
   b. .12 cents per kW
   c. $1,200 per month
   d. $2,420 Non-Coincident Demand Fees *

      = 110 kWh x $22 per kW
   e. $2,090 On-Peak Demand Fees *

      = 110 kWh x $19 per kW
   f. $466 monthly service fee *
   g. Total = $6,176 per month
   h. Price per Mile = .30 cents

RESULTS = 115% increase at .16 cents more per mile or $3,325 more per month.

* *New fees incurred due to the charging loads on the grid which triggers demand rates*

The lack of an available EV commercial rate is a *Barrier* as all commercial use will go over 20 kW at one time. The demand rate occurs when consumption at one given time goes over 20 kW. Charging during normal business hours activates peak-time charging rates, and charging two EV buses at one time regardless of the time of day activates maximum demand rate. Both demand rates will repeat each month no matter what time of day or what day it is as the use of more than 20 kW at one time can't be avoided on a daily basis with commercial infrastructure and VMT. Furthermore, this analysis does not consider any other electric energy use from standard equipment needed for running the business, since the kilowatts from EV are now being folded into the overall bill.

This validates why demand charges cannot be avoided with the use of EV in the commercial sector, which currently is one of the most critical barriers that commercial electrification fleets have raised. In conjunction with the objective for ZEV acceleration, the current price comparison clearly shows that electricity demand rates will not be at a rate that will promote acceleration of commercial fleets. As adoption demonstrates a higher cost per mile than conventional fuel, where is the benefit for fleets to adopt EV? The other long term consideration is how this will affect the future of supply and demand. We need an immediate short term solution in order to ensure that acceleration is on track, providing an opportunity to drive down the future costs of accelerating EV's into the electrification market. We are concerned that the current tariff and demand rates will negatively impact outreach as the early adopters certainly were not aware of demand rates or the effects of EVSE equipment loads in Utility price plans. This is all evident in the facilitation of the workshops that has been provided by the CPUC Commission and recommends the Utility to refine the rates as per the *Second Track* (R.13-11-007 at 14.) to "focus on new tariffs" that would include fleets. The current demand rate price for the EV business customer is unreasonably high and particularly unfair after they have done their part to meet the climate goals with no cost benefit. The cost is 30% to 115% more per mile than conventional diesel fuel and it is 30% to 115% more per mile when compared to the small business price plan which has no demand rates. The utility initiatives include supporting ZEV acceleration, but in order to meet this goal, the utility must incorporate a fair rate for commercial EV, one that is clearly lower than conventional fuels.

7. **Advance EV Infrastructure *Remedies* for charging are available today.**

1. We want the funding program to include ***Renewable Energy Infrastructure*** in the budget, helping reach Climate Goals while reducing our Demand Use Fees and Peak Load energy use that occur from being 100% tied with our Utility Companies. Let's drive on sunshine securing more diverse charging applications with a more modern and advanced charging infrastructure.

Envision Solar is a San Diego based company that supplies the world's only transportable EV solar powered charging station. The EV solar stations are deployed in minutes with no environmental impact or disruption at the site location. Envision Solar has already received a statewide mandated contract award for the State of California. Caltrans made its first series of delivered Envision Solar powered charging stations in September 2015, a decision which enables their employees and fleet vehicles to drive on sunshine. Envision Solar is invented and manufactured in California; the EV ARC™ fits inside a parking space and does not reduce available parking in any way. It generates enough clean, solar electricity to power up to 150 miles of EV driving each day. The system's solar electrical generation is enhanced by the patented Envision Trak™ system, which causes the array to follow the sun, generating 18% to 25% more electricity than a fixed array. The energy is stored in the EV ARC™ product's energy storage for charging day or night. The EV ARC™ requires no trenching, foundations or installation work, allowing it to be deployed in minutes and moved to a new location with ease. Envision Solar's EV ARC™ products are manufactured in the company's San Diego facility, by combat veterans, minorities and workers with disabilities, all of which has contributed to creating more jobs and employment opportunities. Sunny Southern California has an opportunity to plan the future for others to follow -- drive on sunshine without trenching, foundations or electrical connections and without utility bills. This means real emissions-free driving that is perfectly in line with our goals for California.

The solar powered stations charge EV vehicles off the grid or grid tied with a battery storage option deploying an array of products that include some of the following equipment and benefits:

Solar Tree Arcs (they track the sun)

- **a.** Level 1 Charging
- **b.** Level 2 Charging
- **c.** Fast Charging
- **d.** Off load charging
- **e.** Grid Tied Charging
- **f.** Battery Storage
    - i. Available in Various Sizes

Solar Tree Charging Benefits

1) Reduces Grid load immediately
2) Off Load Charging or grid tied
3) Has Battery Storage options
4) Is FREE kilowatts
5) Zero Utility bill
6) Reduces cost per mile
7) It is a capital asset
8) No permits for installation
9) Can easily be installed or deployed in minutes
10) It can be relocated if you move
11) Is available today
12) Could be less expensive in some installations than trying to trench and construct 3 phase cables and wires underground or into urban dense populated areas that must get through concrete walls to install new cables for wall charging infrastructure.
13) During Peaks times, can give back to the grid
14) Can provide support to reduce the demand use required on emergency days
15) Promotes a very low carbon credit score

2. We also want the funding program to include ***Fast Charging Infrastructure*** in the budget that will help ameliorate the time management issue related to charging. The Demand Use Fees and Peak Load energy may be optimized with fast and short charging interval connections. When incorporating smart grid load management technology, we may find a solution for commercial fast charging at higher speeds with the help of communication software that regulates the interval charging period to 15 minute increments, rather than charging for hours on the grid. Let's become more diverse with how we can charge using other more modern and advanced technology.

The benefits of electric energy diversity include addressing the California climate policy, putting a priority on carbon reduction resulting in more carbon credits, and implementing charging that benefits commercial EV adoption. Incorporating Renewable Energy charging stations mixed with Fast Charging will best support the continuation of the policy to drive EV electrification. Solar powered charging benefits all classes of EV vehicles and does not create prohibitively expensive installations due to high construction cost, city permits or property ownership approval; moreover, this will facilitate off-load charging without contributing to issues with both load use and demand rates. Fast Charging benefits all classes of EV vehicles and will reduce the amount of time on the grid. We believe a mix of charging options may emerge as the optimal solution for PEV; it accommodates all EV vehicle classes, generates grid sustainability, and supports the adoption of renewable energy planning standards, ZEV policy goals, and results in load use that is more diverse with a higher carbon score.

***8*. VGI Program – the facilitation of PEV infrastructure and development for the service territory of San Diego.** The proposed VGI program only addresses light duty, workplace, and multi-use dwellings and does not address medium duty or heavy duty, and it does not include fast chargers or renewable charging equipment that could capture grid benefits and benefit commercial use. The VGI Rate appears to be designed to foster use during off peak periods, a standard to which commercial operators cannot conform due to the VMT. The VGI is a 'day ahead hourly time-variant rate' based on forecasted grid use and the cost of the grid at the anticipated time of charging. Since grid load use can't typically be controlled in commercial operations, this framework will not support the required activity of daily multiple charging.

Unknown rates or the ‘day ahead hourly time-variant rate’ are perceived as confusing and not very user friendly; as such, we would like to see the adoption of a simple flat rate, standardized for different levels of charging in order to support acceleration, and specifically designed for EV commercial use. In other words, the power you draw from charging would be at a premium rate for more power at one time; the less power you draw, the lower the rate. The concern with the VGI rate approach is that the proposed pricing method and time of use incentive will not mitigate the most critical barriers commercial users face, which is the demand rate and demand charge loads. The rate structure needs more refinement and should assign a rate structure that is flat for the specific power you choose to draw. Otherwise, the pricing as proposed is not attractive enough to entice deployment and more importantly it could slow down deployment.

