

Application No. 14-04-____
Exhibit No.: _____
Witness: Randy Schimka

Application of SAN DIEGO GAS & ELECTRIC)
COMPANY (U 902 E) For Approval of its)
Electric Vehicle-Grid Integration Pilot Program.)
_____)

Application No. 14-04-____
(Filed April 11, 2014)

**PREPARED DIRECT TESTIMONY OF
RANDY SCHIMKA
CHAPTER 2
ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY**

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

April 11, 2014



#286653

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1 grid-integrated charging at the two critical times of day with long parking durations (MuD
2 during late night /early morning hours and workplace during the day during high output of
3 solar). The VGI Pilot Program’s proposed MuD and workplace siting has great potential to
4 increase EV ownership and zero emission miles driven per EV, as well as provide
5 opportunities to examine the benefits of MuD and workplace siting and grid-integrated
6 charging.¹

7 Under the VGI Pilot Program, SDG&E will contract with third parties to build,
8 install, operate and maintain EV charging facilities under a service level agreement, to
9 SDG&E’s VGI specifications, and under SDG&E’s overall supervision.² SDG&E will also
10 contract with interested MuD and workplace host sites wishing to participate in the VGI
11 Pilot Program by providing no-cost charging equipment and installation, while the potential
12 hosts provide a charging site location and appropriate parking for EV customers. After the
13 VGI equipment is installed, SDG&E will then offer VGI charging services to its EV
14 customers (drivers) at the workplace and MuD locations under a new VGI Pilot Rate,
15 offered through the VGI Pilot Program. SDG&E would bill participating drivers directly for
16 EV charging (using the VGI Pilot Rate at VGI facilities) on the customer’s home energy
17 bill.

¹ MuD and workplace locations are also prime candidates for VGI Pilot Program charging station installations, because of the need for additional EV charging facilities at these sites. After two years of solicitation at our quarterly EV charging workshops, SDG&E has only been able to document three MuD charging site case studies to share with interested customers. Of the workplace charging projects that SDG&E has provided utility consultation on and/or tracked, there are currently approximately 35 operational workplace charging facilities in San Diego. Because of this, SDG&E believes that there are additional opportunities in the region to install more charging facilities at MuD and workplace locations.

² SDG&E will contract for these services to the greatest extent possible while continuing to fulfill its duties as a regulated public utility.

1 VGI Pilot Program sign-ups and contracting are proposed to take place over 4 years,
2 and installations to take place over 4 to 5 years, with a goal of VGI installations at a blend of
3 workplace and MuD host sites as follows:

- 4 Year 1 (2015) – 50 site installations of 10 charging stations
- 5 Year 2 (2016) – 100 site installations of 10 charging stations
- 6 Year 3 (2017) – 200 site installations of 10 charging stations
- 7 Year 4 (2018) – 200 site installations of 10 charging stations

8 This proposed limited time schedule and number of VGI facility installations is designed to
9 encourage MuD and workplace host sites to sign up quickly, thus encouraging the success of
10 the program.

11 **B. How the VGI Pilot Program Works**

12 The VGI Pilot Program technology will allow an EV customer on the VGI rate to
13 enter preferences for energy price and quantity (hours) into a mobile phone application or a
14 website, according to the customer’s preference. Hourly pricing for each day will be made
15 available on the VGI mobile and web application, on a day-ahead basis. Hourly charging
16 prices will correspond with the expected changing hourly price of electricity and will be
17 designed to encourage EV charging to occur at times of the day that will minimize
18 incremental peak loads on the electrical distribution system, integrate high levels of
19 renewable energy use, and avoid charging on system peaks. Ms. Fang’s testimony describes
20 how the VGI Pilot Program rate is designed to reflect these system pricing components. The
21 EV charging preferences selected by the EV customer will be used by the VGI system to
22 determine EV charging session “boundaries” such as:

- 23 What is the maximum hourly price the EV charging customer wishes to pay?

- 1 When does the EV customer plan to leave the VGI charging facility?
- 2 How much energy does the EV charging customer need?

3 Based on the customer’s charging preferences regarding pricing, energy and duration, for
4 example, the VGI system will dispense electricity at the lowest possible price within these
5 EV charging preferences, during a time period prior to the specified departure time.

6 Through this methodology, the VGI Pilot Program is designed to test how EV charging
7 customers can be encouraged (through pricing) to charge at a grid-friendly time of the day,
8 while accommodating EV charging customers’ needs.

9 **C. The VGI Pilot Program Targets Workplace and MuD Sites**

10 As Mr. Krevat testifies, the VGI Pilot Program proposal allows for the exploration of
11 alternative implementation approaches with workplace and MuD host sites, which have the
12 greatest potential to demonstrate the benefits of VGI, while also increasing EV ownership
13 and increasing zero emission miles driven per EV.³ Strategically, both of these customer
14 segments offer around-the-clock opportunities for grid-integrated charging, due to the long
15 parking durations at these locations. The term “workplace” is made up of several private
16 location types, such as fleet, large commercial, municipalities, small business; any private
17 location where EVs will be parked for several hours during the day and stay plugged-in for
18 EV charging. The workplace setting offers the opportunity to charge vehicles during times
19 when renewable energy is at its highest level of production, net of load, from solar

³ According to the California Center for Sustainable Energy website, a February 2014 California PEV Driver survey showed that, of responding EV drivers: 88% live in a single-family detached home, 93% own their own homes, and 46% had access to workplace charging. Survey results are available at: <https://energycenter.org/clean-vehicle-rebate-project/vehicle-owner-survey/feb-2014-survey>. By targeting MuD and workplace siting, the VGI Pilot Program is designed to increase EV adoption.

1 photovoltaic resources on the grid. MuD units currently comprise approximately 50%⁴ of
2 residential living units in the greater San Diego region.

3 **II. SDG&E'S EV CHARGING FACILITY KNOWLEDGE AND EXPERIENCE**

4 SDG&E has actively supported efforts to deploy public, workplace, and residential
5 charging for EV. The VGI Pilot Program is designed to provide a robust managed charging
6 network that will further encourage the adoption of EVs in the region, while also minimizing
7 impacts to SDG&E's grid.

8 Since 2011, SDG&E has purchased over a dozen fleet EVs, and SDG&E employees
9 have individually purchased or leased about 70 vehicles (a mix of battery electric and plug-
10 in hybrids). SDG&E has worked to install several different types of workplace charging
11 equipment that can be used for charging fleet and employee-owned/leased EVs. SDG&E
12 has examined how these charging facilities are used by employees and fleet vehicles, and
13 how that usage affects parking and energy usage. SDG&E currently has over 45 charging
14 stations available at 13 company locations, made up of AC Level 1 units, AC Level 2 units,
15 and a DC Fast charging station. Within this mix of charging facilities SDG&E has installed,
16 one is a VGI prototype charging facility, similar to the type proposed in this Application for
17 the VGI Pilot Program. This charging facility was launched in 2013, with a simple time-of-
18 use rate, and in 2014 with an hourly VGI-like rate, with enabling charging technology and
19 controls, to help to better understand employee charging preferences. The VGI charging
20 facility has been well received by employees and has helped to refine this VGI Pilot
21 Program proposal. In addition, about 67% of SDG&E employees who own or lease an EV

⁴ See the "Demographic & Socio Economic Estimates – San Diego Region" document from the SANDAG website: <http://profilewarehouse.sandag.org/profiles/est/reg999est.pdf>.

