Exhibit*:* _____
Witness: Paul Chernick
Date: January 13, 2020

STATE OF CALIFORNIA

BEFORE THE PUBLIC UTILITIES COMMISSION

Application for Approval of Pacific Gas and Electric Company's Commercial Electric Vehicle Rate.	**)**	**Application 19-07-006**

DIRECT TESTIMONY OF

PAUL CHERNICK

ON BEHALF OF

THE SMALL BUSINESS UTILITY ADVOCATE

Resource Insight, Inc.

JANUARY 13, 2020

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ATTACHMENTS

I. Identification & Qualifications

Q: Mr. Chernick, please state your name, occupation, and business address.

A: My name is Paul L. Chernick. I am the president of Resource Insight, Inc., 5 Water St., Arlington, Massachusetts.

Q: Summarize your professional education and experience.

A: I received a Bachelor of Science degree from the Massachusetts Institute of Technology in June 1974 from the Civil Engineering Department, and a Master of Science degree from the Massachusetts Institute of Technology in February 1978 in technology and policy.

I was a utility analyst for the Massachusetts Attorney General for more than three years, and was involved in numerous aspects of utility rate design, costing, load forecasting, and the evaluation of power supply options. Since 1981, I have been a consultant in utility regulation and planning, first as a research associate at Analysis and Inference, after 1986 as president of PLC, Inc., and in my current position at Resource Insight. In these capacities, I have advised a variety of clients on utility matters.

My work has considered, among other things, the cost-effectiveness of prospective new electric generation plants and transmission lines, conservation program design, estimation of avoided costs, the valuation of environmental externalities from energy production and use, allocation of costs of service between rate classes and jurisdictions, design of retail and wholesale rates, and performance-based ratemaking and cost recovery in restructured gas and electric industries. My professional qualifications are further summarized in Exhibit PLC-1.

Q: Have you testified previously in utility proceedings?

A: Yes. I have testified over three hundred and fifty times on utility issues before various regulatory, legislative, and judicial bodies, including utility regulators in thirty-seven states and six Canadian provinces, and three U.S. federal agencies. This previous testimony has included planning and ratemaking for distributed resources, distributed resource planning, the benefits of load reduction on the distribution and transmission systems, utility planning, marginal costs, and related issues.

I have filed testimony in five California PUC proceedings since June 2018.

II. Introduction

Q: On whose behalf are you testifying?

A: I am testifying on behalf of Small Business Utility Advocates.

Q: What is the scope of your testimony?

A: I review the proposal of San Diego Gas & Electric (SDG&E or the Company) for an interim rate and a new permanent EV-HP rate for electric-vehicle charging by commercial customers, including "direct current fast charging ("DCFC") and medium-duty and heavy-duty ("MD/HD") charging" (page 1 of SDG&E's Application). I understand these categories to cover essentially all electric vehicle charging except for alternating-current charging of cars and light trucks.

Q: What issues do you address?

A: I address four SDG&E proposals:

- The proposed interim rate.
- The proposed inclusion in the EV-HP rate of a demand charge restyled as a "subscription charge," and the lumpiness of that subscription charge.

- The definition of the peak period.
- The request for an EV-HP Incentive Balancing Account ("EVHPIBA").

Q: What are your conclusions regarding the SDG&E proposals?

A: Some of SDG&E's intentions and proposals are laudable, including the intention to increase the penetration of electric vehicles and to reduce the adverse effect of demand charges by shifting revenue recovery to time-of-use energy rates. Unfortunately, the proposed rate design does not go far enough to eliminate demand charges, introduces new problems with the so-called subscription charge, and mis-specifies the peak period.

Q: What do you recommend?

A: I recommend that the CPUC order SDG&E to either keep the EV-HP at the TOU-M tariff (with adjustments for primary service) or:

- Eliminate the subscription rate or reduce it to direct connection costs (service drop and protective equipment, in excess of those collected in the basic service fee).
- Charge any limited the subscription charge per kilowatt, rather than in 25-kW lumps

In any case, the peak period should be extended to 11 PM, reducing the peak and off-peak energy charges to maintain the same expected revenue. This step can occur in this proceeding or in SDG&E's GRC Phase II, A.19-03-002.

In conjunction with the generic review of EV rates in R.18-12-006, the CPUC should also require SDG&E to investigate further the following issues to improve EV rate design:

- The costs that are driven by an EV customer's undiversified peak load, to refine any residual subscription charge.

- The variation by time of day of exposure to low local or state-wide supply reliability levels, to inform the choice of peak hours.
- The variation by time of day of distribution and transmission loads, to determine how T&D loads should be distributed across TOU periods.

