



Pacific Gas and Electric Company
San Francisco, California
U 39

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ELECTRIC SAMPLE FORM 79-1158
ELECTRIC VEHICLE SUBMETERING METER DATA MANAGEMENT AGENT
(MDMA) REGISTRATION AGREEMENT

Sheet 1

Please Refer to Attached
Sample Form

(N)
(N)

Advice Letter No: 4606-E
Decision No.

Issued by
Steven Malnight
Senior Vice President
Regulatory Affairs

Date Filed	March 26, 2015
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Resolution No.	

EV Submeter Pilot Phase 1

Submeter MDMA Registration Agreement

ELECTRIC VEHICLE SUBMETERING METER DATA MANAGEMENT AGENT (MDMA) REGISTRATION AGREEMENT

I. INSTRUCTIONS FOR QUALIFYING AS A SUBMETER METER DATA MANAGEMENT AGENT

A. BACKGROUND

On November 19, 2013, the California Public Utilities Commission (Commission or CPUC) issued Decision (D.) 13-11-002 modifying the PEV Submetering Protocol requirements set forth in D. 11-07-029 by adopting the Commission Energy Division (ED) Staff's Plug-In Electric Vehicle Submetering Roadmap for a two-phase pilot. Ordering Paragraph 2 of D.13-11-002 requires the investor-owned utilities (IOUs) to submit a Tier 2 Advice Letter that includes the metering requirements provided by the ED to the IOUs, draft versions of the data format template, the Submeter Meter Data Management Agent (MDMA) registration Agreement, the customer enrollment Agreement, and MDMA Service Requirements.

All Submeter MDMA's must submit a Notice of Participation to the Commission's Energy Division by July 11, 2014 to participate in the pilot. Submeter MDMA's must indicate the following in the Notice of Participation: (1) the number of submeters associated with customers that have agreed to participate as of the date they submit the Notice and (2) the total number of submeters that they plan to enroll. The Notice of Participation is embedded within the Submeter MDMA Registration Agreement. Phase 1 of the Pilot ends after 12 billing cycles for a customer participant and no later than August 31, 2016.

The Commission may require that potential Submeter MDMA's comply with certain Energy Division standards in experience, education and training to perform the functions of a Submeter MDMA. These functions and associated requirements are described in detail in the Phase One Performance Standards for Metering and Meter Data Agents Participating in California's Electric Vehicle Submetering Pilot (Performance Standards), approved by the Commission in Resolution E-4651 and attached hereto as Attachment 1

B. REGISTRATION AGREEMENT

An entity desiring to act as a Submeter MDMA must complete the attached registration Agreement and submit it to the ED.

The ED will review the submitted documentation, determine if the prospective Submeter MDMA's standards meet the requirements established by the Commission, and notify the Submeter MDMA whether its request is approved via e-mail. The ED will make reasonable efforts to review the documentation and respond to the Submeter MDMA request within ten business days. Missing documentation may require the prospective Submeter MDMA's to resubmit that portion of the application and restart the ten-day review process.

C. REQUIREMENTS

1. Entities seeking to offer Submeter MDMA services for an electric vehicle (EV) submeter must submit a Submeter MDMA Registration Agreement to the ED. Approval to act as a Submeter MDMA will be granted to Submeter MDMA's that satisfy the requirements established in the MDMA Performance Standards document.
2. The determination is based on the ED's review of the Submeter MDMA's written application, completed documents, and the ability to meet PG&E's EV Submeter Pilot Phase 1 Data Reporting and Transfer Requirements (Data Exchange Requirements), attached hereto as Attachment 2.

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3. Upon receipt of the Submeter MDMA's Registration Agreement, PG&E will electronically forward a copy of its data exchange requirements to the Submeter MDMA. The Submeter MDMA's are allowed ten days to report a customer drop out or change of address to the IOUs.
4. The Submeter MDMA's must notify Energy Division and all IOUs in which they are providing services in the event that they terminate service prior to the end of the Pilot Term.