SDG&E has installed an **EV Study Meter** on the SDAP property to study the EV data from the SDAP EV Fleet. This has been generating results since October 2015. SDAP seeks participation on the SDG&E PAC Advisory Council to fill the seat of the stakeholder position as SDAP’s experience to date and knowledge with ZEV use and equipment installation and funding experience can help SDG&E develop an effective plan for ZEV commercial electrification while mitigating the barriers that could slow down commercial adoption and, more importantly, assist in acceleration. SDAP can fairly contribute to the goals to address electrification design, sharing actual lessons learned and data. SDAP is open to contributing its results from its year of EV operations along with the data that SDG&E can examine from the appropriate meter installation. This provides both parties the opportunity to examine and evaluate the activities, and will prove very productive. SDAP originally adopted the use of B-20 fuel in 2010 for the SDAP fleet. SDAP has been planning and procuring transportation to meet the LCFS and to comply with the climate goals for over seven years, developing a clear understanding of the LCFS policy, including working closely with the adoption of Propane Auto Gas to meet the criteria for off road vehicles. All of these factors make SDAP a great resource to contribute to the needs of electrification, specifically in commercial use.

III. Conclusion

SDAP believes that the information contained in this filing provides a sufficient basis for acceptance.

However, SDAP requests that, to the extent deemed necessary, the CPUC Commission waive Demand Rates for a period of three years for Fleets that can't avoid generating Load use, helping them be successful after participating as early ZEV adopters in the reduction of GHG, and to be able to operate at a fair rate. This demonstrates an incentive and benefit that promotes accelerating the use of ZEV in Commercial Electrification fleets. This could be a continuous order similar to the Tier 3 Advice Letter 4292 E with PGE and San Joaquin Transit.

SDAP submits that the CPUC Commission require a revised Formula rate by the IOU to reflect a more accurate depreciation rate on their next annual filings. The impact by the adoption of ZEV drivers represents changes in the amortization periods and thereby accelerates the current recovery cost schedules. ZEV drivers will generate more electric use and more revenue than what was estimated in the original depreciation equipment costs schedules that were created prior to the goals of EV transportation. SB 350 will move 1.5 million drivers that were generating GHG to zero emissions; the 1.5 million drivers represent removal of 11 billion light duty miles and 30 billion heavy duty fleet miles eliminating a total of 40 billion miles of petroleum annually which is being exchanged for distribution by electrification of 20 billion kilowatts annually.[1] This will allow the new revenue generated from 20 billion kilowatts annually to be considered in the existing infrastructure costs and to be amortized with consideration of the 1.5 million EV drivers plus the future capacity of additional EV drivers.

SDAP Comments propose to support a pilot program for fleet operators to provide feedback while installing and using other charging methods that include Renewable Energy Charging Infrastructure and Fast Charging Infrastructure. This is appropriate in light of what needs to be learned about Fleet Charging and to ensure that all solutions are included and tested.

[1] As part of SB 350, the defined goal is to adopt 1.5 million ZEV's and in doing so, these comments assumed 50% light duty and 50% heavy duty miles would produce 40 billon annual miles which transfers into 20 billion kilowatts annually. Light duty is assigned 40 miles per day. Heavy Duty is assigned 110 miles per day. 1 kilowatt = 2 miles traveled.

One of the barriers that must be resolved is how to optimize the grid use during peak times. Specifically focusing on diverse charging that is net zero or fast charging that allots for the shortest period of time on the grid will positively reflect on sustaining the grid while reducing load use or time on the grid. The importance of finding successful charging solutions will benefit all parties. Diversity needs to be encouraged in order to find a solution that will produce a reduced cost in kilowatt rates and ensures the fleet operator a fair EV rate when compared to conventional fuel.

SDAP appreciates the opportunity to submit the forgoing Comments herein.

Dated: June 6, 2016

Respectfully submitted,

/s/ Lisa McGhee

Lisa McGhee
Operations Manager
San Diego Airport Parking Company
Tel: 619-574-1177
E-mail: sdap@sdap.net

EXHIBITS A – F, Exhibits Attached:

1. **Exhibit A:** **History of SDAP Electricity use with SDG&E**

   1. 5 year billing history with No demand.
      a. May 2015 ZEV bus #1,
         1. Demand starts at 22.6 kW
      b. Aug 2015 ZEV bus #2,
         1. Demand is 30.9 kW
   2. Electric meter consumption - EV study.
      a. October 2015 thru March 2106
   3. Electric meter consumption – Property + EV.
      a. April 2015 thru March 2106

2. **Exhibit B:** **SDG&E Business Customer Price Plans**

   1. Small Business Price Plan Rates for business customers that use less than 20 kWh, this plan has zero demand rates.
   2. Medium Business Price Plan Rates for business customers that use over 20 kWh, this plan includes two demand rates.

3. **Exhibit C:** **Daily Load Use Analysis of EVSE Fleet Charging by SDG&E**

   a. Various days of kilowatt Use average (Sept 2015):

      1. The spike depicts charging 2 buses at one time at 2:30pm consuming the load of 35 kW at one single time from charging two buses at one time.

b. Daily Charging Behavior over 19 days (Sept 2015):

2. Lowest use period is at 5am and 9am, the least amount of charging is repeating at early morning.
3. Highest peak use at 2:30pm, this is occurring from charging after use from shift 1. Drivers need to charge as often as possible in order to complete VMT.
4. Increasing charging use throughout late afternoon and evening. Charging each time at base to be able to finish shift with enough charge.

c. Daily Charging effect of Demand Rates (Sept 2015):

5. Maximum use at 3:15am: $24 per kW x 26kWh = $624
6. Maximum Peak time use at 2:30pm: $20 per kW x 35kWh = $700

4. **Exhibit D: ZEV Shuttle Bus test drive Analysis by Zenith Motors**

1. EVSE charging power is at 12.6 kWh. We are averaging 94% efficiency from our EVSE 13kW level 2 chargers.
2. Consumed 3.15 kWh in test drive trip 1 = 6.24 miles. We are average 2 miles per kilowatt.

5. **Exhibit E: Remedy 1: The EV Solar Tree ARC....**"Drive on Sunshine"

1. A deployed solar ARC
   a. Spec sheet
2. DCFC Fast Charging
3. Proposal by Envision Solar

6. **Exhibit F: Daily Interval Data of kilowatt hourly consumption. By SDG&E**

1. 2 uploaded Excel files available upon request.