1 said that the presence of workplace charging influenced their EV buying or leasing decision
2 and 79% said the presence of workplace charging will increase their EV miles driven per
3 week.⁵ Through all of these installation experiences, SDG&E has learned which
4 technology, architecture, and configurations work best for charging at the workplace, as well
5 as its applicability to MuD settings. SDG&E will bring those lessons learned forward into
6 the VGI Pilot Program.

7 In addition to workplace charging facilities, SDG&E has also been a very committed
8 supporter of Electric Vehicle Service Providers (EVSPs) that have installed residential,
9 public and workplace charging facilities in the SDG&E service territory. In addition to
10 holding workshops and providing education and outreach support, SDG&E's Clean
11 Transportation team has worked closely with the EVSPs to offer utility consulting that
12 provides value when the EVSPs are designing and constructing charging facilities. SDG&E
13 intends to continue its support of EVSPs with utility consulting for their projects and facility
14 installations, as well as partnering with third parties that participate in the VGI Pilot
15 Program request for proposal (RFP) process, described below.

16 **III. CUSTOMER ENGAGEMENT & SELECTION CRITERIA**

17 **A. Customer Engagement**

18 SDG&E has established customer relations and channels of communication
19 regarding EVs with service territory agencies, municipalities, trade associations and
20 planning councils; SDG&E also has working relationships with SDG&E's workplace and

⁵ See Appendix B: Survey for EV Drivers SDG&E EV Driver Work Place Charging (WPC) Survey April 2014.

1 MuD customers.⁶ SDG&E has regular workshops, outreach and assigned account
2 relationships with account executives for these customers. SDG&E also works with Smart
3 City San Diego, CleanTech San Diego, and other general education and outreach venues.

4 **B. Site Selection Criteria**

5 Once a workplace or MuD host customer expresses an “indication of interest” for
6 VGI Pilot Program siting, SDG&E will evaluate and prioritize the interested site for VGI
7 installation in terms of the following criteria:

- 8 Date of indicated interest (first-in-line priority);
- 9 Current and expected volume of EV drivers;
- 10 Number of VGI installations desired;
- 11 Type of VGI installation (workplace, MuD);
- 12 Nearby transformer available capacity;
- 13 Distance between transformer and new service point;
- 14 Site conditions related to construction feasibility (i.e., trenching surface, EV
15 Supply Equipment (EVSE) mounting surface, condition of facility);
- 16 Land and property ownership;
- 17 If leasing, term and conditions of lease; and
- 18 Existing /available Americans with Disabilities Act (ADA) accessible parking.

⁶ See the PEV Collaborative publication “Amping up California Workplaces” and “Plug-in Electric Vehicle Charging Infrastructure Guidelines for Multi-unit Dwellings,” available at: http://www.evcollaborative.org/sites/all/themes/pev/files/WPC_Report4web.pdf, and http://www.evcollaborative.org/sites/all/themes/pev/files/MUD_Guidelines4web.pdf.

1 **IV. REQUEST FOR PROPOSAL AND REQUEST FOR INFORMATION**

2 SDG&E's VGI Pilot Program has the potential to create opportunities for third-party
3 EVSPs and related contractors and subcontractors. Under the VGI Pilot Program, to the
4 greatest extent possible, SDG&E will contract with third parties to build, install, operate and
5 maintain EV charging facilities under a service level agreement to SDG&E's VGI
6 specifications, and under SDG&E's overall supervision. To accomplish this SDG&E will
7 implement a two-step process to engage qualified third parties, to the extent possible. The
8 first step is a Pass/Fail round, through a Request for Information (RFI) process whereby a
9 potential bidder will have to pass all criteria necessary to participate in the VGI Pilot
10 Program in order to advance to the second RFP round, which will have a specific weighted
11 scoring criteria focused on the VGI technical and operational specifications (described
12 further in the following section). Within this process, it is also expected that such an
13 approach would allow SDG&E to expand its opportunity to meet Diverse Business
14 Enterprise (DBE) objectives. Through the VGI Pilot Program, SDG&E and stakeholders
15 will also learn whether building to one grid-integrated charging specification will reduce
16 technology risk and lower project costs.

17 **A. Pre-bid Conference**

18 If the VGI Pilot Program is approved, SDG&E will then hold pre-bid conferences
19 with third parties that serve the EV customer market, such as EVSPs, vendors, contractors
20 and subcontractors, with the goal of informing and increasing the participation in the
21 competitive bidding process. SDG&E proposes that contracts will be awarded to multiple
22 bidders (to the greatest extent possible) who meet SDG&E's requirements set forth below.

1 **B. VGI RFP – Developing and Distributing the RFP for Competitive Bids**

2 The following summarizes SDG&E’s competitive bidding process:

- 3 SDG&E will develop source selection criteria before the RFP is released to
- 4 the marketplace.
- 5 SDG&E Supply Management uses a centralized communication system to
- 6 manage all bidder communications, and this system is used to help fairly
- 7 administer bidder conferences, demonstrations, technical evaluations, and
- 8 any activity associated with the RFP. All of this information will be offered
- 9 equally to all suppliers under consideration.
- 10 The RFP will be sent to known contractors in the industry, including various
- 11 women-owned, minority-owned, and disabled veteran-owned business
- 12 enterprises (W/M/DVBEs), as well as California Service Corps of Retired
- 13 Executive (SCORE) members.
- 14 The RFPs will be posted on a secure SDG&E website available to
- 15 prospective bidders. Any questions by potential bidders about the RFP and
- 16 answers to those questions will also be posted on the same website.

17 In addition, the following will be included in the VGI Pilot Program RFP:

- 18 SDG&E Supply Management Procurement Policies and Guidelines;
- 19 Criteria for each round of solicitation; and
- 20 Use of SDG&E internal and department M/W/DVBE resources.

21 **V. ESTIMATED VGI PILOT PROGRAM COSTS (CAPITAL AND O&M)**

22 This section provides estimates of the VGI Pilot Program operations and

23 maintenance (O&M) and capital cost components. These estimates have also been used to

1 model the estimated program net benefits and cost-effectiveness, as described in Mr.
2 Martin's testimony (Chapter 6). Although SDG&E has sound bases for its cost estimates, as
3 I describe below, the actual costs that will be incurred through third-party contracting is
4 currently unknown. For this reason, SDG&E has requested a two-way balancing account
5 mechanism, which is described in Ms. Jasso's testimony (Chapter 5). Since one of the
6 objectives of this Pilot is to better understand project implementation costs, these estimated
7 costs will be updated with actual aggregated costs (and actual realized benefits), along with
8 an update of the cost-effectiveness calculations at the conclusion of the VGI Pilot Program,
9 which will be included in SDG&E's reporting to the CPUC.