III. The Interim Rate Proposal

Q: What was SDG&E's original proposal for an interim rate for the loads that would be covered by the EV-HP tariff, pending approval of such a tariff and the availability of SDG&E's new billing system?

A: SDG&E originally proposed to charge each EV-HP customer on the commercial rate for which it would otherwise be eligible, with "a 50% discount on the single highest priced demand charge" (p. BS-15) and to hand-bill those customers at a cost of $1 million.

Q: Did SDG&E change this interim rate proposal?

A: Yes. After considerable resistance from SBUA and other parties, SDG&E withdrew that proposal and replaced it with a proposal to bill all EV-HP customers on the TOU-M rate. Stakeholder opposition was based on the confusing and inconsistent language, the high remaining demand charges, and SDG&E's unsupportable demand for increased revenue.

Q: What is the TOU-M rate?

A: That tariff includes:

- A monthly customer charge of $101.56.
- A non-coincident demand charge of $2.22/kW-month.
- A distribution energy charge of 9.182¢/kWh, plus generation costs, to produce the total prices shown in Table 1 (as of January 2020).

Table 1: SDG&E TOU-M Rates ($/kWh) and Periods

	Summer	Winter	Hours
On-Peak	$0.3593	$0.1687	4 PM-9 PM
Off-Peak	$0.1977	$0.1605	Other hours
Super Off-Peak	$0.1539	$0.1512	12 AM-6 AM; to 2 PM March, April, weekend and holiday

Q: Is TOU-M an appropriate interim rate for the EV-HP loads?

A: Yes. While the rate includes a demand charge, that charge is reasonably small and may approximate the cost of equipment that must be sized for customer non-coincident peaks (as I discuss below), at least for large EV-HP installations.

The TOU-M design would be an appropriate permanent rate structure, as well. The final rate design should be modified over time to reflect the following:

- The rate should be differentiated to reflect the metering voltage, since some EV-HP installations may take service at primary.
- The demand charge should be reviewed and modified to better reflect the typical equipment required by the non-coincident peak load of various size customers.
- Once the SDG&E billing system is open for addition of new tariffs, and once SDG&E has representative data on EV-HP load shapes, the EV-HP tariff should be adjusted to reflect the differences in the load shape of these customers, which would mean that the EV-HP tariff would diverge from the TOU-M rate.

IV. Demand and Subscription Charges

Q: Does SDG&E recognize that demand charges are inappropriate for electric rate design?

A: Yes. SDG&E admits that its rate designs are biased in favor of customers with flat loads.

> Medium and large C&I rate design favors customers with consistent energy usage relative to their maximum demand, a metric referred to as the customer's load factor. However, DCFC and MD/HD EV customers can have lower load factors than is typical of other C&I customers. Utility general service rates typically include billing components based on maximum kilowatt ("kW") power demand – commonly referred to as demand charges – which can result in high bills for DCFC and MD/HD EV customers with low load factors (e.g., high maximum demand relative to energy use). Demand charges can also be confusing to customers. (Application at 3–4)

Q: Do SDG&E's costs of providing generation, transmission and distribution service vary with each customer's their maximum demand and thus the load factor, as defined in the quote above?

A: No. The costs of generation, transmission and most of the distribution system is not affected by customer maximum demand. The only costs that vary with customer maximum demand, as opposed to customer contribution to a diversified demand, are those associated with facilities dedicated to that customer (service drops, sometimes transformers) and—for very large customers—local facilities that experience their peak loads whenever the customer peaks.

Demand charges are generally inappropriate because they do not reflect the way that customers impose costs on the system. Demand charges are based on the customer's monthly non-coincident peak load, regardless of whether that load coincides with high-load, high-cost hours on the generation,

transmission or distribution systems. These charges fail CPUC rate design principle 4 "Rates should encourage conservation and energy efficiency."

Attachment PLC-2 is a paper I coauthored, entitled "Charge without a Cause," further explaining the shortcomings in demand charges.

Q: Given the problems with demand charges for all but the most local costs, does SDG&E propose to eliminate them from the EV-HP rate?

A: No. Laudably, SDG&E proposes to forgo the on-peak demand charges common on other commercial rates, and specifically the AL-TOU tariff on which SDG&E models the EV-HP rate, replacing them with on-peak energy charges. SDG&E also converts the non-coincident demand charge to a time-invariant energy rate. But instead of eliminating or dramatically reducing the inappropriate and inefficient non-coincident distribution demand charges, SDG&E has proposed to replace double-down with an even more arbitrary and inefficient charge, the so-called subscription charge.[1]

Q: How would SDG&E determine the billing demand for the subscription charge?

