Exhibit: _____
Witness: Paul Chernick
Date: February 20, 2020

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of San Diego Gas & Electric Company (U-902-E) for Approval of Electric Vehicle High Power Charging Rate.	Application 19-07-006 (Issued July 3, 2019)

REBUTTAL TESTIMONY OF PAUL L. CHERNICK ON BEHALF OF SMALL BUSINESS UTILITY ADVOCATES

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SBUA
Small Business Utility Advocates

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I. Introduction

Q: Are you the same Paul Chernick who filed direct testimony in this proceeding?

A: Yes.

Q: What is the scope of this rebuttal testimony?

A: I comment on aspects of the proposal of San Diego Gas & Electric ("SDG&E "or "Company") that were raised in the direct testimony of other parties regarding the new permanent EV-HP rate for electric-vehicle charging by commercial customers.

Q: What issues do you address?

A: I address the following three issues:

- The meaning of a subsidy in the context of setting an appropriate revenue requirement for the EV-HP rate.
- Discounting of the permanent rate, compared to TOU-M, to ensure that the energy cost per mile for electric vehicles is less than that of comparable oil-fueled vehicles, but above marginal costs.
- The definition of the pricing periods.

Q: How have your conclusions regarding the SDG&E proposals changed since you filed your direct testimony in this proceeding?

A: While most of my concerns have been verified and supported by the testimony of other parties, I realized that the TOU-M rate may not be competitive with diesel and gasoline fuels, undermining statewide policy intentions. I have also found more guidance in redefining the TOU-M pricing periods to more accurately reflect SDG&E costs.

Q: How have your recommendations changed?

A: In addition to the recommendations in my direct testimony I recommend that, if the California Public Utilities Commission ("CPUC") decides to use TOU-M as a model for the EV-HP rate (which appears to be the easiest way forward), it should order SDG&E to set the EV-HP energy and especially demand charges below those of the TOU-M rate, to ensure that the EV-HP rate is competitive with fossil fuels.

My recommendations regarding the TOU periods are now more nuanced, as discussed in Section IV. The peak period should be moved later in the evening, and the summer and winter super off-peak periods should be modified to better align with costs.

II. The Meaning of "Subsidy"

Q: How does the concept of subsidy arise in this proceeding?

A: Both SDG&E and CalPA have suggested that any EV-HP rate that collects less than fully allocated cost constitutes a subsidy. For example, SDG&E argues that:

> Because SDG&E considers the subscription charge discount to be a cost that EV-HP customers would normally be responsible for but that must be recovered from other ratepayers, it is in effect a subsidy. SDG&E generally considers any EV-HP revenue collection that is below customers' otherwise applicable tariff (e.g. AL-TOU) to be a revenue shortfall that must be recovered from other ratepayers—i.e., a subsidy. (SDAP-CalPA DR-02, Q1)

CalPA has a more nuanced view of subsidization:

> Subsidization occurs when a given customer group contributes less revenue than its cost responsibility and SDG&E collects this lost revenue from other ratepayers in order to make itself whole. [That is, to cover its total cost of service plus a Commission-approved rate of return.] EV-HP load is essentially retained or incremental load that is attracted due to the offer of effective rate discounts, similar to SDG&E's Economic Development Rates, hence the appropriate measure of revenue under-collections (i.e. subsidization) or over-collections is a Contribution to Margin (CTM) analysis, because this type of analysis measures actual EV-HP revenues against the costs the utility incurs at the margin to EV-HP load. In the context of EV-HP, subsidization would occur if EV-HP participants contribute less revenue than the marginal costs price floor [Consisting of the sum of marginal costs and non-bypassable charges] in a CTM analysis. (SDAP/CAL PA-DR-03, Q1)

Q: Is this SDG&E's application of the term "subsidy" useful in the context of this proceeding?