10 This section of my testimony describes the following:

- 11 **VGI Program Cost Components:** Describes the major cost components for
12 the VGI installation and system, including vehicle charging hardware,
13 associated electrical components, parking signage, and installation costs.
- 14 **VGI Program Installation Scenario:** Defines drivers of potential costs
15 associated with the range of installation types, and describes the scenario
16 used to calculate cost estimates for the VGI Pilot Program.
- 17 **VGI Program Component Costs:** Describes the detailed cost estimates for
18 the mid-priced VGI installation scenario.

19 **A. VGI Pilot Program Cost Components**

20 There are five main cost components for a typical VGI installation, as follows:

21 **1. Engineering Design and Permitting**

22 For each VGI location contracted with a host site, an engineering design must be
23 completed and electrical load calculations must be performed to prepare for the permit

1 application. The engineering documentation will include design details specific to that VGI
2 installation location. Once the engineering design drawing package is produced, a permit
3 application package must be created and submitted for each job. Permit requirements will
4 vary depending on the location and the associated jurisdictional authority where the specific
5 VGI installation is to be sited. In parallel with producing an engineering design and the
6 permit package, an SDG&E Planner will be consulted about the job and a Request for
7 Service form will be filed, which will result in a Service Order issued for the job by
8 SDG&E. The Service Order will contain installation-specific information and specifications
9 to use when constructing the VGI charging facility. This work will be the responsibility of
10 SDG&E.

11 **2. New Electric Service**

12 Each VGI installation will be fed from a new electric service that is separately
13 metered by SDG&E. SDG&E estimates that up to 25% of these new electric services for
14 VGI sites will require a new transformer, and up to 25% of the new electric services will
15 require an upgraded transformer, while the remaining 50% of the new electric services will
16 connect to an existing transformer. Included with each new electric service will be a pad-
17 mounted meter pedestal and breaker panel with a new meter, all the necessary trenching,
18 conduit, wire, and connectors from the transformer to the new meter pedestal, and a
19 refill/repair of the trench. This work will be the responsibility of SDG&E.

20 **3. Electric Vehicle Supply Equipment (EVSE) and Installation**

21 Each VGI installation will consist of ten separate electric vehicle charging stations or
22 EVSE. From previous workplace charging installation experience, SDG&E has learned that
23 a good mix of charging performance in a typical VGI installation would consist of a 50% /

1 50% split between AC Level 1 and AC Level 2 charging stations (120 volts and 208 – 240
2 volts, respectively). The ultimate blend of Level 1 and Level 2 EVSE will be customized to
3 meet specific host site needs, in light of SDG&E’s managed EV charging load opportunities
4 and available electrical capacity.

5 **4. Access Control Equipment and Installation**

6 Each VGI installation will have a pad-mounted control kiosk, which will be fed from
7 the new electric service meter pedestal and will contain the associated hardware to activate a
8 charging session with an individual EVSE via a system of dual factor authentication (for
9 enhanced security). The kiosk will also contain billing quality meters that will track
10 individual customer usage for billing purposes. The kiosk will securely send that data daily
11 to a back-end data collection system, so it can be processed and included on the customer’s
12 bill. Wiring from the kiosk runs to each of the charging stations to provide metered power
13 for EV charging.

14 **5. Compliance with Americans with Disabilities Act, Parking** 15 **Modifications and Signage**

16 SDG&E has estimated costs associated with ensuring compliance with the ADA.
17 Depending on the location, this potentially involves designing van accessibility for one
18 parking space, re-striping the parking spaces, installing ADA signage, and ensuring the
19 ADA accessible space is within the 2% grade compliance specification. In addition, to help
20 protect the charging stations, concrete wheel stops are typically installed on the pavement.
21 Finally, SDG&E VGI project signage will be installed to identify the site to drivers and
22 provide necessary service and contact information.

1 **B. VGI Pilot Program Installation Scenario**

2 There are several reasons why costs can vary from site to site when installing EV
3 charging station facilities. The components of a typical installation are outlined below and
4 can be used to estimate the expected costs. When reviewing costs of similar field charging
5 facility construction projects, SDG&E’s experience has shown that some of the sites will be
6 slightly less expensive than the defined “typical” installation, while some will be more
7 expensive. Therefore, the cost estimates presented below are anticipated for a typical VGI
8 installation scenario.

9 **1. Typical, Expected VGI Installation Scenario – Assumptions**

- 10 EVSE is pedestal or pole mounted.
- 11 Trench for new electrical service is limited to 100 feet or less.
- 12 Most trenching will be in asphalt or soil (with a minimum amount of concrete
13 cutting required).
- 14 There are no special installation issues for the central kiosk and EVSE circuit
15 installation.
- 16 ADA and Project signage will be pole mounted.
- 17 A new transformer may be required in up to 25% of the VGI installation
18 sites, and an upgraded transformer may be required in up to 25% of the sites.
- 19 A new electric service will be installed for each of the installations.
- 20 The centralized EVSE kiosk control station will be equipped with billing
21 quality recording meters and power relays for 10 EVSE per configuration.

1 **C. VGI Pilot Program Component Costs – Installation**

2 The breakdown of the VGI installation components (as previously described) and
3 estimated costs per VGI site including 10% contingency and applicable sales tax are as
4 follows:

5 **1. Engineering Design and Permitting**

6 Cost estimate: \$2,900

7 **2. New Electric Service**

8 Electrical Installation: \$18,000

9 Transformer Installation: \$2,000

10 **3. EVSE and Installation**

11 EVSE Equipment and Installation: \$21,600

12 **4. Access Control Equipment and Installation**

13 Access Control Equipment and Installation: \$47,700

14 **5. ADA, Parking Modifications and Signage**

15 Cost estimate: \$5,500

16 **D. VGI Program Component Costs – Information Technology (IT) Costs**

17 The breakdown of the VGI IT estimated costs (one-time) including 10% contingency
18 and applicable sales tax are as follows:

19 **1. VGI Billing System Integration (One-Time)**

20 Cost estimate total: \$1,385,900 consisting of:

21 Contract Labor for software development: \$1,296,800

22 Hardware costs: \$89,100

1 Description: SDG&E internal labor and hardware equipment necessary to ensure the
2 VGI Service Pricing and Billing system supporting the VGI Pilot Program is effectively
3 integrated with other SDG&E back-office billing functions.