D. SUBMETER MDMA REGISTRATION PROCESS

1. Submeter MDMA submits Registration Agreement to Adam Langton (adam.langton@cpuc.ca.gov) or Noel Crisostomo (noel.crisostomo@cpuc.ca.gov) of the CPUC's Energy Division by July 11, 2014. Reasonable efforts will be made to acknowledge receipt of the Registration Agreement within ten business days of receipt. The Energy Division may request additional information, as needed, to approve the MDMA's registration request for this phase of the Pilot.
2. Submeter MDMA receives final approval, may submit Customer Enrollment Agreements to PG&E starting September 1, 2014.
3. Submeter MDMA's shall enroll submeters on a first-come, first-served basis subject to Exclusivity Period and Enrollment Cap.

E. ENROLLMENT REPORTING

1. Submeter MDMA's must report the balance of unenrolled customers to PG&E that will be available for enrollment during the Exclusivity Period on Friday of each week until 450 customers have been enrolled, in which case, Submeter MDMA must submit daily updates.
2. PG&E will notify Submeter MDMA's of remaining spaces available via email by Wednesday of the following week.
3. Beginning at the fourth month Submeter MDMA's are able to enroll additional submeters on a first-come, first-served basis, reporting enrollments to PG&E daily.

F. SUBMETER TESTING AND CALIBRATION

Submeter MDMA's are not required to provide compliance and testing data to the IOUs if they have otherwise complied with the application process and demonstrated consistency with the Performance Standards for Metering and MDMA's. The Third Party Evaluator retained by the IOUs may randomly field test no more than five percent of the submeters for accuracy. By virtue of a customer's enrollment with submeter service by the IOU, the Independent Evaluator and Submeter MDMA's may obtain access from their participants for testing and calibration, if selected as part of the evaluation.

G. SUBMETER SAFETY REQUIREMENTS

Any Electric Vehicle Supply Equipment (EVSE), EVSE with embedded submeter, and/or stand-alone submeter installed prior to the Pilot must be certified by an Occupational Safety & Health Administration (OSHA)-approved Nationally Recognized Testing Laboratory (NRTL). Any EVSE, EVSE with embedded submeter, stand-alone submeter, and related PEV charging circuits, must have been installed by a person or entity with a general electrical contractor's license issued by the California Contractors State License Board and must have obtained any required inspection and approval by the local

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Authority Having Jurisdiction (AHJ). The OSHA-approved list of NRTLs is maintained at: <https://www.osha.gov/dts/otpca/nrtl/>.

Any EVSE, EVSE with embedded submeter, and/or stand-alone submeter installed as part of the Pilot must be Underwriters Laboratories (UL)-certified or meet PG&E safety standards. Any EVSE, EVSE with embedded submeter, stand-alone submeter and related PEV charging circuits must be installed by a person or entity with a general electrical contractor's license issued by the California Contractors State License Board and must obtain any required inspection and approval by the local AHJ.

H. DATA FORMAT

Submeter MDMA must satisfy PG&E's EV Submetering Pilot Phase 1 Data Reporting and Transfer Requirements, attached hereto as Attachment 2.

I. FORMAT TESTING

After PG&E receives the completed qualification documentation, the Submeter MDMA may contact PG&E to schedule the format acceptance test to ensure it can produce a secure data file that satisfies PG&E's Data Exchange Requirements. To schedule the test, please contact the EV Submetering Pilot Program Manager at PG&E.

J. SECURITY AND CONFIDENTIALITY

Submeter MDMA must comply with Data security and confidentiality requirements specified in the CPUC's Privacy Rules and PG&E's Electric Rule 27 (Privacy and Security Protections for Energy Usage Data). The Submeter MDMA's access to, use, and disclosure of customer-specific energy usage and billing data is subject to the prior, express written consent of the participating customer and the sole responsibility of the Submeter MDMA.

K. VEE PERFORMANCE STANDARDS

For the purposes of Phase 1 of the submetering pilot, the usage measured at the EV submeter will be used to allocate energy usage between a primary load and an electric vehicle. PG&E will accept the Submeter MDMA's data as being "valid" or VEE'd and bill both the EV and primary accounts accordingly. For purposes of Phase 1 of the pilot only, the Submeter MDMA is not required to satisfy the "Standards for Validating, Editing, and Estimating Monthly and Interval Data for Monthly and Interval Data" contained in "VEE-Attachment of the Direct Access Standards for Metering and Meter Data".

