Docket:	:	A.17-01-020, et al.
Exhibit Number	:	
Commissioner	:	Peterman
Admin. Law Judges	:	Wong, Cooke,
	:	Goldberg
Judge	:	Rick Tse
ORA Project Mgr.	:	

OFFICE OF RATEPAYER ADVOCATES
CALIFORNIA PUBLIC UTILITIES COMMISSION

TESTIMONY

ON

PACIFIC GAS AND ELECTRIC COMPANY'S

DIRECT CURRENT FAST-CHARGE

MAKE-READY STANDARD REVIEW

PROGRAM

A.17-01-020, et al.

San Francisco, California
July 25, 2017

192582349

TABLE OF CONTENTS

PAGE

I. MEMORANDUM

This report was prepared by the Office of Ratepayer Advocates in Application 17-01-020. In this docket, the applicant, Pacific Gas and Electric Company requests Commission approval to implement its Fast-Charge Standard Review Program pursuant to Senate Bill 350 (Chapter 547, Statutes of 2015). In this report, ORA presents its analysis and recommendations associated with PG&E's request.

Rick Tse is ORA's witness for this report and his prepared qualifications and testimony are contained in Appendix A.

ORA's counsel for this proceeding is Tovah Trimming**.**

.

II. EXECUTIVE SUMMARY

In accordance with Rule 13.8 of the California Public Utilities Commission Rules of Practice and Procedure, and the April 13, 2017 Scoping Memo and Ruling of Assigned Commissioner and the Administrative Law Judges, the Office of Ratepayer Advocates ("ORA") submits this testimony on the standard review projects ("SRPs") proposals relating to fast-charging infrastructure filed by Pacific Gas and Electric Company ("PG&E") in Application ("A.") 17-01-020.

PG&E proposes to implement a make-ready infrastructure program for customers interested in hosting Direct Current Fast Chargers ("DCFC") for light-duty vehicle use. The proposed DCFC Make-Ready Program ("Fast-Charge Program") could cost $22.4 million ("M") over five years to deploy make-ready infrastructure for DCFC at up to 52 sites, or 234 charging points.

ORA conducted in-depth review and analysis of PG&E's application and makes the following recommendations, summarized below:

1) The Commission should approve PG&E's Fast-Charge-Program as a phased pilot and not a full-scale program as currently proposed. Given the uncertainty in market demand for fast-charging, the lack of experience and information in this area, and the rapid changes in the charging station and car technologies, PG&E should not be authorized such a large amount of ratepayer funds ($22.4M) for full deployment. Instead, the Commission should modify PG&E's Fast-Charge Program into a pilot similar to SCE's Urban DCFC Cluster pilot, which proposes to install make-ready to support approximately 5 dual-port DCFC stations at up to 5 sites for $3.9M.

2) PG&E's request to install 350 kilowatt ("kW") fast charging stations should be rejected at this time because there is no commercially available electric vehicle that can charge at this power level.

3) The Commission should reduce PG&E's cost-contingency request from 25% to 10%. PG&E's does not provide justifiable reason(s) for such a high

contingency. PG&E's explanation that installing three different types of fast-charging infrastructure results in substantial cost variations is unfounded.

4) To encourage greater deployment of electric vehicles in disadvantaged communities, the Commission should adopt PG&E's proposed rebate amount of up to $25,000 per charger in disadvantaged communities.

III. ORA TESTIMONY ON PG&E'S FAST-CHARGE PROGRAM

A. BACKGROUND

PG&E requests $22.4M for its proposed Fast-Charge Program, which would install make-ready infrastructure[1] to support approximately 234 DCFC chargers at up to 52 sites.[2] PG&E claims that public charging plazas, particularly fast-charging, provide charging options for those who may not have access to home or workplace charging and also that they facilitate longer trips by allowing electric vehicle ("EV") drivers faster opportunities to recharge away from home.[3]

PG&E completed a research project which helped identify priority areas for DCFC sites in its service area, based on projected demand.[4] PG&E states that it will use the outcome of this project to help inform the siting of DCFC for its proposed Fast-Charge Program.

Each site where PG&E installs DCFC make-ready will include a separate meter from the site host's existing service for the charging equipment. PG&E assumes it could install make-ready infrastructure at about 8 to12 sites per year over the five-year program period, and the power available through the charging points could range from 50 kW to 350 kW, based on the needs of site hosts and charging network developers. Each site will be required to offer at least one

---

[1] A make-ready model for deployment permits utility ownership of infrastructure up to, but not including, the electric vehicle service equipment.