4 **2. VGI Phone and Web Applications (One-Time)**

5 Cost estimate: \$178,200

6 Description: Fixed price contract to deliver phone software applications.

7 **VI. VGI PILOT PROGRAM O&M COSTS**

8 VGI Pilot Program costs summarized below reflect only those incremental costs (i.e.,
9 incremental to existing SDG&E resources) incurred by SDG&E in executing the VGI Pilot
10 Program. As noted above in the discussion regarding installation costs, an understanding of
11 these costs is necessary to model the program net benefits and cost-effectiveness (described
12 in Chapter 6).

13 The breakdown of additional VGI Program Management O&M costs is as follows:

14 **A. Replacement Costs**

15 The charging equipment and cables will be replaced one time during the course of
16 the VGI Pilot Program. Due to expected improvements in EVSE design and longevity,
17 SDG&E expects these replacement units to last 10 years through the end of the VGI Project.
18 The O&M funds for these replacements will be added to the project budget at a 20% annual
19 level over a 5-year time period. The breakdown of O&M replacement costs over the life of
20 the project consists of the following:

- 21 a. EVSE Equipment: \$21,600
22 b. Access Control Equipment: \$14,700
23 c. ADA Costs: \$5,500

1 **B. Access Control**

2 Description: Wireless service fees.

- 3 a. Cost: \$1,100 (per installation, annually over the life of the project)

4 **C. Customer Engagement**

5 Description: Staff necessary to manage customer contact throughout program:
6 solicitation, VGI sales, installation, operational follow-up and fielding inquiries.

- 7 a. Cost: \$90,000 (internal labor, annually for the first 4 years of the project)
- 8 b. Cost: \$75,000 (contract labor, annually for the first 4 years of the project, to
9 help support SDG&E Account Executive sales efforts and interface with
10 SDG&E departments such as Project Management, Real Estate, Construction
11 Services, and Clean Transportation)
- 12 c. Cost: \$75,000 (contract labor, annually for years 3 and 4 of the project, to
13 help support increased SDG&E Account Executive sales efforts and interface
14 with SDG&E departments such as Project Management, Real Estate,
15 Construction Services, and Clean Transportation)

16 **D. Customer Engagement Support Materials**

17 Description: Support material necessary to support communications, education and
18 outreach with potential program participants. This will include, but is not limited to, website
19 content and tools, marketing materials, material for outreach events, email communication
20 templates, training videos, and other related materials.

- 21 a. Cost: \$200,000 (non-labor, spent over the first four years of the VGI Pilot
22 Program), for education and outreach, trade organizations, sponsorships,
23 events, and website content

- 1 b. Cost: \$30,000 (non-labor, spent over the first four years of the VGI Pilot
2 Program, for marketing material and customer engagement material
3 production)

4 **E. Billing System Integration (Annual labor for first two years of VGI Pilot**
5 **Program)**

6 Description: SDG&E labor and support function necessary to ensure billing
7 confirmation, check the quality of meter reads, and troubleshoot customer site billing,
8 ensuring that the VGI data is effectively coordinated with other SDG&E back-office billing
9 functions.

- 10 a. Cost: \$75,000 (contract labor, annually for the first 2 years of the project)

- 11 b. Cost \$95,000 (internal labor, annually for the first 4 years of the project, for
12 IT billing and ongoing support)

13 **F. Customer Support and Billing Integration Services**

14 Description: Vendor-provided helpdesk services for helpdesk, IT, and customer and
15 equipment support functions.

- 16 a. Cost: \$75,000 (contract labor, annually for the first 4 years of the project)

17 **G. SDG&E Rates/Distribution Circuit Modeling**

18 Description: SDG&E full-time employee to perform circuit level load modeling for
19 VGI rate calculations.

- 20 a. Cost: \$90,000 (internal labor, annually for the duration of the project)

21 **H. SDG&E Evaluation of VGI Pilot Program Deployment and Load**
22 **Impacts**

23 Description: SDG&E will engage a third party evaluator to analyze the VGI Pilot
24 Program load impacts, billing processes, participant attitudes, and installation costs. The

1 detailed scope of this analysis will be developed with input from interested stakeholders.
2 This analysis will commence four years after the initial VGI system is installed and will
3 incorporate available data from all VGI Pilot Program installations. A description of this
4 work, including the data collection and analysis detail is described in Chapter 6, Mr.
5 Martin's testimony.

- 6 a. Cost: \$200,000 (in year 4 and 5 of the project)

7 **VII. VGI PILOT PROGRAM MANAGEMENT**

8 SDG&E will be responsible for the overall management of the VGI Pilot Program, in
9 order to create a seamless, positive customer experience for both host site customers and EV
10 customers.⁷ To achieve this, a blend of SDG&E and third-party resources are necessary.
11 Two key SDG&E areas of responsibility include customer contact and back-office support.
12 Back-office support is focused primarily on the VGI Pilot Program billing function and
13 support, since the success of the Pilot is dependent on EV customer awareness of both the
14 kilowatt-hour (kWh) unit pricing and the total cost of EV fueling, as presented in the
15 customer's bill. As noted above, under the VGI Pilot Program, to the greatest extent
16 possible, SDG&E will contract with third parties to build, install, operate and maintain EV
17 charging facilities under a service level agreement to SDG&E's VGI specifications, and
18 under SDG&E's overall supervision. This relationship and these responsibilities will be
19 managed through a Service Level Agreement (SLA) between SDG&E and the third party, as
20 described below.

⁷ Appendix C provides a high-level VGI system description, overview of the graphical user interface, a driver's perspective of how the system will be used, SDG&E and vendor responsibilities and a basic visual illustration of a VGI facility.

1 **A. Service Level Agreement**

2 After third party proposal(s) are approved, SDG&E will enter into a contract with
3 each third party that will include a SLA describing the responsibilities between SDG&E and
4 the third party to build, install, operate and maintain the VGI systems to SDG&E's
5 specifications. This will include, and will not be limited to, operational requirement
6 responsibilities of the third party to implement the VGI operating system. Examples of
7 these requirements include:

- 8 System operational specifications
- 9 Individual charging equipment repair time specifications
- 10 Billing data transmission intervals
- 11 Billing data reconciliation specifications
- 12 System energy usage resolution specifications
- 13 System per charging session billing specifications for users
- 14 System web and phone apps specifications:
 - 15 Maximum price willing to pay
 - 16 Chosen hours
 - 17 Planned departure time
 - 18 kWh needed

19 Quality assurance specifications will ensure that the system installed is fully
20 operational, within agreed-upon performance tolerances (e.g., accuracy, reliability, duration
21 of performance). Additional conditions will pertain to monitoring equipment for failure,
22 repairing and replacing failed or damaged equipment, and related maintenance criteria.