L. SUBMETER MDMA TERMINATION

PG&E will notify Submeter MDMA in the event it fails to timely meet performance requirements for two consecutive billing periods. Absent corrective actions, if Submeter MDMA fails to timely meet performance requirements for a third consecutive month, PG&E may petition Energy Division to terminate pilot participation by Submeter MDMA and its customers.

M. JURISDICTION

This agreement at all times shall be subject to such modifications as the Commission may direct from time to time in the exercise of its jurisdiction.

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N. INDEMNIFICATION

I, Submeter MDMA, hereby release, hold harmless, and indemnify PG&E from any liability, claims, demands, causes of action, damages, or expenses resulting from my participation in the submetering pilot under this Registration Agreement, including but not limited to the use of customer information obtained pursuant to the prior express, written consent of customers participating in the pilot, and from the taking of any action, including changes in services or rates of customers participating in the pilot, pursuant to this Registration Agreement, and provided such Utility action is consistent with applicable CPUC orders, tariffs and regulations.

[This Agreement must be signed by someone who has authority to financially bind the Submeter MDMA]

Signature of Authorized Agent of Company

Submeter MDMA Company Name

Name of Authorized Agent of Company (Print)

Executed on (Date)

Phone Number

City and State Where Executed

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2.0 SUBMETER MDMA REGISTRATION AGREEMENT

A completed and approved Submeter MDMA Registration Agreement must be submitted by any entity desiring to participate as a Submeter MDMA in the Phase 1 Submetering pilot.

PG&E will use reasonable efforts to acknowledge receipt of the Registration Agreement, request any necessary additional information, and provide information on the required Acceptance Test with sample data, contact names, and procedures, within ten business days of receipt of the Registration Agreement.

MDMAs will have a temporary right to a number of customers within each IOU territory in which they plan to participate. During this three month "Exclusivity Period" each MDMA will have "Exclusivity Rights" to a number of submeters that will be determined by dividing the 500 maximum submeter enrollments by the number of Submeter MDMAs. Submeter MDMAs must report the balance of unenrolled customers to PG&E that will be available for enrollment during the Exclusivity Period on Friday of each week until 450 customers have been enrolled, in which case, Submeter MDMA must submit daily updates. Beginning at the fourth month Submeter MDMAs are able to enroll additional submeters on a first-come, first-served basis, reporting enrollments to PG&E daily.

This registration is for Phase 1 only and expires on August 31, 2016

Submeter MDMA NAME	Contact Person
Address:	Title
City, State, ZIP	Phone Number
Address	Email Address
Submeter MDMA's DUNNS Number	

NUMBER OF SUBMETERS ASSOCIATED WITH CUSTOMERS THAT HAVE AGREED TO PARTICIPATE:

TOTAL NUMBER OF SUBMETERS YOU PLAN TO ENROLL AND PROVIDE SUBMETERING SERVICES:

Total Submeter installations will be broken down as follows:

Residential:	Non-NEM	<input type="text"/>	+	NEM	<input type="text"/>	= Subtotal	<input type="text"/>
		+			+		+
Commercial:	Non-NEM	<input type="text"/>	+	NEM	<input type="text"/>	= Subtotal	<input type="text"/>
		=			=		=
	Subtotal	<input type="text"/>		Subtotal	<input type="text"/>	= Total	<input type="text"/>

Attachment 1

EV Submeter Pilot Phase 1 PERFORMANCE STANDARDS FOR METERING AND METER DATA MANAGEMENT AGENTS

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I. STANDARDS FOR EV SUBMETERING

A. Physical Location

1. **Location.** The submeter must be located at any fixed point between the primary utility electric meter and the electric vehicle supply equipment (EVSE) coupler. Any EVSE containing an embedded submeter must indicate that it contains a metering device.
2. **Identification.** A submeter must be labelled with a unique serial number for identification.
3. **Security.** A meter system shall be designed and constructed so that metrology components are adequately protected from environmental conditions likely to be detrimental to accuracy. Components shall be designed to prevent unauthorized access to adjustment mechanisms and terminal blocks by providing for application of a physical security seal or an Audit Trail.
4. **Security from Tampering.** During Phase 1 of the submetering pilot, no sealing requirements will be placed on the submeter, regardless of whether remote configuration is feasible. The Submeter Meter Data Management Agent and/or EVSPs should document how they physically prevent submeters from tampering. No means shall be provided by which any measured electricity can be diverted from the measuring device.