A: No. SDG&E's references to costs "that EV-HP customers would normally be responsible for" and "revenue collection that is below customers' otherwise applicable tariff" mischaracterize the purpose and context of the EV-HP rate. Without an EV-HP rate that is lower than the generally applicable rates, electric-vehicle charging will be quite limited, there will be little EV-HP load and the potential EV-HP customers would not be "responsible for" any costs. The concept of an "otherwise applicable tariff," for loads that would not otherwise exist, is meaningless.

Q: What would be the effect on other customers of minimizing EV-HP subsidies, as SDG&E defines them?

A: Other customers, including small businesses that do not use EV-HP charging, would wind up with higher revenue requirements, because the EV-HP customers would not exist and would not contribute anything to SDG&E's embedded revenue requirements.

Q: What is the difference between a subsidy and an incentive, in utility practice?

A: In my experience, parties refer to payments and discounts of which they approve as "incentives," while calling similar payments and discounts they dislike as "subsidies." Calling a payment for energy-efficiency or a discount for load retention a subsidy is propaganda, not a technical assessment. The same is true for restyling a rate reduction as an incentive.

There are policies that indisputably involve subsidies, such as discounts for low-income customers. These subsidies are not intended to either encourage specific customer behavior (no one wants to encourage people to be poor, so they can get lower electricity prices) or reflect cost differentials.[1] That use of "subsidy" does not apply to the EV-HP rate, which is intended to encourage behavior that both benefits other ratepayers, by contributing some revenue to cover non-marginal costs, and achieves important objectives of all levels of California government.

Q: What is the appropriate measure of whether an EV-HP rate benefits other customers?

A: The EV-HP load will primarily be incremental load, not shifting of load from another tariff. Hence, so long as the EV-HP revenues cover the marginal or incremental costs of serving the EV-HP load, other customers are no worse off.[2] If the EV-HP tariff covers anything more than marginal cost, other customers will pay lower rates due to the EV-HP revenue. Thus, a tariff that resulted in new customers who paid only

[1] Low-income customers may in fact be less expensive to serve than higher-income customers, at least for some utilities, but this is not the basis for the CARE rates, for example.

[2] That statement applies to customers *qua* customers. To the extent that customers are also people with lungs and ears, or people and enterprises that will suffer the effects of climate change, or taxpayers who would otherwise need to spend more on tax incentives to encourage transportation electrification in the face of high EV-HP rates, customers will be better off with EV-HP tariffs that just cover marginal costs than with higher EV-HP rates.

marginal cost and non-bypassable charges would benefit all ratepayers who would have otherwise paid the non-bypassable charges.

Q: How does that test differ from the tests proposed by SDG&E?

A: SDG&E defines any revenue below the otherwise applicable tariff as a subsidy. As I explained above, this definition is not a useful tool in designing the EV-HP rate.

CalPA suggests that any tariff that collects less than allocated marginal cost plus non-bypassable costs is an improper subsidy. So long as the tariff collects more than marginal cost and contributes to the non-bypassable costs, additional load is beneficial to other rate classes and cannot be considered a subsidy. Nonetheless, I sympathize with CalPA's desire for each class to contribute to non-bypassable costs, so long as that does not interfere with important policy objectives.

Q: Would the subsidy concepts applied by CalPA and SDG&E be counter-productive in other settings, as well?

A: Yes. For example, a restaurant may decide to open for lunch, offering prices lower than those on the dinner menu. SDG&E would say that the lunch menu is a subsidy, since it would charge patrons less than the otherwise applicable dinner menu. CalPA would say that the lunch menu is a subsidy, so long as it would charge patrons less than the marginal cost of the lunch service, plus a predetermined share of the certain unavoidable costs. Avoiding subsidies, as defined by either of these parties, might well result in the lunch service failing, producing no revenues to cover common costs, forcing the restaurant to raise dinner prices or go out of business.

Q: Do you have any concerns about the manner in which CalPA computed the marginal and full-allocated cost of EV-HP service?

A: Yes. I understand that other parties, including San Diego Airport Parking ("SDAP"), will be discussing these problems in some detail, so I will only briefly touch on this subject.