[2] PG&E Testimony, p. 4-1.

[3] PG&E Testimony, p. 4-4.

[4] PG&E's Electric Program Investment Charge Project created an interactive mapping tool for PG&E and third party developers to explore potential DCFC sites, available at: https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/electric-program-investment-charge/direct-current-electric-vehicle-fast-chargers.page.

CHAdeMO[5] and one Combined Charging System[6] charging connector to help maximize site utilization.

PG&E also plans to offer a rebate of up to $25,000 per charger for sites located in disadvantaged communities in an effort to encourage greater deployment in those communities.

B. DISCUSSION

1. The Commission Should Approve PG&E's Fast-Charge Program as a Phased Pilot and Reject PG&E's Request to Include 350 kW Chargers in the Scope of the Program.

Given the uncertainty in market demand for fast-charging and the lack of deployment and associated learning in this area, ORA recommends a phased pilot for this program. A phased pilot program is more appropriate than a full-scale program in light of these unknowns.

PG&E bases its demand forecast for fast-charging on the results of its Electric Program Investment Charge ("EPIC") Project, which estimates the number of fast chargers needed in the top 300 highest demand locations to be around 574 to 916 chargers.[7] This estimate, however, does not account for the possibility that Tesla, who is developing an expansive supercharger network in California, may open up its network to vehicle makes other than Tesla. Although Tesla superchargers currently belong to a closed network that is only accessible to Tesla vehicles, there is a real possibility that it may open up its network.

---

[5] CHAdeMO refers to the charging standard for battery electric vehicles that delivers up to 62.5 kW of direct current via a special electrical connector. It is proposed as a global industry standard by the CHAdeMO Association.

[6] Combined Charging System (CCS) is a competing standard to CHAdeMO. CCS is widely supported by major auto manufacturers.

[7] PG&E EPIC Final Report, p. 13.

As Tesla begins delivery of its mass-production Model 3 EV, it announced it will double the size of its global supercharger network by the end of 2017.[8] In California alone, it plans to add more than 1,000 superchargers.[9] This could increase access to fast-charging for all EV drivers if Tesla opens up it charging network. And as reported by BGR Media, LLC, "during a recent presentation at the Midwest Renewable Energy Association's Energy Fair in Wisconsin, Tesla Chief Technology Officer announced that the company is 'actively talking' with other auto manufacturers about opening up its Supercharger network to other cars."[10]

Tesla's potential open-access to its fast-chargers would significantly reduce the need for PG&E's Fast-Charge network, and is one of many variables that add market uncertainties. Even PG&E acknowledges that there are "uncertainties regarding the size and pace of the market demand."[11] Given the lack of experience and learning in the fast-charging market,[12] PG&E should not be authorized significant ratepayer funding ($22.4M) for full deployment. In comparison, Southern California Edison Company ("SCE") also proposes to install DCFC make-ready in its Urban DCFC Cluster proposal, but proposes a $3.9M pilot rather than a full deployment program.[13]

---

[8] https://www.tesla.com/blog/charging-our-priority.

[9] https://www.tesla.com/blog/charging-our-priority.

[10] http://bgr.com/2017/06/20/tesla-supercharger-network-auto-manufacturers/.

[11] PG&E Testimony, p. 4-12.

[12] The fast-charging market segment lacks robust data on charging behavior and site utilization. For example, metrics such as charging events, times, and duration should be gathered to generate load profiles to depict charging behavior and analyze how well they fit with off-peak periods and Demand Response events for better load management.

[13] SCE Testimony, p. 42.

SCE's objective for its Urban DCFC Cluster pilot is to "determine interest in DCFC in urban areas and evaluate charging behaviors of end-users".[14] PG&E should use a similar pilot approach to test interest and utilization. SCE proposes to collect a number of metrics including the number of charging events, times, and duration.[15] From this data, SCE can generate load profiles to depict charging behavior and analyze how well they fit or not fit with off-peak periods and Demand Response events for better load management.[16] While PG&E will also collect similar metrics,[17] it should do so as a pilot. Numerous data can be gathered to inform and ensure a more successful rollout of a full-scale program.

Further, PG&E's Fast-Charge Program includes installation of three types of DCFC clusters (a 'cluster' or 'plaza' is simply a collection of chargers at one site):[18]

- 5-DCFC-cluster at 50 kW
- 5-DCFC-cluster at 150 kW
- 3-DCFC-cluster at 350 kW

Currently, there is not a single mass-produced EV model on the market that can charge at 350 kW.[19] While companies such as EVgo are experimenting with high-power (150 to 350 kW) fast charging station, the station is meant to be a research platform. Thus, PG&E's proposal to install 350 kW DCFC-cluster may be premature.