1 **B. Pricing Awareness**

2 As was learned in SDG&E’s PEV Rate and Technology experiment,⁸ creating
3 pricing awareness requires at least two components: knowledge of the unit price (in this
4 case, the hourly electricity pricing), and total cost reflected in the monthly bill or over some
5 relevant period of time. The VGI Service Pricing and Billing system associated with the
6 VGI Pilot Program will calculate an hourly price schedule for each VGI charging facility, as
7 described in Ms. Fang’s testimony (Chapter 3). SDG&E customers participating in the VGI
8 Pilot Program will be able to view the total hourly price for each VGI charging facility using
9 either the VGI mobile or website applications. As VGI customers finish their charging
10 session, the hourly charges and the total cost for charging their vehicle will be calculated
11 and displayed each day based on the hourly price schedule and when charging usage
12 occurred. By using either the VGI mobile or website application, customers will be able to
13 view their current and historical charging session information at any time, including energy
14 consumed, hourly prices paid and total calculated charges. The ability to view hourly and
15 total charges immediately following each charge session will help customers to refine their
16 predefined VGI charging facility preferences and minimize the cost of charging their EV.
17 The total billing costs for each charge session, and each billing period, will be summarized
18 within the SDG&E Customer Information System and will be displayed as a single line-item
19 on a customer’s SDG&E bill.

⁸ SDG&E is in its final year of PEV Pricing and Technology study to test how EV charging time decisions respond to varying price ratios between time-of-use periods, approved by the CPUC June 2010, Advice Letter 2157-E. The results of the study can be found at:
<https://www.sdge.com/sites/default/files/documents/1681437983/SDGE%20EV%20%20Pricing%20&%20Tech%20Study.pdf?nid=10666>

1 **VIII. CONCLUSION**

2 This concludes my prepared direct testimony.

3

1 **IX. STATEMENT OF QUALIFICATIONS**

2 My name is Randall L. Schimka. My business address is 8306 Century Park Court,
3 San Diego, California 92123. I am employed by San Diego Gas & Electric Company as a
4 Project Manager in Clean Transportation.

5 I have over 28 years of energy industry experience. My current duties involve
6 project management to support SDG&E's electric transportation efforts, including electric
7 vehicle charging in residential, workplace, and public locations, including utility interface
8 with service providers wanting to install this equipment. I also contribute to our Clean
9 Transportation education and outreach efforts for electric vehicle customers, and am the
10 proud owner of two battery electric vehicles. In addition to driving an EV on a daily basis, I
11 have driven over 4,000 miles on various EV road trips using public charging since 2011.

12 Prior duties at SDG&E focus on transmission grid control systems computer control,
13 transmission system cyber security, distribution system reliability, substation engineering,
14 and project management.

15 My education is in the general area of electrical engineering and business. I
16 graduated from San Diego State University in 1985 (BS Electrical Engineering), 1990 (MS
17 Electrical Engineering), and 1992 (Executive MBA). I am a registered Electrical Engineer
18 in the State of California.

19 I have not previously testified before the California Public Utilities Commission.

APPENDIX A
GLOSSARY OF ACRONYMS AND DEFINED TERMS

| ACRONYM | TERM |
|----------------|--|
| AC | Alternating current |
| ADA | Americans with Disabilities Act |
| AFV | Alternative fueled vehicle |
| CAISO | California Independent System Operator |
| DBE | Diverse Business Enterprise |
| DC | Direct current |
| EVSP | Electric vehicle service providers |
| IT | Information technology |
| MuD | Multi-unit dwelling |
| O&M | Operations and maintenance |
| OIR | Order Instituting Rulemaking |
| PEV | Plug-in electric vehicles |
| RFP | Request for proposal |
| SANDAG | San Diego Association of Governments |

| | |
|----------|---|
| SCORE | California Service Corps of Retired Executives |
| SLA | Service level agreement |
| VGI | Vehicle-grid integration |
| W/M/DVBE | Women-owned, minority-owned, and disabled veteran-owned business enterprises |

APPENDIX B

SDG&E EV DRIVER WORK PLACE CHARGING (WPC) SURVEY APRIL 2014

Purpose

To determine through employee self-report, the degree to which the presence of workplace EV charging equipment influenced the employee to:

- Lease or purchase an EV
- Drive the EV more

Methodology

- Administered to 57 SDG&E employees who own or lease an EV through email survey
- 40 employees responded**
 - These responses **represent 43 vehicle purchases or leases**
 - Eight of these vehicles were purchased or leased before July 2011 and removed from the “**Work Place Charging Influence Over Purchase**” question because employee WPC had not yet been installed at SDG&E facilities.
 - Of these eight, three purchased a second vehicle, which also was stricken from the WPC Influence Over Purchase question (**leaving 32 applicable respondents for this question**)
 - “**Work Place Charging Influence Over EV Miles**” driven question was applied to all respondents, only once (**40 answers**)

Survey Questions

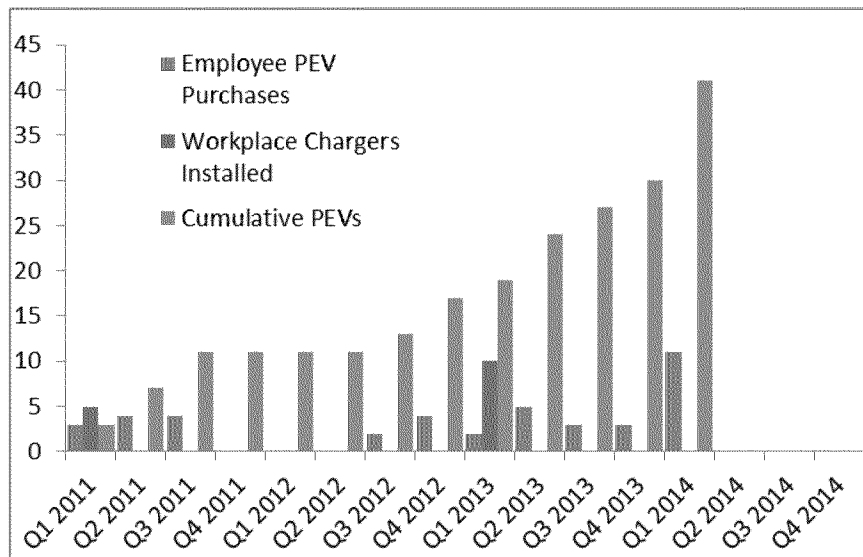
Your primary work location:

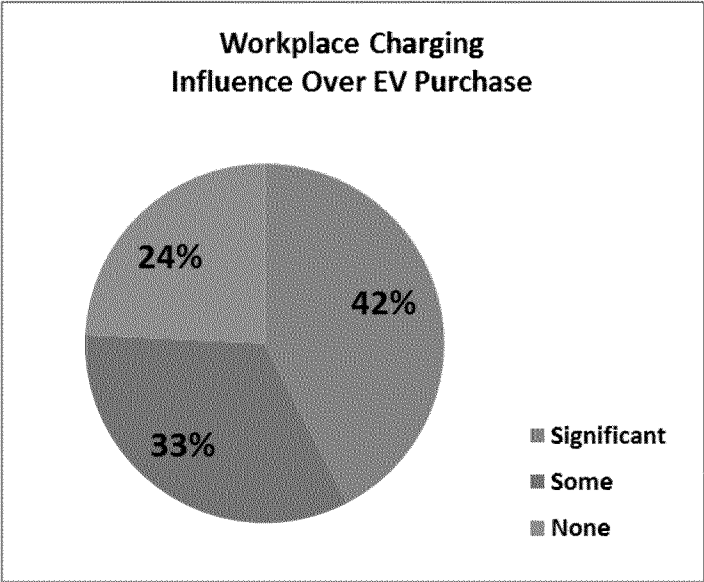
- 1) What Month/Year did you buy or lease your EV(s)?
- 2) Do you have access to EV charging where you work?
 - a. Yes
 - b. No
- 3) Do you have access to EV charging at your home?
 - a. Yes
 - b. No
- 4) Did the availability of EV charging equipment at work influence your decision to purchase or lease your EV?
 - a. It had a critical influence
 - b. It had some influence
 - c. It had no influence at all

- 5) Does the availability of EV charging at work influence you to drive your EV more?
- a. It has a critical influence
 - b. It has some influence
 - c. It has no influence at all

Results

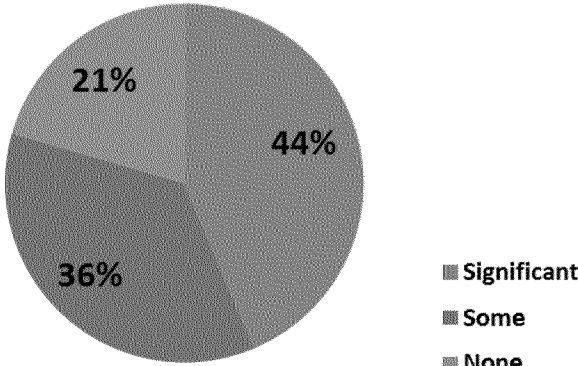
Over 67% of SDG&E employees who own or lease an EV said that the presence of workplace charging influenced their EV buying decision, and 79% said it will increase their EV miles driven per week.





| Influence over EV Purchase | | | |
|----------------------------|-------------|----|-----|
| A | Significant | 14 | 41% |
| B | Some | 11 | 32% |
| C | None | 9 | 26% |
| | TOTAL | 34 | |

**Workplace Charging
Influence on Driving More EV Miles**



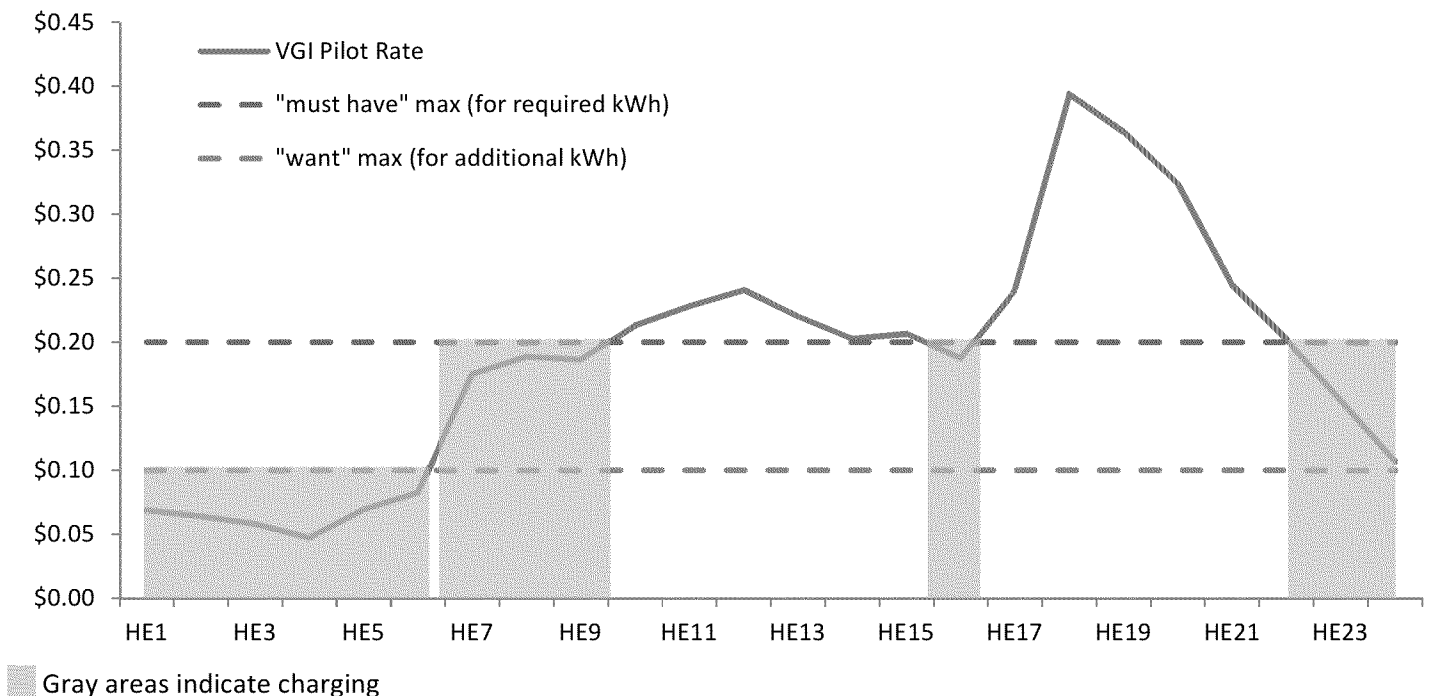
| Influence on Driving More | | | |
|---------------------------|-------------|----|-----|
| A | Significant | 17 | 43% |
| B | Some | 14 | 35% |
| C | None | 9 | 23% |
| | TOTAL | 40 | |