It appears that CalPA has applied demand costs per kilowatt of coincident load (at the ISO, regional, substation or feeder level) to customer non-coincident peaks, which are assumed to equal the total connected load. (SDAP-CalPA DR-01, Q6 Attachment) Even without any special rate provisions, such as time-of-use rates, the peaks of EV charging customers (which will sometimes equal connected load and

sometime be lower) will tend to be widely dispersed through the day and the month.[3] There is no reason to believe that those peaks will all (or even mostly) coincide with the peak loads on the customer's feeder, substation, or transmission lines, or the regional net generation peak. If my understanding of CalPA's computations is correct, it has greatly overstated the marginal cost of serving EV-HP load.

While CalPA appears to be attempting to protect residential customers, its approach would result in higher rates for all non-EV customers than would an EV-HP tariff that charges less per kWh, but collects some revenue above marginal cost.

III. The Rate Proposal

Q: Have you reexamined your recommendation that the TOU-M rate be used as the interim and permanent EV-HP rate?

A: Yes. It is not clear whether it is feasible for SDG&E, prior to activation of its new billing system, to implement a rate more appropriate to EV-HP charging than the TOU-M rate. Thus, my concerns may be most applicable to the design of the permanent rate.

Q: What concerns do you have with the permanent use of the TOU-M rate as the EV-HP rate?

A: I have two concerns. First, analysis by other parties, such as SDAP have indicated that the TOU-M rate would result in EV-HP rates that would make electric propulsion more expensive than gasoline or diesel, per mile traveled. That would undermine the legislative and regulatory mandate to electrify transportation.

Second, the time-of-use energy rates are not properly aligned with SDG&E's costs.

Q: How should the first concern be resolved?

A: The permanent EV-HP rate should reduce the TOU-M demand and energy charges to the extent necessary to bring the cost per mile for common charging applications

[3] CalPA's error may result in part from its reliance on demand allocators for costs that are incurred by load in many hours. This issue is discussed in greater detail in Lazar, et al., "Electric Cost Allocation for a New Era: A Manual," www.raponline.org/knowledge-center/electric-cost-allocation-new-era/.

below the cost for oil-fueled engines. Other parties with more information about mile-per-kWh and mile-per-gallon consumption and about charging patterns for various use cases are better positioned than SBUA to recommend the magnitude of that reduction. In general, reduction or elimination of the demand charge should be prioritized.

The reduction should not bring the rates below marginal cost, appropriately estimated.

IV. Time-of-Use Periods

Q: Please elaborate on your second concern.

A: The structure of the TOU-M energy rates has two problems. First, the distribution rate is not time-differentiated. Second, the TOU periods do not match well to SDG&E's costs.

Q: Please describe the mismatch between the TOU-M periods and SDG&E's costs.

A: SDG&E's TOU-M periods are shown in Table 1. Most importantly, the peak period runs from 4 PM to 9 PM every day, and the super-off-peak period runs from midnight to 6 AM weekdays in most months, with extensions to 2 PM in March and April weekdays and all weekends and holidays. SDG&E does not appear to be proposing any change in these periods in its Phase II GRC proceeding, A.19-03-002.

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

These periods do not appear to coincide well with SDG&E's actual cost patterns. Since TOU rates will not shift EV-HP charging between months, I focus on the cost patterns within months.

Q: What mismatches have you identified?

A: First, the designated peak hours do not appear to match well with locational marginal price variation over the day or week. Table 2 shows the LMP for each weekday hour (e.g., the average price in the 9 AM hour, across all weekdays) in each month,

normalized to the highest hourly price. I used 2019 prices at the Urban 6 substation for this illustration.

Cells in red are the highest hours in each month, while cells in blue are the lowest.