---

[14] SCE Testimony, p. 39.

[15] SCE Testimony, pp. 41-42.

[16] SCE Testimony, p. 42.

[17] "PG&E will develop data collection and metrics consistent with those approved in the Charge Smart and Save Settlement (Appendix B)." PG&E Testimony, p. 4-12.

[18] PG&E Testimony, p. 4-11.

[19] Electrek, *The First 'High-Powered Fast-Charging Station' (150-350 kW) is Installed by EVgo and ABB Right in Tesla's Backyard*, https://electrek.co/2017/02/27/high-power-fast-charging-station-150-350-kw-evgo-abb-tesla/.

PG&E is essentially asking that ratepayers subsidize an infrastructure rollout for a market that does not yet exist, which creates significant risk. It puts ratepayers at risk for unused or stranded assets if demand for 350 kW charging stations does not materialize. Although PG&E asserts it will size and install infrastructure to support the high-power demand, if such a demand does not materialize, assets, such as larger conductors and higher-rated transformers, will be left unused and stranded. Further, given that an average commuter in California drives approximately 40 miles per day,[20] EV drivers may choose to primarily charge at their homes instead of using on-the-road fast charging. Therefore, the demand for on-the-road fast-charging could be low and non-existent at that level. Indeed, PG&E admits "the estimated demand for the project should not be considered forecasts of the actual market demand".[21]

It is also important to note that the Commission has rejected PG&E's request to install DCFC chargers in its previous light-duty application, where PG&E proposed to install DCFC at workplaces and multi-unit dwellings.[22] In that application, the Commission concluded that DCFC costs were high compared to Level 2[23] chargers and including them in the pilot was inappropriate.[24] Deploying DCFC in workplaces and multi-unit dwellings makes little sense because of the long duration that vehicles typically park in those places. While PG&E's Fast-Charge proposal aims to deploy DCFC in high-demand areas as identified by its

---

[20] According to an article published by carinsurance.com dated July 2016, a licensed driver in California drives on average about 14,435 miles per year, or about 40 miles per day (http://www.carinsurance.com/Articles/average-miles-driven-per-year-by-state.aspx).

[21] PG&E Testimony, p. 4-12.

[22] D.16-12-065, p. 79.

[23] Level 2 charger delivers electricity at a higher voltage, at 240 volts (V) (same voltage as an electric dryer or stove in a typical home), and enables a greater amount of charging current and thereby charges an electric vehicle at a much quicker rate than Level 1 charger at 120V.

[24] D.16-12-065, Findings of Fact No. 29 and 30.

interactive mapping tool,[25] the widespread need for DCFC remains questionable because of low average daily commuter miles.

While it is true that as car battery range increases, people can drive further away from home and the need for DCFC would become greater, however, just because people *can* does not mean people *will* drive further away from home. Again, statistics still show Californians drives on average 40 miles per day. Thus, investing heavily in DCFC to account for long trips (i.e., longer that 40 miles per day) that may occur occasionally is not a good use of ratepayer funds. Also with a pilot, more information can be gathered to help assess where to best place DCFCs that benefits most drivers. Therefore, ORA urges the Commission to approve only a phased pilot.

Specifically, ORA recommends that the Commission approve a pilot similar to the DCFC priority review project proposed by SCE. Due to the lack of learning in fast-charging, PG&E is better positioned to gather key data in a pilot program to inform a full-scale rollout. This approach is prudent because there are also many uncertainties about the size and pace of market demand for fast-charging, including Tesla's potential open access to its supercharger network. The Commission should not grant PG&E significant upfront ratepayer funds ($22.4M) to use on a speculative, non-existent market by allowing it to install 350 kW DCFC-cluster in 52 sites. Ratepayer funds should be used to serve as a catalyst for increased EV adoption in order to drive a self-sustainable market. Therefore, ORA recommends the Commission modify PG&E's Fast-Charge Program into a pilot similar to that of SCE's Urban DCFC Cluster pilot, which proposes to install

---

[25] PG&E's Electric Program Investment Charge (EPIC) Project created an interactive mapping tool for PG&E and third party developers to explore potential DCFC sites, available at: https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/electric-program-investment-charge/direct-current-electric-vehicle-fast-chargers.page.