To Request a Copy of this document or any supporting Exhibits, please send an email to LisaMcghee@aol.com

EXHIBIT A:

History of SDAP Electricity use with SDG&E

5 year billing history with No demand.

a. May 2015 ZEV bus #1,
   1. Demand starts at 22.6 kW

b. Aug 2015 ZEV bus #2,
   1. Demand is 30.9 kW

Electric meter consumption - EV study.

c. October 2015 thru March 2106

Electric meter consumption – Property + EV.

d. April 2015 thru March 2106

Assumption for start dates of ZEV fleet:

1. Started 1st EV Bus May 2015
2. Started 2nd EV Bus July 2015
3. Start 3rd EV Bus March 15, 2016

16:55:26 Tuesday, March 22, 2016

E01 G00	W 619 574-1177	H		12 12010
CCI008 CINQ	SAN DIEGO	CA 92110	A COM	9404582206
				MULT CC
	ELECTRIC METER BILLING HISTORY			03/22/16 16:55

MTR NO: 06169184 RATE: ASTODPSW HEAT CD: 1 STAT: A NXT BL DT: 04/25/2016

SEL	READ DATE	DAYS	BILL	USE	USE/DAY	SEAS	MAX DMD		LPP AMT	SERVICE AMT	BC	RS
_	03/17/16	29		8036	277	W	29.5		0.00	1,663.47	B	K
_	02/17/16	30		8189	273	W	31.1		0.00	1,693.23	B	K
_	01/18/16	32		8330	260	W	32.7		0.00	1,769.78	B	K
	12/17/15	30		6341	211	W	29.5		0.00	1,377.89	B	M
_	11/17/15	32		8019	251	M	30.5		0.00	2,035.80	B	M
_	10/16/15	29		7290	251	S	34.6		0.00	2,160.61	B	M
_	09/17/15	30		7763	259	S	24.7		0.00	2,299.41	B	M
_	08/18/15	29		6841	236	S	30.9	EV#2	0.00	2,028.82	B	M
_	07/20/15	32		6188	193	S	23.1		0.00	1,798.12	B	M
_	06/18/15	30		5407	180	S	23.3		0.00	1,573.84	B	M
_	05/19/15	32		4903	153	M	22.6	EV#1	0.00	1,279.66	B	M
_	04/17/15	29		3117	107	W	13.7		0.00	673.91	B	M
_	03/19/15	29		3428	118	W	13.7		0.00	739.87	B	M
_	02/18/15	30		3664	122	W	13.7		0.00	789.90	B	M
_	01/19/15	33		4126	125	W	14.1		0.00	873.32	B	M
_	12/17/14	30		3536	118	W	14.		0.00	733.35	B	M
_	11/17/14	32		3716	116	M	12.5		0.00	901.88	B	M
_	10/16/14	29		3888	134	S	14.7		0.00	1,099.36	B	M
_	09/17/14	33		4896	148	S	15.8		0.00	1,381.09	B	M
_	08/15/14	29		4247	146	S	15.8		0.00	1,168.34	B	M
_	07/17/14	30		3469	116	S	12.9		0.00	929.22	B	M
_	06/17/14	32		3414	107	S	13.7		0.00	914.68	B	M
_	05/16/14	29		3240	112	M	11.9		0.00	765.50	B	M
_	04/17/14	29		3213	111	W	→		0.00	625.30	B	M
_	03/19/14	29		3106	107	W			0.00	593.94	B	M
_	02/18/14	32		4102	128	W			0.00	781.16	B	M
_	01/17/14	31		4102	132	W			0.00	782.54	B	M
_	12/17/13	32		3974	124	W			0.00	748.71	B	M
_	11/15/13	29		2896	100	W			0.00	539.28	B	M
_	10/17/13	29		2603	90	M			0.00	534.87	B	M
_	09/18/13	30		3217	107	S			0.00	722.64	B	M
_	08/19/13	31		2557	82	S			0.00	549.79	B	M
_	07/19/13	31		2861	92	S			0.00	613.98	B	M
_	06/18/13	32		2611	82	S			0.00	561.22	B	M
_	05/17/13	29		2142	74	M			0.00	424.75	B	M
_	04/18/13	30		2228	74	W			0.00	386.18	B	M
_	03/19/13	32		2783	87	W			0.00	479.86	B	M
_	02/15/13	29		2630	91	W			0.00	453.98	B	M
_	01/17/13	31		2917	94	W			0.00	501.00	B	M
_	12/17/12	33		1925	58	W			0.00	332.91	B	M
_	11/14/12	29		1342	46	W			0.00	235.13	B	M
_	10/16/12	29		1509	52	M			0.00	290.91	B	M
_	09/17/12	32		1857	58	S			0.00	370.42	B	M
_	08/16/12	29		1467	51	S			0.00	294.64	B	M
_	07/18/12	30		1430	48	S			0.00	290.47	B	M
_	06/18/12	32		1717	54	S			0.00	348.01	B	M
_	05/17/12	29		1668	58	M			0.00	311.93	B	M
	04/18/12	30		1957	65	W			0.00	320.25	B	M
_	03/19/12	32		2426	76	W			0.00	394.84	B	M
_	02/16/12	29		2123	73	W			0.00	347.12	B	M
_	01/18/12	33		2605	79	W			0.00	432.61	B	M
_	12/16/11	30		2361	79	W			0.00	402.92	B	M
_	11/16/11	29		2043	70	W			0.00	350.02	B	M
_	10/18/11	29		1806	62	M			0.00	337.48	B	M
_	09/19/11	32		2007	63	S			0.00	421.88	B	M
_	08/18/11	29		1743	60	S			0.00	366.45	B	M
_	07/20/11	30		1984	66	S			0.00	415.74	B	M
_	06/20/11	32		1810	57	S			0.00	380.05	B	M
_	05/19/11	30		1758	59	M			0.00	343.24	B	M
_	04/19/11	29		1900	66	W			0.00	321.29	B	M

MORE PAGES

SDGE EV STUDY W H 12 120

2771 KURTZ ST SAN DIEGO CA 92110 A RES 94045800

E01 G00

CCI008 CINQ MULT CC

ELECTRIC METER BILLING HISTORY 04/01/16 15:

MTR NO: 06679861 RATE: DR HEAT CD: 1 STAT: A NXT BL DT: 12/31/9999

SEL	READ DATE	DAYS	BILL USE	USE/DAY	SEAS	MAX DMD	LPP AMT	SERVICE AMT	BC
_	03/18/16	29	5870	202	W				
_	02/18/16	30	5810	194	W		0.00	0.00	B
_	01/19/16	33	4380	133	W		0.00	0.00	B
_	12/17/15	30	2890	96	W		0.00	0.00	B
_	12/17/15	30	2890	96	W		0.00	0.00	B
_	11/17/15	28	4060	145	M		0.00	1,093.80	C
_	11/17/15	28	4060	145	M		0.00	0.00	B
_	10/20/15		0				0.00	1,596.22	C
							0.00	0.00	B

DAVID J MCGHEE
2771 KURTZ ST W 619 574-1177 H
E01 G00 SAN DIEGO CA 92110 A COM 12 120
CCI008 CINQ 940458220

ELECTRIC METER BILLING HISTORY

MULT CC
04/01/16 15:4

MTR NO: 06169184 RATE: ASTODPSW HEAT CD: 1 STAT: A NXT BL DT: 04/25/2016

SEL	READ DATE	DAYS	BILL	USE	USE/DAY	SEAS	MAX DMD	LPP AMT	SERVICE AMT	BC
_	03/17/16	29		8036	277	W	29.5	0.00	1,663.47	B
_	02/17/16	30		8189	273	W	31.1	0.00	1,693.23	B
_	01/18/16	32		8330	260	W	32.7	0.00	1,769.78	B
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_	10/16/15	29		7290	251	S	34.6	0.00	2,160.61	B
_	09/17/15	30		7763	259	S	24.7	0.00	2,299.41	B
_	08/18/15	29		6841	236	S	30.9	0.00	2,028.82	B
_	07/20/15	32		6188	193	S	23.1	0.00	1,798.12	B
_	06/18/15	30		5407	180	S	23.3	0.00	1,573.84	B
_	05/19/15	32		4903	153	M	22.6	0.00	1,279.66	B
_	04/17/15	29		3117	107	W	13.7	0.00	673.91	B

EXHIBIT B:

SDG&E Business Customer Price Plans

1. Small Business Price Plan Rates
for business customers that use less than 20 kWh,
this plan has zero demand rates.

2. Medium Business Price Plan Rates
for business customers that use over 20 kWh,
this plan includes two demand rates.

Created on : 3/23/2016 9:30 AM

SDGE
A Sempra Energy utility

My Pricing Plan

Account: 2771 KURTZ

Electric Meter: 06169184

¿06

Small customer >20

medium size
<20

Cost Comparison by Features

The displayed estimates have been updated based on your answers from the energy use questionnaire, currently approved prices (rates) and your past 12 months of electricity use.