Table 2: Relative Weekday LMP Patterns by Month

Hour Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	May to Sept	Non-summer
1	0.54	0.54	0.48	0.34	0.35	0.33	0.37	0.39	0.40	0.39	0.35	0.48	0.42	0.37	0.44
2	0.52	0.52	0.45	0.31	0.30	0.30	0.35	0.37	0.38	0.37	0.34	0.46	0.39	0.34	0.41
3	0.51	0.51	0.43	0.29	0.26	0.29	0.33	0.36	0.36	0.36	0.33	0.45	0.37	0.32	0.39
4	0.51	0.51	0.43	0.29	0.27	0.28	0.32	0.35	0.36	0.36	0.33	0.46	0.37	0.31	0.39
5	0.54	0.55	0.48	0.33	0.34	0.31	0.34	0.36	0.37	0.38	0.36	0.48	0.40	0.34	0.43
6	0.60	0.70	0.63	0.49	0.53	0.38	0.41	0.42	0.44	0.45	0.41	0.53	0.50	0.43	0.54
7	0.76	0.89	0.82	0.64	0.65	0.42	0.42	0.47	0.54	0.58	0.48	0.67	0.61	0.50	0.68
8	0.79	0.78	0.73	0.61	0.62	0.37	0.39	0.43	0.50	0.53	0.38	0.57	0.56	0.46	0.63
9	0.63	0.56	0.51	0.43	0.53	0.39	0.32	0.36	0.39	0.36	0.32	0.26	0.42	0.40	0.45
10	0.58	0.45	0.35	0.35	0.47	0.37	0.37	0.39	0.36	0.25	0.26	0.20	0.37	0.39	0.36
11	0.48	0.40	0.27	0.29	0.45	0.42	0.39	0.45	0.37	0.22	0.23	0.14	0.34	0.42	0.31
12	0.48	0.37	0.22	0.26	0.39	0.43	0.42	0.47	0.44	0.21	0.22	0.13	0.34	0.43	0.29
13	0.42	0.33	0.19	0.27	0.37	0.44	0.45	0.52	0.52	0.24	0.23	0.19	0.35	0.46	0.28
14	0.43	0.33	0.17	0.25	0.31	0.40	0.48	0.64	0.52	0.26	0.26	0.18	0.35	0.47	0.27
15	0.45	0.35	0.22	0.24	0.30	0.50	0.50	0.65	0.60	0.28	0.30	0.28	0.39	0.51	0.30
16	0.54	0.45	0.28	0.27	0.33	0.49	0.80	0.72	0.62	0.34	0.40	0.44	0.47	0.59	0.38
17	0.72	0.64	0.40	0.33	0.29	0.50	0.59	0.61	0.61	0.41	0.61	0.65	0.53	0.52	0.51
18	1.00	0.84	0.58	0.45	0.39	0.49	0.62	0.67	0.73	0.65	1.00	1.00	0.70	0.58	0.74
19	0.95	1.00	0.83	0.67	0.61	0.77	0.72	0.87	1.00	1.00	0.68	0.88	0.83	0.79	0.83
20	0.85	0.90	1.00	1.00	0.96	1.00	1.00	1.00	0.98	0.77	0.55	0.78	0.90	0.99	0.85
21	0.76	0.85	0.85	0.85	1.00	0.81	0.72	0.68	0.66	0.58	0.48	0.66	0.74	0.77	0.75
22	0.67	0.78	0.75	0.67	0.75	0.54	0.55	0.55	0.56	0.51	0.44	0.61	0.61	0.59	0.65
23	0.61	0.66	0.62	0.50	0.55	0.41	0.46	0.47	0.48	0.47	0.40	0.56	0.52	0.47	0.55
24	0.56	0.60	0.56	0.42	0.42	0.34	0.40	0.42	0.44	0.42	0.38	0.53	0.46	0.40	0.49