make-ready to support approximately 5 dual-port DCFC stations at up to 5 sites at a of cost $3.9M.[26]

Upon completion of the pilot, PG&E should be permitted to file a new application to request additional funding for full-scale deployment. This approach will enable PG&E to incorporate lessons learned for an improved fast-charging program. ORA's suggested approach is consistent with the Commission's guidance in its ruling to "encourage the utilities to target pilots and experiments in diverse market segments to gain experience to inform the eventual design of scaled programs."[27] In addition to recommending this phased pilot approach, ORA also recommends that the Commission reject PG&E's proposal to install 350 kW chargers. Rather, PG&E should focus on meeting the demand of current fast-charging power levels of 50 and 150 kW.

2. The Commission Should Reduce PG&E's Cost-Contingency From 25% to 10%.

PG&E's requested cost-contingency of 25% in its revenue requirement for the Fast-Charge Program is too high and should be reduced.[28] PG&E justifies this request on the basis that there are many cost variables and, therefore, cost contingencies are needed to address potential cost variations and overruns.

On March 21, 2017, ORA submitted a data request[29] asking PG&E to further explain why it needs a 25% cost-contingency for its Fast-Charge Program. PG&E again refers to its testimony, which merely states "given that significant site variation can arise across large numbers of installations, PG&E has included a cost contingency of 25 percent for the DCFC make-ready portion of this

---

[26] SCE Testimony, p. 38.

[27] Assigned Commissioner's Ruling Regarding the Filing of the Transportation Electrification Application pursuant to SB 350 issued September 2016, p. 19.

[28] PG&E Testimony, p. 4-13.

[29] ORA Data Request No. ORA-A1701022-PGE-01 Question 4b.

program."[30] PG&E's data response further explains that because it provides make-ready to support a wide array of electric technologies and different charging scenarios, this would result in substantial cost variations. For example, PG&E will be installing three different types of DCFC make-ready (50 kW, 150 kW, and 350 kW).

As discussed above, ORA recommends that the Commission reject PG&E's proposal to install 350 kW DCFC-cluster. By PG&E's rationale, this should reduce installation complexity, stabilize cost, and result in a lower contingency need. ORA also disagrees with PG&E's explanation that installing three different types of make-ready is what drives cost variations and the resulting high contingency request. In determining overall program cost, PG&E estimates what it would cost to install each type of clusters separately. For example, PG&E estimates a 5-DCFC-cluster at 50 kW would cost approximately $96,433[31] and a 5-DCFC-cluster at 150 kW would cost about $139,034.[32] Therefore, the wide array of scenarios that PG&E referred to is already accounted for in the overall program cost and does not explain the large contingency need.

Further, PG&E cites the Association for the Advancement of Cost Engineering's ("AACE")[33] cost estimate classification system as a reference to justify its large contingency request.[34] PG&E states that its request is "consistent

---

[30] PG&E Testimony, p. 4-13.

[31] PG&E DCFC Sample Site #1 Detailed Estimate Workpaper Supporting PG&E Testimony Chapter 4.

[32] PG&E DCFC Sample Site #2 Detailed Estimate Workpaper Supporting PG&E Testimony Chapter 4.

[33] The Association for the Advancement of Cost Engineering is a recognized technical authority in cost and schedule management for programs, projects, products, assets, and services (http://web.aacei.org/).

[34] PG&E Response to ORA Data Request No. ORA-A1701022-PGE-01 Question 4a.

with a Class 4 estimate,"[35] which has a contingency range of 20 to 50%.[36] While AACE's system may be a valid tool to use for estimating cost in common EPC (Engineering Procurement and Construction) projects, PG&E's Fast-Charge program is atypical and unlike traditional infrastructure projects where real-world data and statistics are abundant to inform reasonable estimates. Therefore, PG&E lacks a justification for its large contingency request.

In addition, PG&E's request is not supported by previous Commission decisions. The Commission issued Decision ("D.") 10-04-028 authorizing PG&E to install fuel cell projects, in which the Commission deemed PG&E's capital cost-contingency unreasonably high.[37] The Commission found that "the contingency rates proposed by PG&E and SCE are significantly higher than other contingency rates, generally in the 5 to 8 percent range, previously approved by the Commission"[38] Further, the Commission found that "approval of large contingencies for capital costs sends an improper incentive to the utilities and vendors that they can enhance the project scope within the limits of the contingencies."[39] A large contingency also reflects the fact that the project scope is too raw or unrefined. In the D.10-04-028, the Commission reduced PG&E's capital cost contingency rate in line with 5 to 10 percent consistent with a prior Commission decision.[40] Therefore, ORA recommends the Commission limit

---

[35] PG&E Testimony, p. 3-30 ("Class 4 has typical expected accuracy range of 20% - 50%. Class 4 estimates generally use estimating methods such as equipment factors, land factors, unit costs/ratios and other modeling techniques.")