Time of Use Plus (TOU-A-P)	Time of Use (TOU-A)	Time of Use (AL-TOU)
$17,233 Estimated cost per year	$17,805 Estimated cost per year	$20,759 Estimated cost per year
N/A Estimated savings per year	No Savings	No Savings
1 Year Commitment	1 Year Commitment	1 Year Commitment
1 Year No Risk Pricing	1 Year No Risk Pricing N/A	1 Year No Risk Pricing N/A
Reduce Your Use Days	Reduce Your Use Days - N/A	Reduce Your Use Days - N/A
Details • Electricity prices change based on the time of day. • Lower prices throughout the year, except on Reduce Your Use days where a higher price is charged from 11am to 6pm.	Details • Electricity prices change based on the time of day. • Summer: Electricity costs less before 11am and after 6pm. • Winter: Electricity costs less before 5pm and after 8pm.	Details • For business customers that use more than 20 kilowatts (kW). • Electricity prices change depending on the time of day. • Price is partially based on your highest electricity use point during the month.
Who This Plan Is For • Most of your electricity use is before 11am and after 6pm during the summer. • Most of your electricity use is before 5pm and after 8pm during the winter. • You can take big electricity-saving actions on Reduce Your Use days.	Who This Plan Is For • Most of your electricity use is before 11am and after 6pm during the summer. • Most of your electricity use is before 5pm and after 8pm during the winter. • You're not able to take big energy-saving actions on Reduce Your Use days.	Who This Plan Is For • Most of your electricity use is before 11am and after 6pm during the summer. • Most of your electricity use is before 5pm and after 8pm during the winter. • You're not able to take big energy-saving actions on Reduce Your Use days.

(Small size Bussiness)
> 20 kwh

Rates Effective 01/01/2016

Basic Monthly Service Fee		
Will be determined each month based on the customer's maximum annual demand. If unavailable or less than 50% of 15-min. interval data available, demand will be calculated by dividing total kWh by number of days in the billing period times 24 hours.	0-5 kW	$7.00
	>5-20 kW	$12.00
	>20-50 kW	$20.00
	>50 kW	$50.00

Energy Charge (per kWh) - UDC & EECC	"TOU-A"	"TOU-A-P"	
Summer On-Peak	$0.28	$0.24	$1.41
Summer Semi-Peak	$0.25	$0.21	$1.38
Summer Off-Peak	$0.21	$0.19	$1.36
Winter On-Peak	$0.21	$0.21	$1.38
Winter Semi-Peak	$0.20	$0.20	$1.37
Winter Off-Peak	$0.18	$0.18	$1.35
			RYU Day (11am to 6pm) Year Round

Rates Effective 01/01/2016

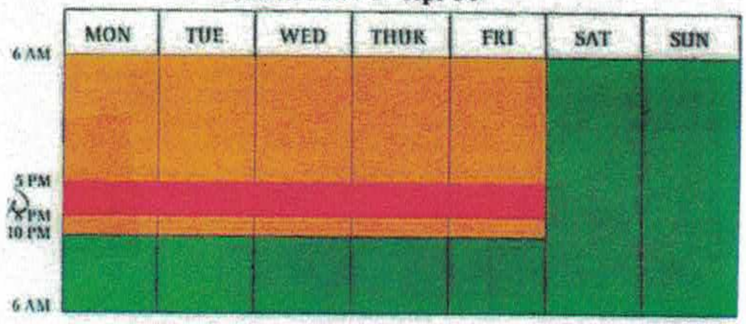
(Medium Size Bussiness
< 20 kwh)

RATE "ALTOU" SUMMARY	
Basic Monthly Service Fee (<500 kW)	$116.44
Basic Monthly Service Fee (>500 kW)	$465.74
Demand Charges (per kW)	
Non-Coincident (UDC)	$22.55
Summer On-Peak (UDC & Commodity)	$19.19
Winter On-Peak (UDC)	$6.86
Energy Charges (per kWh) - UDC & EECC	
Summer On-Peak	$0.12
Summer Semi-Peak	$0.11
Summer Off-Peak	$0.08
Winter On-Peak	$0.11
Winter Semi-Peak	$0.10
Winter Off-Peak	$0.08

The Non-Coincident Demand Charge shall be based on the higher of the Maximum Monthly Demand or 50% of the Maximum Annual Demand.

The On-Peak Period Demand Charge shall be based on the Maximum On-Peak Period Demand.

Winter: Nov 1 - Apr 30



On-Peak – Highest energy cost. Avoid energy use whenever possible.

Semi-Peak – Medium energy cost. Minimize energy use.

Off-Peak – Lowest energy cost. Use energy efficiently.
Off Peak includes these holidays: New Year's Day, President's Day, Memoria[l] Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Christmas Day. When a holiday listed above falls on Sunday, Monday shall be defined as a holiday. Friday will not be recognized as a holiday when a listed holiday falls on a Saturday.

Summer: May 1 - Oct 31

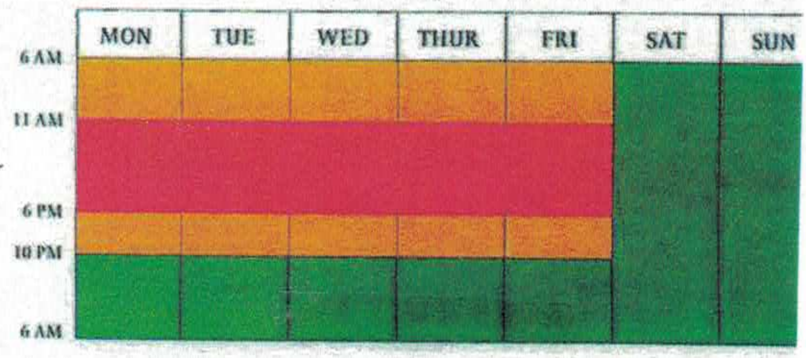


Exhibit C:

Daily Load Use Analysis of EVSE Fleet Charging by SDG&E

d. Various days of kilowatt Use average (Sept 2015):

The spike depicts charging 2 buses at one time at 2:30pm consuming the load of 35 kW at one single time from charging two buses at one time.

e. Daily Charging Behavior over 19 days (Sept 2015):

Lowest use period is at 5am and 9am, the least amount of charging is repeating at early morning.

Highest peak use at 2:30pm, this is occurring from charging after use from shift 1. Drivers need to charge as often as possible in order to complete VMT.