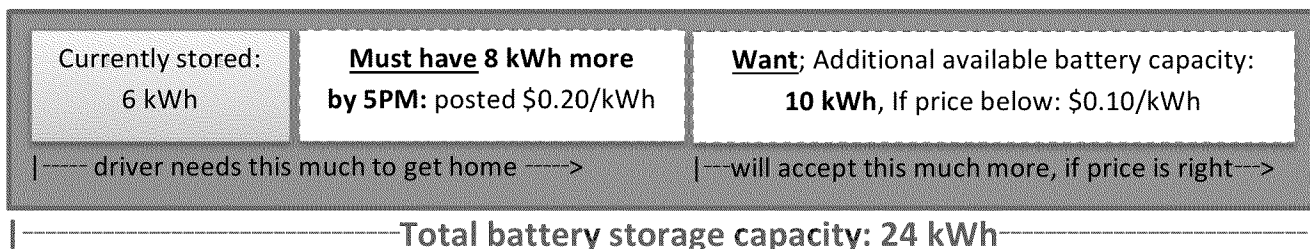
APPENDIX C

High level VGI system description and specification of functional requirements

1) Overview

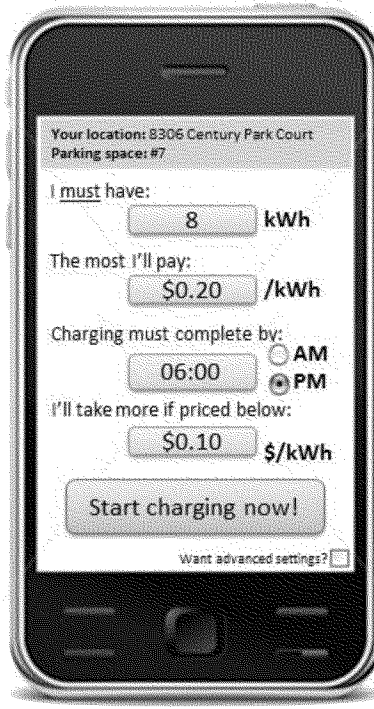
- a) Each installation site will have ten charging units of varying power-delivery capability (i.e., five 1 kW “Level 1” units, and five 7 kW “Level 2” units).
- b) Instead of a flat or fixed time-of-use pricing scheme, all units will be subject to the VGI Pilot Rate described in Ms. Fang’s testimony. The rate is designed to support the objectives identified in Mr. Krevat’s testimony, who testifies that SDG&E’s VGI Pilot Program intends to examine and provide cost-effective, grid-friendly EV charging that will accommodate and promote growth in the EV market. Plug-in vehicle drivers will choose how much energy they *must* have prior to departing – at a particular “must have” maximum price – and how much additional energy they are *willing to accept*, at a different “want,” the customer-specified maximum price.
- c) As the example chart below depicts, once the customer has chosen how much energy they must have at the “must have” maximum price (e.g. \$0.20/kWh), and the “want” price at which they are willing to accept additional kWh (e.g. \$0.10), the VGI system will charge the vehicle:
 - i) During times when the price between \$0.00/kWh and \$0.20/kWh, until the “must have” amount of energy has been provided – at the lowest possible price – after which time...
 - ii) Additional amounts of energy are dispensed when the price is less than or equal to the “want” price of \$0.10/kWh.



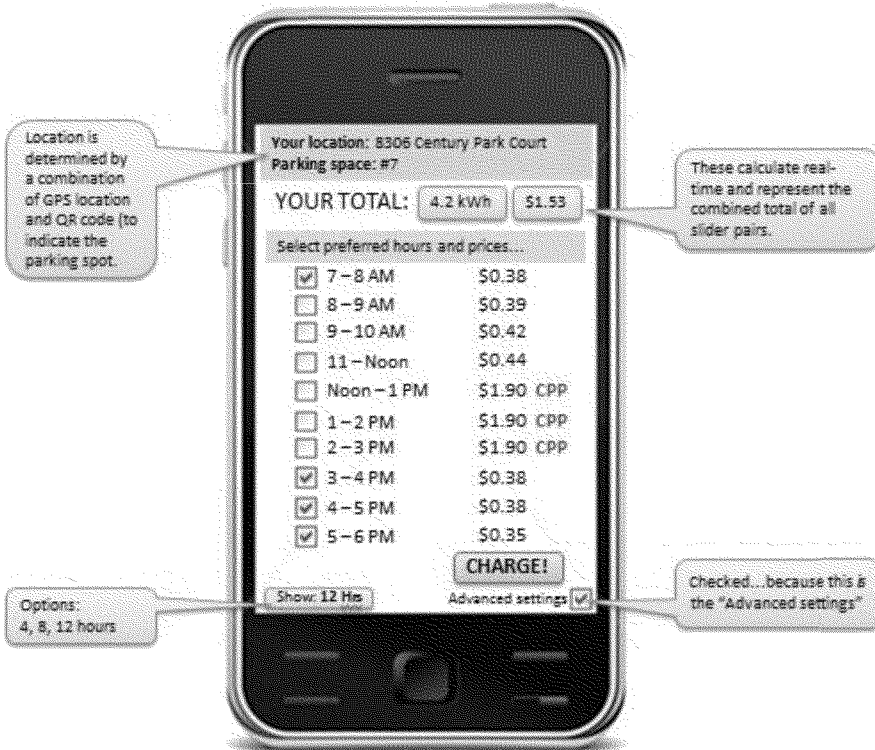


2) Graphical User interface (GUI)

- a) For both the website version and the mobile application version of the VGI driver interface, two screens will be created – a “Basic Settings” screen, and an “Advanced Settings” screen with additional input choices. The purpose of the VGI driver interface is to communicate VGI Pilot Rate pricing information to PEV drivers and, to collect information specifying driver requirements and preferences regarding required energy departure time, and acceptable prices. Each version of the GUI will be created for the iOS and Android platforms, and for the Internet Explorer and Google Chrome Web browsers. The look and feel of the GUIs will be made as identical as practically feasible on both the phone and Web browser VGI driver interfaces.
- b) Two principles will guide GUI design and design-review: 1) simplicity; ease of use for PEV drivers, and 2) if, during design review with customers, a particular GUI element under consideration is shown to not consistently contribute to the PEV driver taking the next intended or desired action, such elements will be eliminated from the GUI design.
 - i) The GUI and supporting software system logic (the VGI System) must be able to translate PEV drivers’ specification of departure time and needed miles of additional driving range into required and desired amounts of energy and a time-schedule for dispensing required (“must have”) energy by no later than the specified departure time. Delivery of all “must have” energy must be done consistently and reliably, and must take into consideration the unique vehicle-charging-system specifications of available makes and models of plug-in vehicles.
- c) Note: all PEV drivers must have the option to interact with an on-site kiosk, without having to interact with the Web and/or cell phone applications while on site. In that case, the maximum default price and required kWh choices that were previously entered in with either the phone or web application will be used to control the charging session started at the kiosk.
- d) During particular PEV driver’s charging sessions, when that the current price is higher than the current PEV driver-specified maximum price, the charging must stop. If the PEV driver decides to prematurely depart (prior to the previously-specified departure time) while this condition persists, the opportunity for an “intruder” to get free energy – when charging commences – at the previous driver’s expense must be eliminated.



BASIC SETTINGS



ADVANCED SETTINGS

3) How the system will be used – PEV drivers’ perspective

The VGI System will be used primarily in workplace and multi-unit dwelling settings. When the driver arrives at a parking spot equipped with a charging unit, the driver will identify the particular charging unit they intend to use (e.g., using the on-site kiosk; a QR code (photographed with the PEV driver’s phone) or by keying in the precise location and charging unit on their phone).