[36] PG&E Testimony, p. 3-30.

[37] D.10-04-028 issued in April 2010 authorizing PG&E and SCE to install fuel cell generating facilities at several University of California and California State University campuses.

[38] D.10-04-028, p. 18 (citing D.06-11-048 at 21-22 and fn. 12).

[39] D.10-04-028, p. 19.

[40] D.10-04-028, p. 19.

PG&E's Fast-Charge Program contingency rate to 10%, for both capital cost and expense, to comport with D.10-04-028 as well as what it generally allows for in utility infrastructure projects.[41]

3. The Commission Should Adopt PG&E's Recommended Rebate Amount for Disadvantaged Communities.

ORA supports PG&E's proposal to provide site host in disadvantaged communities ("DACs") a rebate of up to $25,000 per charger to encourage greater deployment of EVs in DACs. ORA agrees with PG&E that greater access to faster chargers in DACs can make EV ownership in those communities more attainable and can bring other economic benefits to those communities as well.

IV. CONCLUSION

ORA conducted an in-depth review and analysis of PG&E's application relating to fast-charging make-ready infrastructure and makes the following recommendations:

1) The Commission should approve PG&E's Fast-Charge Program as a phased pilot and not a full-scale program as currently proposed. PG&E has not provided adequate support to demonstrate that the scope and size of its Fast-Charge Program is appropriate. Ratepayer funds should be used to serve as a catalyst for increased EV adoption in order to drive a self-sustainable market, and not to supplant a competitive market.

2) PG&E's request to install 350 kW fast-charging stations should be rejected. PG&E's proposal to support 350 kW chargers is premature because there is no commercially available

[41] The CPUC generally adopts 10 to 15% cost contingencies for infrastructure projects. *See, e.g.*, D.16-12-065, Conclusion of Law #18; D.13-03-032, p. 69 ("As we have done in prior decisions, we adopt a 10 percent contingency amount for Transmission and Distribution aspects of the approved pilots in this decision.") (footnoting D.12-11-051, p. 247).

electric vehicle that can charge at this power level.

3) The Commission should reduce PG&E's cost-contingency request from 25% to 10% to an amount more consistent with previous Commission decisions and utility infrastructure projects.

4) The Commission should adopt PG&E's proposal to provide greater financial incentives to site host in disadvantaged communities.

APPENDIX A

QUALIFICATIONS AND PREPARED TESTIMONY
OF
RICKEY KIT TSE

Q1: Please state your name, business address, and position with the California Public Utilities Commission.

A1. My name is Rickey Kit Tse and my business address is 505 Van Ness Avenue, San Francisco, CA 94102. I am a Senior Utilities Engineer in the Energy Safety and Infrastructure Branch of the Office of Ratepayer Advocates.

Q2: Please summarize your educational background.

A2: I attended the University of California at Davis. I graduated in 1999 with a bachelor of science in mechanical engineering.

Q3: Briefly describe you professional experience.

A3: After graduating in 1999, I started my professional career at AT&T (then Pacific Bell) as an engineer in the construction and engineering department designing telecom network in support of high-speed DSL (Digital Subscriber Line) service. My core responsibilities included facilities design, permitting, construction oversight, and budget management. I spent about three years in the telecom industry before joining a consulting firm as a civil engineer associate working on hydrology designs for small commercial developments. In 2003, I started my career with the California Public Utilities Commission as a utilities engineer in the Safety and Enforcement Division (formerly CPSD). I spent the next 13 years in the enforcement of General Order 167 to ensure California power plants comply with Commission's operation and maintenance standards. My responsibilities revolved around conducting outage inspections, compliance audits, and incident investigations. I'm a licensed professional engineer and am technically-versed in power generation, transmission, and distribution. In 2016, I joined the Office of Ratepayer Advocates in charge of the transportation electrification application proceeding pursuant to Senate Bill 350.

Q4: What is your responsibility in this proceeding?

A4: I am sponsoring this prepared testimony on PG&E's Direct Current Fast Charge Make-ready Standard Review Program.

Q5: Does this conclude your prepared testimony?

A5: Yes, it does.