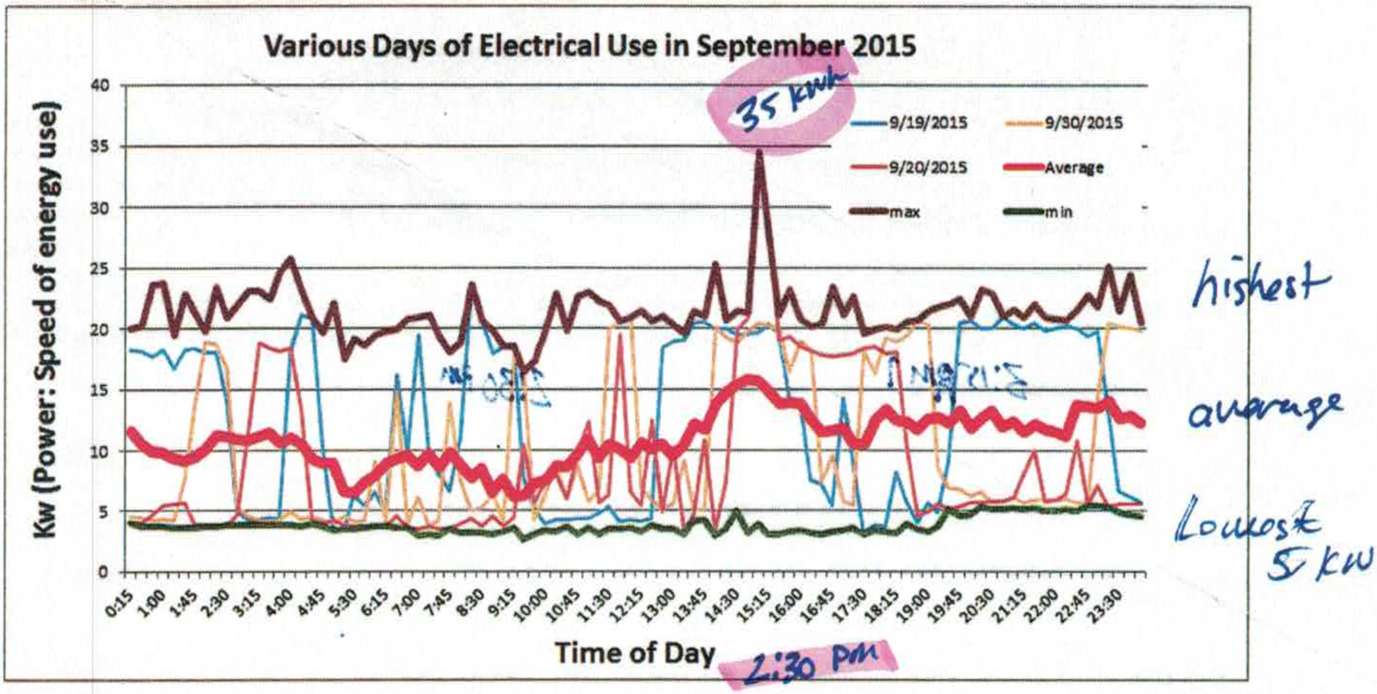
Increasing charging use throughout late afternoon and evening. Charging each time at base to be able to finish shift with enough charge.

f. Daily Charging effect of Demand Rates (Sept 2015):

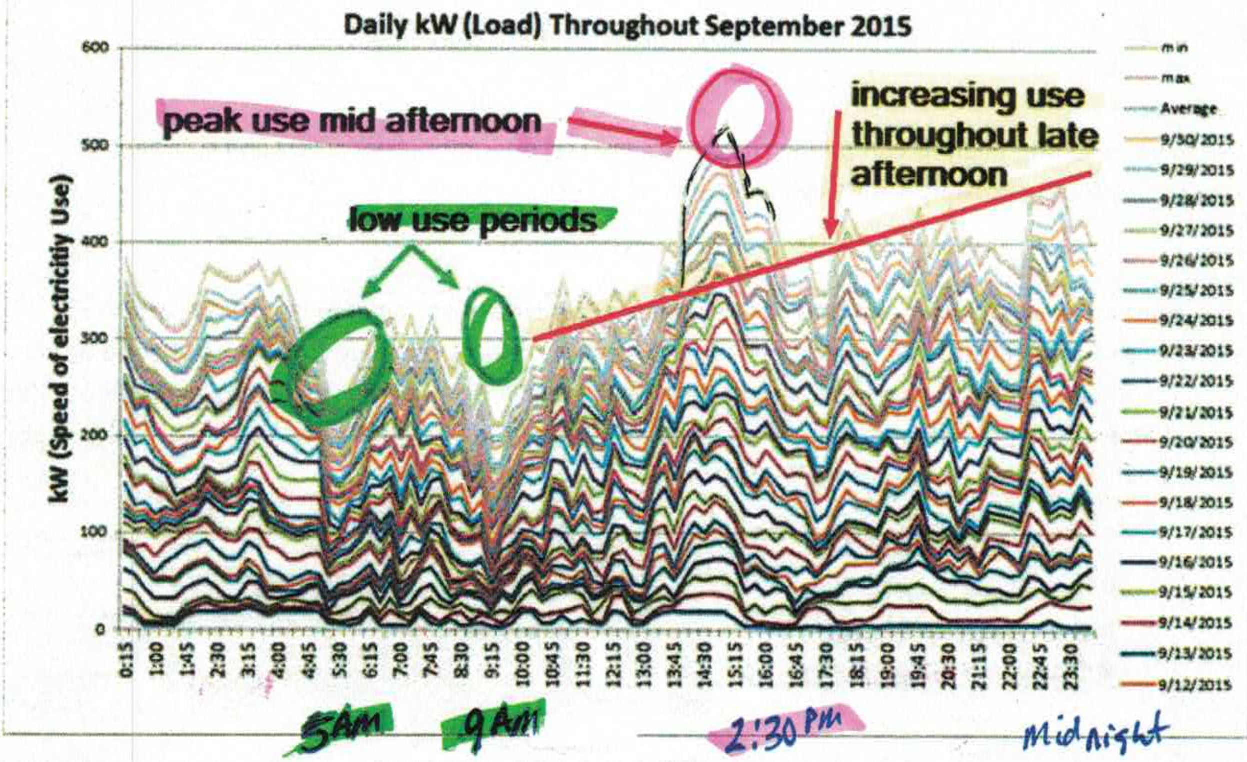
Maximum use at 3:15am: $24 per kW x 26kWh = $624

Maximum Peak time use at 2:30pm:
$20 per kW x 35kWh = $700

This chart removes most of the days to provide a simpler perspective of energy use; namely **comparing the high, low and average uses along with several individual days.**



A method to identify when electricity is used the most is to stack each day's load on top of all other days. **This creates a pronounced effect to make higher use times more obvious.**



Analysis

We have run a rate analysis comparing customer's existing operational behaviors and subsequent energy uses on the existing A Rate against the AL-TOU rate.

This chart compares all days and times of September. There does not seem to be a clear pattern of energy use suggesting random operations. Due to so many days of changing patterns we have a hard time identifying patterns. **However this chart helps us identify how current behaviors and operations would affect billing of demand charges on the ALTOU rate based on peak power usage of which there are a small handful of spikes throughout the month.**