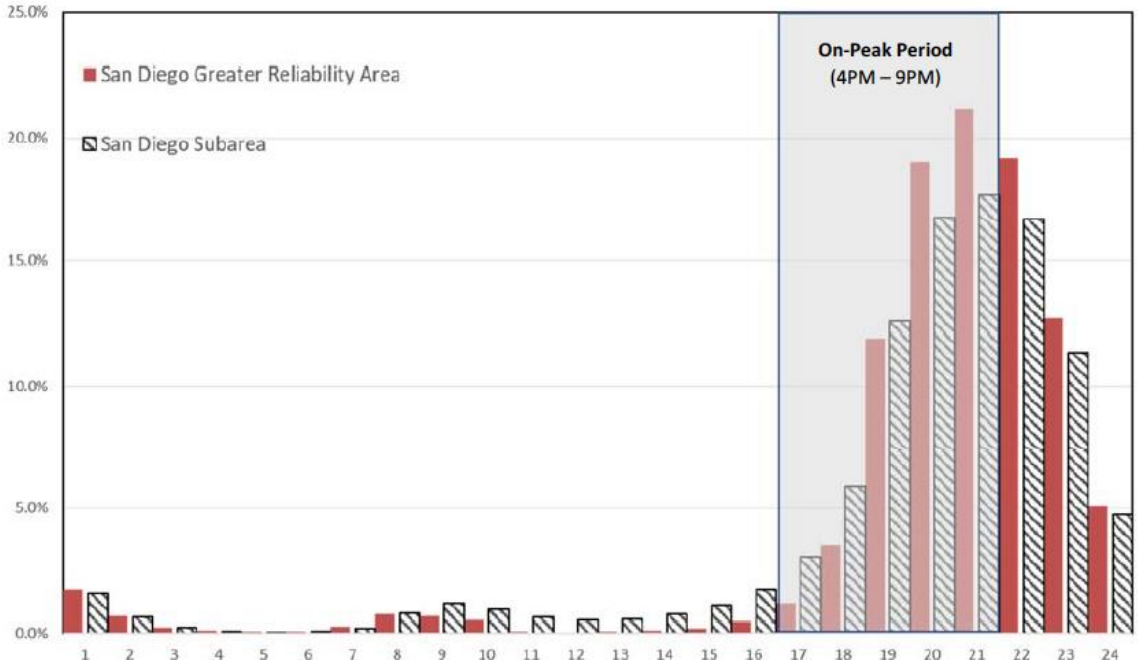
Table 3: Relative Weekend LMP Patterns by Month

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	May to Sept	Non-summer
1	0.68	0.72	0.55	0.49	0.43	0.43	0.47	0.51	0.57	0.56	0.50	0.58	0.61	0.48	0.56
2	0.65	0.68	0.52	0.44	0.37	0.38	0.45	0.50	0.56	0.54	0.48	0.56	0.57	0.45	0.53
3	0.63	0.64	0.48	0.39	0.32	0.36	0.43	0.48	0.54	0.53	0.46	0.54	0.54	0.43	0.50
4	0.64	0.61	0.47	0.38	0.31	0.35	0.42	0.47	0.54	0.52	0.47	0.54	0.53	0.42	0.49
5	0.66	0.65	0.49	0.43	0.36	0.36	0.42	0.47	0.53	0.53	0.48	0.54	0.55	0.43	0.52
6	0.69	0.71	0.56	0.48	0.43	0.42	0.44	0.50	0.57	0.57	0.51	0.57	0.60	0.47	0.57
7	0.73	0.78	0.63	0.51	0.37	0.38	0.41	0.51	0.58	0.62	0.52	0.59	0.62	0.45	0.59
8	0.69	0.67	0.55	0.36	0.19	0.22	0.36	0.42	0.53	0.59	0.45	0.59	0.53	0.34	0.51
9	0.62	0.87	0.41	0.13	0.14	0.11	0.26	0.26	0.38	0.48	0.36	0.40	0.44	0.23	0.43
10	0.56	0.65	0.27	0.02	0.11	0.10	0.31	0.27	0.30	0.33	0.27	0.31	0.35	0.22	0.31
11	0.49	0.44	0.19	0.00	0.07	0.09	0.33	0.32	0.31	0.28	0.21	0.25	0.29	0.22	0.24
12	0.43	0.27	0.13	<0	0.03	0.11	0.39	0.37	0.36	0.31	0.24	0.18	0.26	0.25	0.20
13	0.40	0.26	0.10	<0	0.02	0.15	0.50	0.43	0.43	0.31	0.22	0.27	0.29	0.31	0.20
14	0.43	0.34	0.10	<0	0.02	0.21	0.62	0.55	0.48	0.39	0.27	0.30	0.34	0.38	0.23
15	0.50	0.55	0.11	<0	0.02	0.28	0.48	0.61	0.65	0.42	0.35	0.43	0.41	0.41	0.29
16	0.62	0.54	0.16	0.00	0.04	0.35	0.56	0.80	0.58	0.41	0.47	0.59	0.48	0.47	0.35
17	0.74	0.88	0.28	0.05	0.05	0.37	0.58	0.58	0.64	0.49	0.64	0.72	0.59	0.44	0.48
18	0.95	0.90	0.55	0.29	0.21	0.45	0.63	0.64	0.81	0.73	1.00	1.00	0.78	0.55	0.71
19	1.00	1.00	0.84	0.63	0.49	0.65	0.72	0.85	0.99	1.00	0.76	0.90	0.91	0.74	0.83
20	0.90	0.93	1.00	1.00	0.80	1.00	1.00	1.00	1.00	0.88	0.68	0.81	1.00	0.96	0.88
21	0.82	0.89	0.88	1.00	1.00	0.97	0.80	0.78	0.81	0.75	0.62	0.69	0.90	0.87	0.83
22	0.75	0.84	0.79	0.79	0.72	0.63	0.66	0.65	0.70	0.68	0.55	0.64	0.77	0.67	0.72
23	0.71	0.76	0.71	0.58	0.51	0.48	0.54	0.56	0.63	0.62	0.53	0.62	0.67	0.54	0.63
24	0.66	0.70	0.58	0.50	0.42	0.41	0.48	0.52	0.57	0.56	0.49	0.58	0.60	0.48	0.56