A: That is very complicated. As SDG&E witness Brittany Applestein Syz explains it (with some complications and asides removed to make the approach easier to follow):

[1] While SDG&E claims that "the energy rate differentials for EV-HP were modified to eliminate demand charges" (IR SBUA-3), it failed to eliminate demand charges.

> [When] a customer exceeds their subscription level, SDG&E will notify the customer that their maximum demand exceeded their subscribed demand level. … If the customer's maximum demand continues to exceed their subscription level after another two months SDG&E will reset their subscription level to align with the customer's actual maximum demand. The customer will then have to remain at the higher subscription level – reflective of their actual maximum demand – for at least three additional months. After three months the customer could lower their subscription level…
>
> To ensure subscription charges are consistent with customer maximum demand, the customer's subscription level will also be increased if their maximum demand exceeds the subscribed demand for 6 or more months (non-consecutive) in a rolling 12-month period. (pp. BS-11 to BS-12)

While the subscription load would be determined by load in three or six months, the subscription level would be determined by loads measured over just 15-minute intervals in each of those three or six months (IR SBUA-15).[2]

Q: Please describe the problems with SDG&E's proposal for the subscription charge.

A: SDG&E's proposed subscription charge is worse than conventional demand charges, in three ways:

- The subscription charge is essentially a demand charge that the customer must specify in advance and pay every month, regardless of actual demand. Rather than paying for the specific number of kilowatts used at peak, the customer would pay for the maximum it might use.
- SDG&E proposes to charge customers under 25 kW as if their demand were 12.5 kW and to add charges in blocks of 25 kW. Hence, an increase in demand from 24.5 kW to 25.1 kW would result in the charge from 12.5 kW to 37.5 kW.

[2] Overloading of distribution equipment is usually driven by hours of load and the build-up of heat, not be a 15-minute blip in load.

- The complicated rules for setting the subscription demand level and the large penalty for even small exceedances of previously-established demand levels will require that customers closely monitor their loads and bills, use any available storage to shift load in ways that are uncorrelated to reducing system costs, and spend time communicating with SDG&E, protesting excessive bills. Ms. Syz's description of the operation of the subscription charge suggests that the business manager would need to budget time every month to determine whether the account is subject to an increase in the subscription demand charge (based on loads in the previous three and twelve months), or eligible for a decrease; determine how much load restriction may be needed and how to schedule charging to achieve that reduction; and/or determine what reduced load level should be nominated and convince SDG&E that such reduced level is justified.

Thus, in some ways, SDG&E's proposal is worse than a conventional demand charge in providing price incentives and reflecting costs.

Q: What is SDG&E's rationale for the subscription charge?

A: SDG&E offers an explanation that is almost perfectly opaque.

> [T]he proposed EV-HP subscription charge recovers non-coincident distribution demand costs allocated to Schedule AL-TOU. (SBUA-SDG&E-DR-01 Question 14)

> The proposed EV-HP subscription charge recovers non-coincident distribution demand costs allocated to Schedule AL-TOU, which are billed to customer's based on their maximum non-coincident monthly demand. (SBUA-SDG&E-DR-01 Question 15a)

> [SDG&E believes that a subscription demand charge that the customer pays every month regardless of usage level is preferable to TOU or CPP energy charges because] distribution demand costs are incurred based on a customer's power demand and not their energy consumption, and to align with the principles of cost causation should be recovered via demand, fixed, or subscription charges. Including non-coincident distribution demand costs in CPP or TOU energy charges would not align with the principles of cost causation. (SBUA-SDG&E-DR-01 Question 19)

In other words, SDG&E claims that it is charging the subscription rate based on the customer's maximum 15-minute load at any time in the month, regardless of the state of load on the distribution system at that hour, because it is recovering unidentified "distribution demand costs" that are "incurred based on a customer's power demand and not their energy consumption."

There are no such costs above the service drop for most customers, and SDG&E does not identify any such costs. Indeed, while SDG&E claims that "SDG&E tracks costs regarding upgrades relating to EV infrastructure installations for the reoccurring Joint Investor-Owned Utility (IOU) Load Research Reports" (Cal PA-SDG&E-DR-03 Question 6), the Company admits that it "did not track distribution upgrade costs related to non-residential EV installations." (SBUA-SDG&E-DR-01 Question 21) Even if these putative non-coincident distribution demand costs exist, SDG&E would have no information on whether commercial EV installations cause any of them.