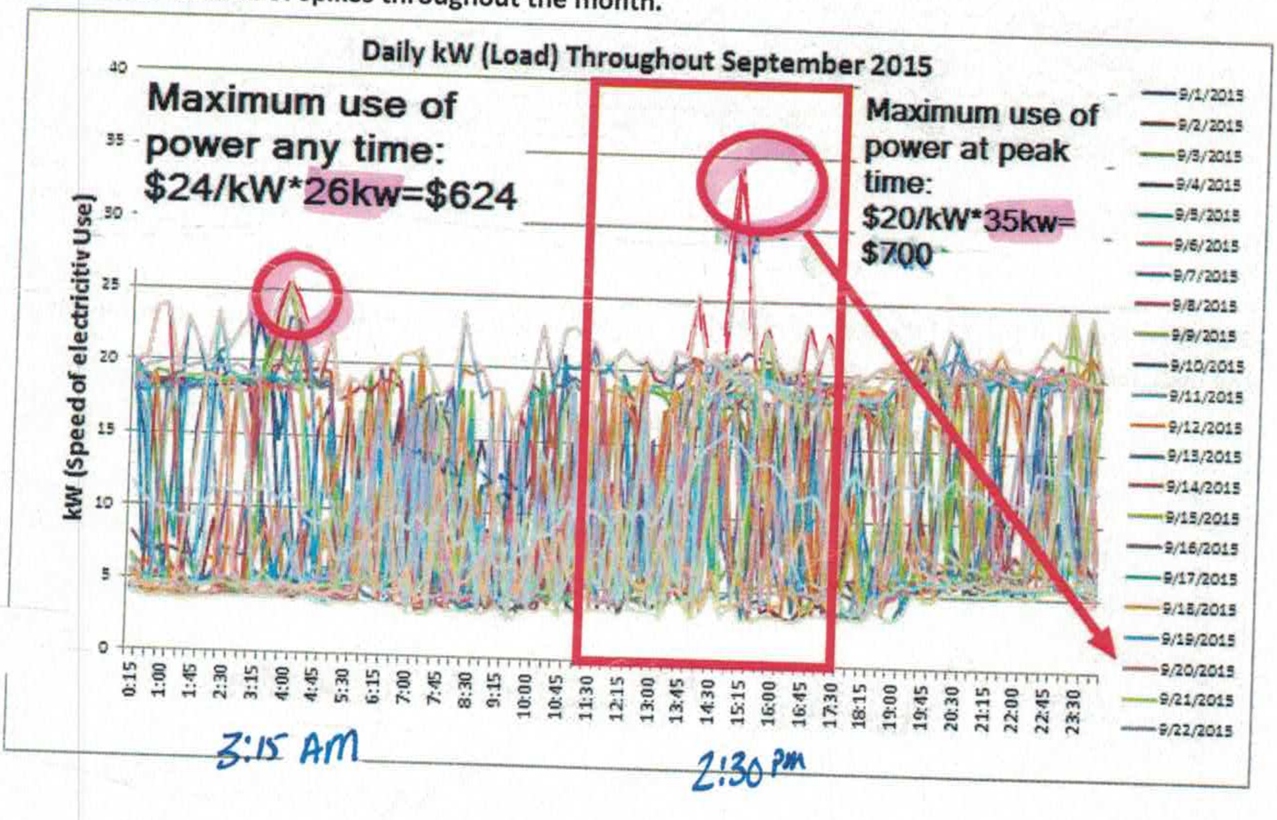


Exhibit D:

ZEV Shuttle Bus test drive Analysis by Zenith Motors

1. EVSE charging power is at 12.6 kWh. We are averaging 94% efficiency from our EVSE 13kW level 2 chargers.

2. Consumed 3.15 kWh in test drive trip 1 = 6.24 miles. We are average 2 miles per kilowatt.

Hi Scott:

Here are the assumptions of our typical use as per shuttle driver Trips and Drivers:

Trip Driving Time: 35 mins round trip

Miles Per Trip: 9.5 miles round trip

Average Driver Shift time at work: 9.5 hours

Average miles per shift: 120

Average Total Trips per Shift: 13

Total Plug in time between Trips when at base: 5 to 10 mins (goal)

Overall trip time with plugging in while loading at base for 5 to 10 mins = 45 mins

Electric passenger doors will open: 65 times per shift

Driving test : 4 test trips completed 6-11-15 started at 1pm California time:

Trip 1: 'NOTHING' turned on such as radio, fan or AC--- all items OFF.

Shorter trip by a couple of miles as we started at cell phone lot (as we were charging at the cell phone lot for a short period while we were talking with Scott and trying to get connected to get our test started).

From Cell phone lot went to Airport for 3 drop offs, then back to base. Mileage on this trip would have been approximately 7 miles. Got to base and plugged in for 10 mins

Trip 2: 'NOTHING' turned on such as radio, fan or AC--- all items OFF.

10 mile round trip: Round Trip started at Base, went to Airport for 3 or 4 drop offs, came back to base.

Charged for 20 mins.

Trip 3: 'TURNED ON' Radio, Start miles: 4876, End Miles: 4886, Start time: 2:22pm End time: 2:59pm, Charged for 7 mins.

Trip 4: 'TURNED ON' Radio, AC and Fan, Start miles: 4886, End Miles: 4895, Start time: 3:07pm End time: 3:41pm,

Charged and stayed at based remaining plugged in as testing was completed.

Scott, please send me the log that we discussed. Please note the above assumptions as we noted that the Electric Slider door took up some noticeable amps and as noted each shift will open the door 65 times on average....so something to add into our energy use. Our down time is typically only Midnight to 4am...other than this 4 hours....we run pretty steady....all day, 365 days a year as per the above assumptions.

~Lisa

From: Mark Winterink <mark.winterink@zenith-motors.com>
To: Scott Froschauer <scott.froschauer@zenith-motors.com>; lisamcghee <lisamcghee@aol.com>
Subject: Re: 6-11-2015 1pm > driving assumptions and test drive of 4 trips > to Scott
Date: Mon, Jun 15, 2015 7:41 am
Attachments: SDAP_drive_analysis.xlsx.zip (28683K)

Trip 1: 0.5379 kWh/mile (62.6 MPG-equivalent)
Trip 2: 0.5104 kWh/mile (66.0 MPG-equivalent)
Trip 3: 0.5196 kWh/mile (64.8 MPG-equivalent)
Trip 4: 0.6780 kWh/mile (49.7 MPG-equivalent)

See attached xlsx file for details. MPG-e is calculated using pure gasoline (no ethanol) 115,000 BTU/gallon.

Using the door and step,
Door is 8A (~100W) for 4 seconds to open. Step is 3A (~40W) for 2 seconds.
Combined, if they are opened and closed 200 times a day that is 0.053 kWh per day. Using my Duke Energy rate ($0.068/kWh) that is about $1.32 worth of electricity per year. The radio is even less ;)

You will find the only significantly consuming accessory is the AC and Heat. Furthermore, because our condenser is very oversized (we use the original RAM condenser) our AC is extremely efficient.

Mark Winterink
859 322 9375

Thanks Mark....our KW rate is 24 cents per KW here in San Diego....and we are in the lowest tier rate for a commercial user.

Can you please give me an updated calculation at my rate of 24 cents per KW and FYI....

We do NOT have the electric step...we only have the electric slider door. I ordered our vehicle without the step.

On a trip....what is a trip....I just want to be specific so that we are on the same page....did you calculate only the driving time...as per the test drive trips of approx. 35 mins and the distance of approx. 9.5 miles per trip?

On Trip #4....we used the AC and Fan along with the Radio....so how many KW due we use per trip if the AC is ON? That would be worth knowing too.

Trip 3: KW use and cost?

Trip 3: x 13 trips....What is KW use for 13 trips and the cost?

Trip 4: KW use and cost?

Trip 4: x 13 trips....What is KW use for 13 trips and the cost?

Can you tell when we were plugged in how much filling we are getting or I am not sure how to say this correctly....how much energy are we consuming when filling, how much do we get in 10 mins and what is the cost?

Thanks so much!