While the monthly price patterns vary, the general is an on-peak period (relative LMP > 0.5) in the hours ending 6 PM to 10 or 11 PM, with additional peak hours in the non-summer hours ending 6 AM to 8 AM and perhaps in the summer ending at 4 and 5 PM. The super off-peak (relative price < 0.4) is something like midnight to 5 AM in the summer and 10 AM to 4 PM in the non-summer months.

The LMP-based peak periods are consistent with the LOLE distribution in Figure 1 of Attachment B (Generation Demand Charge Study Results) of Supplemental testimony of Jose Lopez, William Saxe, Benjamin Montoya and Talal Hanna in A.19-03-002. I reproduce that as Figure 1, below.

Figure 1: Relative Loss of Load Expectation for the San Diego Local Capacity Areas by Hour Ending



This figure shows that SDG&E's 4–9 PM peak period misses a large part of the high-LOLE hours (ending 10 PM, 11 PM and perhaps even midnight) and includes hours with low contribution to LOLE (ending 5 PM and perhaps 6 PM). If the hour from 5 to 6 PM is included in the peak period based on contribution to LOLE, so should be the hour ending midnight.

SDG&E has not provided comparable information on the pattern of distribution and transmission costs (as measured by peak loads or other stressors) over the course of the day. However, in the Demand Charge Workshop Report in A.10-07-009 and A.19-03-002, SDG&E reported that about 33% to 42% of circuits hit their peak loads outside the 4 PM to 9 PM period, as reproduced in Table 4. SDG&E has not provided even this minimal level of detail for the percentage of peak feeder loads in MW or MVA that occur outside the SDG&E peak, nor any data on substation peaks or subtransmission peaks, nor any data from 2017 through 2019.

Table 4: Count of SDG&E Feeders Peaking in its Legacy Peak Period

	Circuit - % Peaking	
	On-peak (4pm - 9 pm)	All Other Hours
2014	58.2%	41.8%
2015	59.1%	40.9%
2016	67.0%	33.0%

Q: How should the TOU periods be set for the EV-HP rate?

A: The Commission should require that SDG&E provide a comprehensive analysis of the temporal distribution of the drivers of generation, transmission and distribution costs and provide a proposal consistent those causal factors. Depending on the timing, that might be part of this proceeding or in A.19-03-002.

Q: Does this conclude your rebuttal testimony?

A: Yes.