In order to support its proposed subscription charge, SDG&E must pretend that there exist costs that are not related to load conditions on the distribution system (or else either a truly coincident demand charge, a CPP charge, or a TOU energy charge would be appropriate) but are somehow

related to "demand" (so that an energy charge would not be appropriate).[3] Frankly, it is difficult to take this tortured position seriously.

Q: How does SDG&E try to justify the lumpiness of the proposed subscription charge?

A: Specifically with respect to the proposal to charge for demand (which can be measured in units smaller than kilowatts) in blocks of 25 kW, SDG&E claims that:

> Delineating the EV-HP subscription charge in 25 kW increments is intended to reduce bill instability and simplify the customer experience. (SBUA-SDG&E-DR-01 Question 16).

> [T]he reason for using 25 kW demand ranges in the proposed EV-HP subscription charge is to simplify the customer experience. (SBUA-SDG&E-DR-01 Question 16a).

> The subscription charge is intended to provide greater bill stability and a simpler customer experience than existing demand charges (SBUA-SDG&E-DR-01 Question 18).

As described above, the co-called subscription charge would greatly complicate the customer experience. Some customers may see greater bill stability, by (for example) paying for 75 kW to be allowed to take 51 kW in some months and far less in others. Others will see greater instability, as the arbitrary subscription measurement jumps around (as described by Ms. Syz), even if monthly energy remains constant.

[3] Interestingly, the TOU-M rate recovers all distribution costs through a single non-time-differentiated energy rate, indicating that SDG&E has not bothered to even partially time-differentiated distribution in other tariffs. The EV-HP would collect through peak energy charges the most narrowly defined portion of the distribution cost (the revenues recovered from the on-peak demand charge in Schedule AL-TOU); the remainder should be recovered through either time-differentiated or flat energy charges.

Q: If SDG&E is really concerned about bill stability, how could it address that concern?

A: I suggest that SDG&E offer an option for level billing, for those customers who prefer it. That may be helpful for budgeting, for the smaller EV-HP customers. Levelized billing would provide greater bill stability than the subscription charge, which is not inherently stable and would only affect one portion of the bill.

Q: Is there any rationale for charging the subscription charge for multiple-kW increments?

A: No. So far as I can tell, utilities have always levied demand charges per kilowatt or kVA. The subscription charge is just a less-flexible demand charge. Requiring a customer who needs one more kilowatt of non-coincident capacity to pay for 25 kW has no economic rationale.

Q: Is there any reasonable role for a subscription charge in any retail electric rate?

A: Only where the customer's undiversified non-coincidental peak affects the sizing, wear or stress on some equipment. For any customer with a dedicated service drop, their non-coincidental peak determines the sizing of that line. The same is true for the transformer serving the customer, if the customer does not share the transformer with anyone else, or dominates the transformer. As we travel up the distribution system, the customer's non-coincidental peak becomes less important: only a very large load will independently determine the peak hours on a feeder, let alone a substation.

V. Time-of-Use Periods

Q: Did SDG&E select appropriate TOU periods?

A: Not entirely. SDG&E appears to have simply used the "TOU periods adopted for SDG&E customers in Decision 17-08-030" (SBUA-SDG&E-DR-01 Question 2), which would have been based on a record that is now at least four years out of date.

The proposed peak period is 4–9 PM year-round, including both weekdays and weekends. That period appears to be too early.

The period with high market energy prices extends much later, to about 11 PM. Generation capacity costs, to maintain reliability locally and statewide, may also be driven by loads in a somewhat different daily pattern than the energy costs, but will also tend to be pushed later as solar generation reduces net load in the late afternoon.

VI. EV-HP Balancing Accounts

Q: Is there any reason to track and recover lost revenues from the interim or final EV-HP tariffs?

A: There is a rationale for tracking revenue differences between existing customers who are currently billed on other large-commercial rates and are shifted to TOU-M as an interim rate. That reduction in revenues should be tracked and recovered from large commercial customers, to minimize shifting of revenue responsibility among classes.

On the other hand, any increase in EV-HP customers or sales due to the interim rate is simply load growth, and need not be tracked for ratemaking.

SDG&E also proposes a tracker for its proposed short-term discount from the subscription charge on the permanent EV-HP. The subscription charge is unnecessary, and the discount is probably not necessary, either.

Q: Is it appropriate to recover the costs recorded in any EV-HP balancing accounts from all customers through Public Purpose Program ("PPP") charges?

A: No. Any costs of the EV-HP rate are offset by benefits to large non-residential customers, and should be recovered from that group. If SDG&E finds in the future that a significant number of the EV-HP customers are associated with small commercial customers, it should propose a mechanism for allocating costs between the small and large customer groups, in proportion to benefits.

Q: Does this conclude your testimony?

A: Yes.