Lisa McGhee, operations manager
San Diego Airport Parking Company
2771 Kurtz St., San Diego, CA. 92110
www.sdap.net
714-881-4856, direct
619-574-1177, work

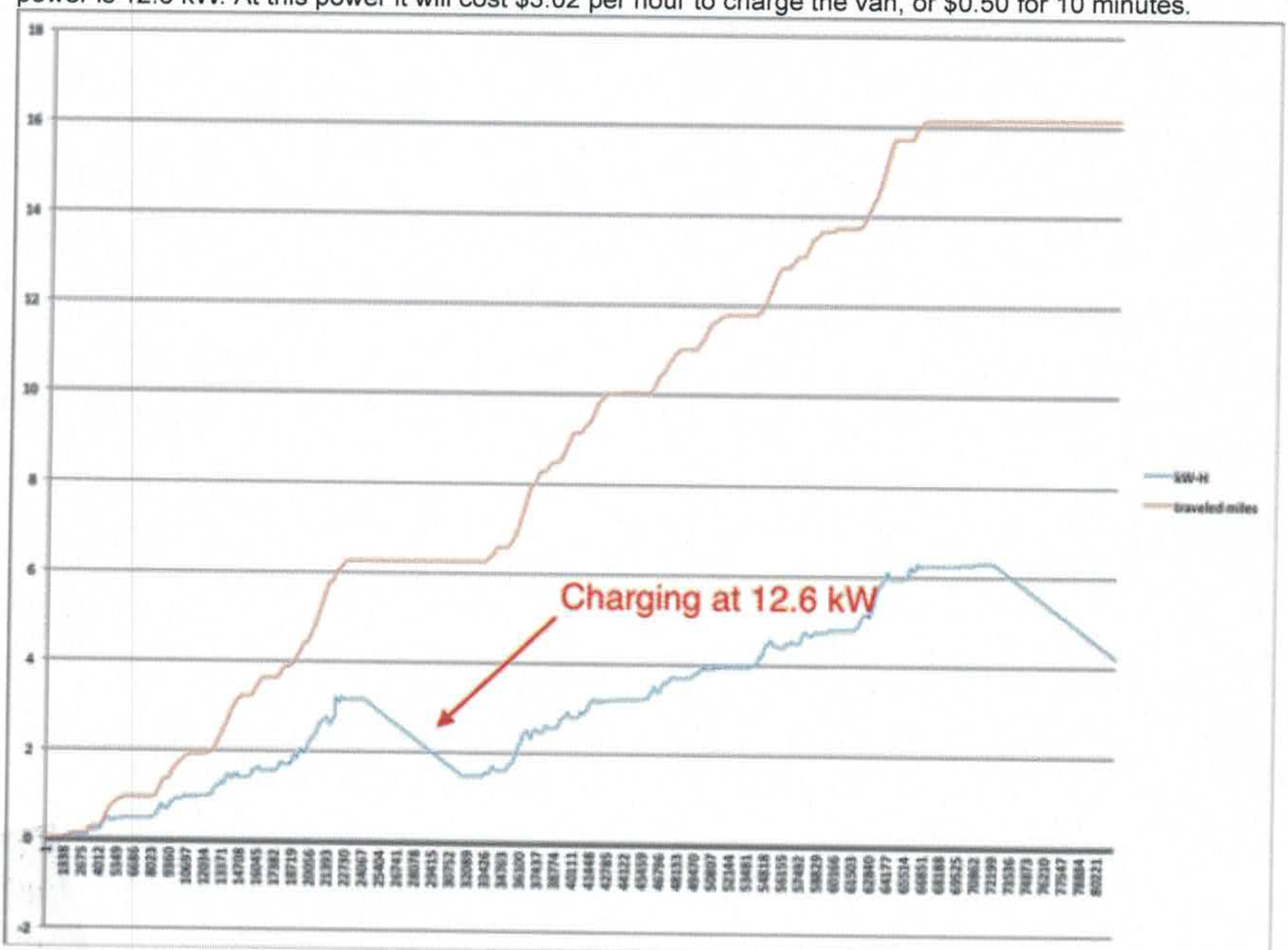
Re: 6-11-2015 1pm > driving assumptions and test drive of 4 trips > to Mark

From: Mark Winterink <mark.winterink@zenith-motors.com>
To: Lisa McGhee <lisamcghee@aol.com>
Cc: Scott Froschauer <scott.froschauer@zenith-motors.com>
Subject: Re: 6-11-2015 1pm > driving assumptions and test drive of 4 trips > to Mark
Date: Mon, Jun 15, 2015 12:27 pm

OK, at $0.24/kWh,
Trip 1: 6.24 miles, 3.15 kWh, $0.76
Trip 2: 9.88 miles, 4.74 kWh, $1.14
Trip 3: 9.68 miles, 4.73 kWh, $1.13
Trip 4: 9.10 miles, 5.8 kWh, $1.39

If you look at the graphs in the spreadsheet you can see I cut the data where speed was 0 for more than a few seconds.

In the first tab logfile(62).csv I left the entire file because it contained trip 1 and trip 2 as well as some time charging. E.g. in the time between trip 1 and trip 2 the van charged 1.688 kWh. This is current going into the battery. "Wall energy" is about 1.795kWh (the efficiency for the charger is about 94%). The average charging power is 12.6 kW. At this power it will cost $3.02 per hour to charge the van, or $0.50 for 10 minutes.



The AC uses about 1.6kW. So your 35 minute drive will use a bit less than 1kWh for the AC.

Mark

<u>Exhibit E:</u>

Remedy 1: The EV Solar Tree ARC "Drive on Sunshine"

1 A deployed solar ARC

   a. Spec sheet

2. DCFC fast charging

3. Proposal by Envision Solar

EV ARC™

Electric Vehicle Autonomous Renewable Charger

ENVISION SOLAR

EV ARC™ Deploys in Minutes - Just Drag, Drop and Charge

Drive on Sunshine, Thrive on Sunshine.

Envision Solar's patented EV ARC™ is the worlds only transportable, solar powered electric vehicle charging station.

Delivered to your location complete and ready to charge EVs, it requires no permits, no civil engineering or planning, no foundations, trenching or electrical connections, is operational within minutes and does not reduce parking space availability.

EV ARC™ Features:

- Patented sun traking technology **EnvisionTrak™** generates up to 25% more electricity than fixed solar arrays
- Zero impact deployment - no foundation or trenching
- 18'x8' base footprint (fits inside standard parking space)
- Level I or Level II charging options
- Works with any quality EV charger or service provider
  **See website for full list of features*

EV ARC™ Highlights:

- No civil engineering or site acquisition
- Fully transportable - can be moved at any time
- Charging power DAY and NIGHT
- 100% solar powered - no utility bills!
- Can charge multiple EVs at a time
- Digital and static advertising options available
- Built tough - structurally certified up to 110 MPH winds
- On-board energy storage keeps you powered during a blackout or other grid failure
- Customizable system to fit your needs - multiple sizes, charger configurations and optional features available
- Qualifies for LEED 3points
  **See website for complete highlights*

PROUDLY MADE IN AMERICA

ENVISION SOLAR INTERNATIONAL, INC. • WWW.ENVISIONSOLAR.COM • GOSOLAR@ENVISIONSOLAR.COM • 866-746-0514

Just Drag, Drop and Charge

The Fastest Way to Deploy Multi/Single Space Parking Metering and EV Charging

Introducing EV ARC™ Portable Solar Powered EV Charging Station

Drive on Sunshine, Thrive on Sunshine

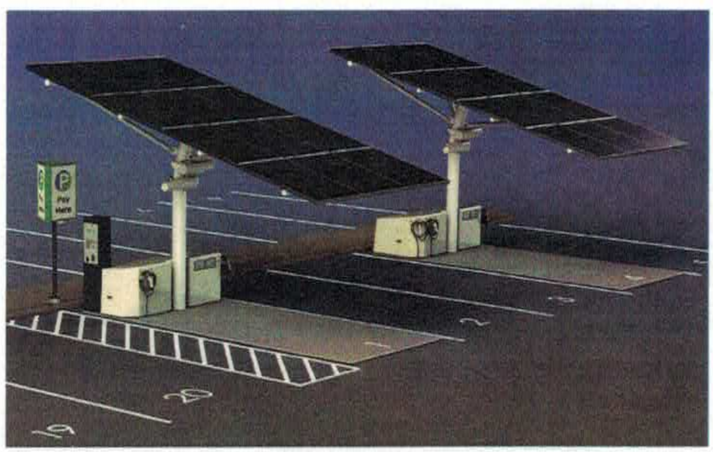
Turn Your Parking Lot into a Revenue Generator