Once the PEV driver has identified the particular charging unit, the driver will be able to review or confirm the PEV driver-specified maximum/not-to-exceed prices. If the PEV driver chooses the BASIC SETTINGS interface, the PEV driver will specify how many kWh (or miles) they must have prior to their specified departure time, and; the price at-or-below which they are willing to take additional energy (or additional miles) above-and-beyond the “must have” amount. The PEV driver can rest assured that they will never pay more than their maximum, not-to-exceed prices for any energy or miles they receive and, that they will receive at least the “must have” amount of energy or mileage prior to their specified departure time, if they remain plugged in.

If the driver chooses the ADVANCED SETTINGS interface, the system can ignore the specified not-to-exceed prices only after it can be confirmed that the day’s VGI Pilot Rate hourly prices – including any circuit or system event prices – have been displayed to the PEV driver.

Once the driver identifies their particular charging unit, the driver chooses the desired day’s price interval(s); any number of intervals may be chosen, limited only by the GUI display/screen area available to display the driver’s choices. In real time, for all chosen intervals, the total energy, range and total cost are calculated and displayed. Once the driver has chosen their desired interval(s), the decisions are committed by the driver via the on-site kiosk, cell phone application or Web browser application.

General system logic

The day’s VGI Pilot Rate prices displayed via the ADVANCED SETTINGS interface are made up of commodity prices collected on a day-ahead basis from the CAISO website. After collection from the CAISO, retail components are added consistent with the VGI Pilot Rate described in Ms. Fang’s testimony.

Note: If a vehicle is unplugged prior to any chosen charging interval(s) or driver-specified departure time, there will be an accommodation and/or procedure for ensuring no economic consequence for the driver; they will simply not receive the energy they expected.

4) SDG&E and Vendor Responsibilities

The following items are the **responsibility of SDG&E**, and must be completed in order for VGI vendors to proceed.

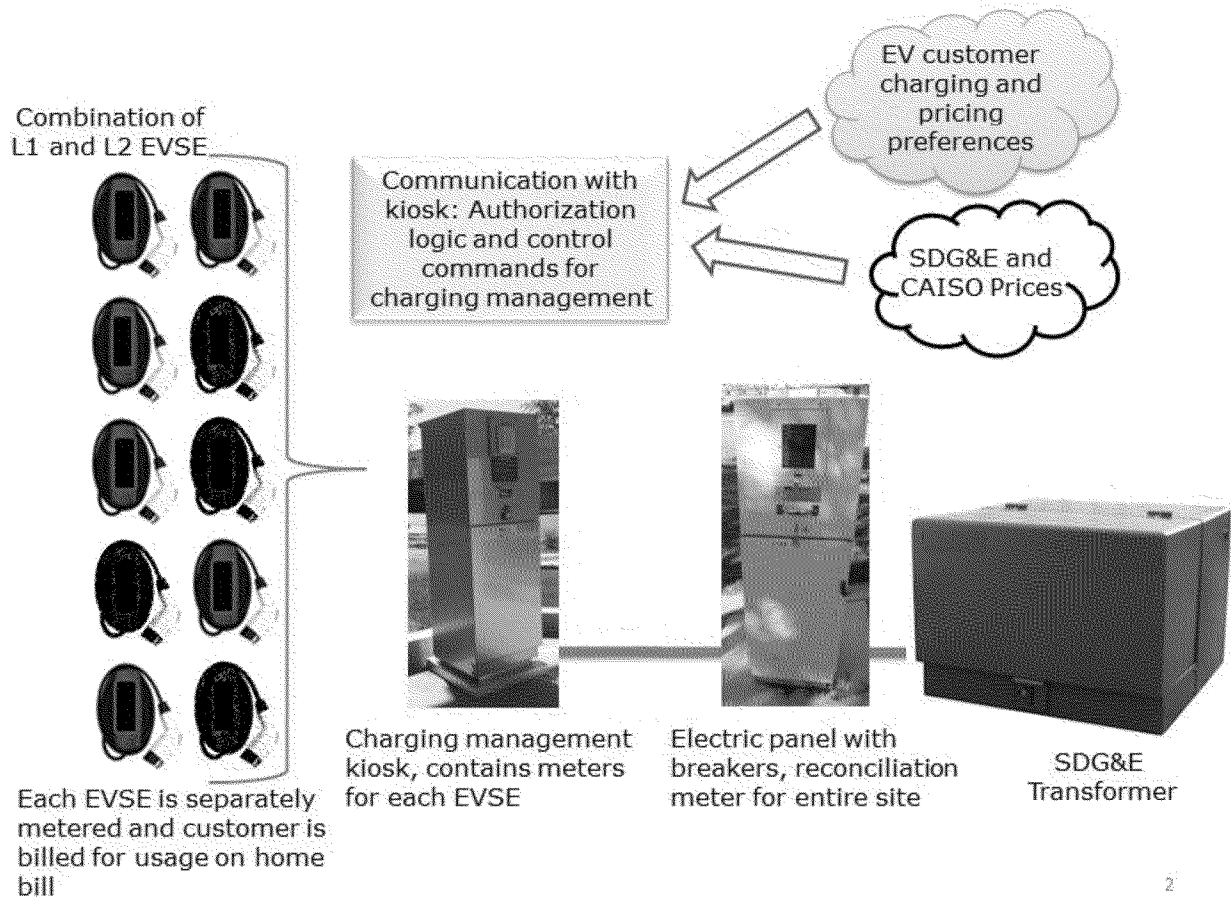
- a) Integrate day-ahead CAISO price with SDG&E’s internal preferred Web service platform.
- b) Identify and integrate SDG&E VGI rate components including the CAISO pricing with preferred Web service platform.
- c) Specify use cases and error messages for all anticipated PEV driver interactions with the VGI System.
- d) Specify usage and VGI system administration reports.
- e) Define required signs and text for parking-area signs.

- f) Define VGI System operational, procedural requirements for monitoring all VGI System components and data-exchange throughout the system.

The following items are the **responsibility of VGI vendors**.

- g) Develop PEV driver and system administration PEV driver interface design and function; develop & test GUI.
- h) Integrate day-ahead VGI Pilot Rate price feed with vendor backend (as provided by SDG&E’s preferred Web services platform).
- i) Develop usage and system administration reports specified by SDG&E.
- j) Develop DR PEV driver-interactions logic and GUI screens.

5) VGI Field Site Equipment Illustration



6) CAISO Application Programming Interface (API) Day Ahead Pricing

The CAISO website will be used to collect the day-ahead price by SDG&E’s preferred Web services platform. This wholesale price will be modified by SDG&E – by adding retail pricing components described in Ms. Fang’s testimony – and will be made available to PEV drivers via the VGI vendor’s backend, via either a push or pull method. If a pull method is chosen, it will be implemented in accordance with CAISO’s Interface Specification for OASIS Version: 3.11.1, found here: http://www.caiso.com/Documents/InterfaceSpecifications-OASISv3_11_1.pdf.