Each EV ARC™ Can Provide:

- Advertising Revenue via High-Definition Outdoor Digital Display
- Single or Multispace Parking and Metering System *by Doc Bornee USA*

Less Hassles, More Charging

- 100% Off-Grid Solar EV Charging
- Patented Sun Tracking Technology **EnvisionTrak™**
- Installs in Minutes
- No Foundations or Trenching
- No Civil Engineering Costs
- No Electric Bills



To reserve your unit today or for more info contact:

David Greenfader
david.greenfader@envisionsolar.com
310-961-4669

Technical Specs on Reverse Side →

ENVISION SOLAR

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EV ARC™ Specifications

		EV ARC™ 3	EV ARC™ 4
Solar Array Power[1]	kW	3.4	4.1
Max Daily EV Range (Solar)[2]	e-miles	100	120
Canopy Dimensions (L x W)	ft	22 x 9.9	20.5 x 10.5
Max Height	ft	13.3	13
Min Clearance	ft	7.6	7.7
Total Battery Storage	kWh	24 or 30	
Reserve EV Range (Battery)[3]	e-miles	64 or 80	
Operating Temperature[4]	°C (°F)	-20 to 50 (-4 to 122)	
Max Wind Load	mph	110	
Basepad Footprint (L x W)	ft	18 x 7.5	
Weight[5]	lbs	Less than 8000	
Surface Loading[6]	psf	5	
Max Total EV Charger Power[7]	kW	4.2	
Max EV Charger Circuits[8]	ports	1 (L2 J1772); 2 (L1 J1772); 3 (L1 Outlets)	
EV Charger Types	n/a	Basic and Networked Options Available	
Standard Shipping Method	n/a	Custom ARC Mobility™ Trailer	
XFMR Shipping Size (L x W x H)[9]	ft	24 x 7.5 x 7.5	

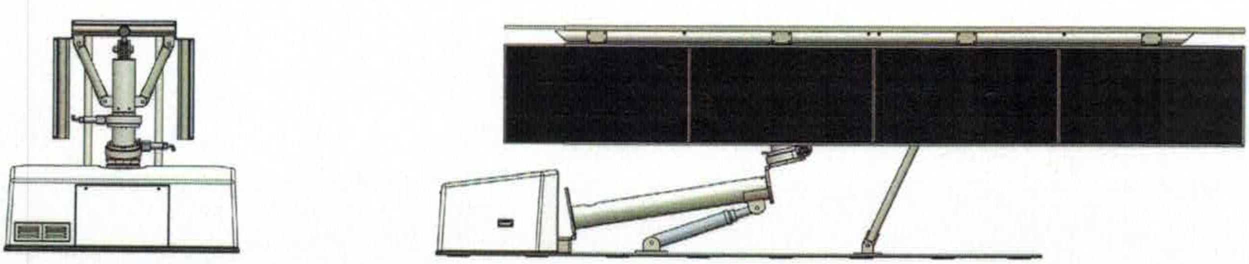
Major Component Ratings[10] UL 94 V-0 (Battery); UL 1741, CSA C22.2 No.107.1 (Inverter and Charge Controller); UL 1778 Annex FF (Inverter); UL 1703, IEC 61215, IEC 61730 (Solar Panels); UL 2594, UL 2231 (EVCS)

References:

1 Actual nameplate output may vary by +/- 5% based on panel availability
2 Range will vary based on local coditions
3 Range assuming 25°C
4 Cold weather package allows for operation to -40°C
5 Exact weight variest based on EV ARC model
6 Load calculated by weight distributed over 8, 8in x 24in anti-skidpads
7 Actual total output power depends on EV and EVCS (3.3 to 3.8kW common for L2 charging)
8 Power may be reduced based on number of circuits, EV models, and EVCS types
9 Enables domestic and international shipping on a standard flatbed trailer or shipping container
10 Subset of ratings are listed; additonal listings furnished upon request

Standard Deployed

Transformer (XFMR) Stowed



San Diego AIRPORT PARKING CO.
Servicing Since 1991

Proposal for one (1) EV ARC™4 solar charging station (Electric Vehicle Autonomous Renewable Charger)

Product Description

EV ARC™ 4 is the world's first fully autonomous, fully mobile, fully renewable electric vehicle charging station. Designed and fabricated in the US by an American company, it's dimensioned to sit comfortably inside a standard parking space (8'x18') and is ADA compliant. The electricity provided is 100% renewable, solar energy. NO foundation. NO trenching. NO grid connection. NO building permits. NO easements. NO switchgear or transformer upgrade, NO utility bill.

BUYER:

Deliver To:
San Diego Airport Parking Company
2771 Kurtz St.
San Diego, CA 92110

Bill To:
San Diego Airport Parking Company
2771 Kurtz St.
San Diego, CA 92110
Attn: Lisa McGhee

SELLER:

Envision Solar International, Inc.
9270 Trade Place
San Diego, CA 92126
ATTN: David Greenfader

EV ARC™ Components

- Twelve (12) 345w PV SUNPOWER modules or equivalent
- Structural Steel canopy, column, and ballasted pad
- Exclusive and Patented EnvisionTrak™ Sun Tracking System
- Truss Integrated LED Lights
- SunCharge™ Electric Vehicle Charging System [1 Level-2 **non-networked** charger - Bosch PowerXpress
- 30 kWhs Battery Storage and Regulation System
- EV ARC™ Grid connect
- Wireless monitoring of the BMS, Charge Controller and EnvisionTrak™ – Buyer Access to data included. (Data plan and EVSE subscription costs not included, Buyer to specify network preference)
- Custom coloring and logo design on branding valance (optional)

* **location and weather dependent – charging results will vary with climate, shading or other external impacts**

Pricing

Description	Quantity	Unit Price	Cost
EV ARC™ 4	1	$ 57,000	$57,000
Grid Connect	1	$ 1,430	$1,430
Additional Battery Pack	1	$ 4,851	$4,851
TOTAL before tax			$63,281
Sales Tax (8% San Diego)			$5,063
Sub-Total			$68,344
S&H	1	N/C	$0
Total			$68,344

The above quoted pricing does not include the significant tax incentives available which include the 30% Federal ITC and MACRS depreciation as wells as other possible state and local incentives. Tax and other incentives can be worth as much as 40% of the purchase price depending on the location and users tax rate and liability.

Payment Terms

$34,172 no later than 10 days from the date of Buyer signing this purchase contract
$34,172 upon delivery.

Please acknowledge your receipt and acceptance of this Purchase Contract by signing and returning to Envision Solar International, Inc., 9270 Trade Place, San Diego, CA 92126. A fully executed copy will be returned to you for your records.

San Diego Airport Parking Company

____

____

Signature

____

Date

Exhibit F:

Daily Interval Data of kilowatt hourly consumption. By SDG&E

(2 uploaded Excel files available upon request: lisamcghee@aol.com)