B. Accuracy and Measurement

1. **Accuracy.** The submeter must maintain accuracy of +/- 5% during the first Phase of the pilot. The term 'accuracy' is equivalent to the same term used in the ANSI C-12 standard. Submeter MDMA is responsible for describing how they comply with this accuracy requirement prior to pilot installation.
2. **Interval of Measurement.** The submeter shall have the capability to measure energy consumption in time intervals equal to the interval used by PG&E, but submeters are not required to measure energy consumption in intervals smaller than 15 minutes. A Submeter MDMA has the option to measure in less than 15-minute time periods if they choose to do so. Regardless of the submeter's measurement interval, the Submeter MDMA must report energy consumption data in time intervals consistent with those used by PG&E.

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3. **Standard Time Synchronization.** The submeter shall be synchronized to the same time used by utility meters in order to maintain billing consistency with measurements from the primary utility meter. The submeter's time should be synchronized to the United States time standard as defined by the National Institute of Standards and Technology or within three minutes of the time used by PG&E.
4. **Unit of Measurement.** The submeter must measure electricity data to the nearest Watt-hour (Wh) for each time interval and must be time-stamped to indicate the time/date of the energy consumption.
5. **Submeter and MDMA Storage of Data.** The device memory should retain information on the quantity of electricity consumed during a loss of external power. Values indicated or stored in memory shall not be affected by electrical, mechanical or temperature variations, radio-frequency interference, power failure, or any other environmental influences to the extent that accuracy is impaired per UL 2594. Memory shall be nonvolatile or backed up in a network.
6. **Utility Storage of Data.** Watt-hour data accumulated and indicated shall be retained by PG&E consistent with the same data storage requirements applicable to customer billing data.

C. Safety

1. Any Electric Vehicle Supply Equipment (EVSE), EVSE with embedded submeter, and/or stand-alone submeter installed prior to the Pilot must be certified by an Occupational Safety & Health Administration (OSHA)-approved Nationally Recognized Testing Laboratory (NRTL). Any EVSE, EVSE with embedded submeter, stand-alone submeter, and related PEV charging circuits, must have been installed by a person or entity with a general electrical contractor's license issued by the California Contractors State License Board and must have obtained any required inspection and approval by the local Authority Having Jurisdiction (AHJ). The OSHA-approved list of NRTLs is maintained at: <https://www.osha.gov/dts/otpca/nrtl/>.
2. Any EVSE, EVSE with embedded submeter, and/or stand-alone submeter installed as part of the Pilot must be Underwriters Laboratories (UL)-certified or meet PG&E safety standards. Any EVSE, EVSE with embedded submeter, stand-alone submeter and related PEV charging circuits must be installed by a person or entity with a general electrical contractor's license issued by the California Contractors State License Board and must obtain any required inspection and approval by the local AHJ.

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D. Informing Customers about Submeter Data

1. **MDMA Responsibilities.** There is no requirement for the submeter device to visually display data. Customers should be informed of this requirement by the EVSP or Submeter MDMA. MDMA's must make data available to customers through a web-based or mobile phone application and by request
2. **Utility Responsibilities.** Utilities are required to report submeter data through the customer's monthly bill. PG&E is not required to report this usage data through their customer web tools. A utility may opt to report data to customers online
3. **Terms Subject to Modification after Pilot Term.** Customers should be informed that the pilot is temporary and that the requirements may change after the end of the first pilot phase.

E. Transfer of Submeter Data from Submeter MDMA's to Utilities

1. **Customer Submeter and Account Identification.** The MDMA must communicate the submeter serial number to the customer's utility as part of the customer enrollment in submetering services. This serial number shall be included in the monthly data communication in order to associate the submeter with the correct customer account.
2. **Minimum Transfer Requirement.** Utilities shall implement a simple means of receiving data that allows any qualified EVSP or Submeter MDMA to submit data to PG&E. Each utility shall make available a standard format for the MDMA to submit meter data via electronic spreadsheet. The form should allow the Submeter MDMA to submit all of its data through a single spreadsheet to the appropriate utility contact. The MDMA's should submit the data via the Internet in a secured /encrypted manner.
3. **Alternative Transfer Option.** Utilities are encouraged to explore additional meter transfer protocols that involve the use of 'Green Button' elements or other data transfer protocols that allow PG&E to efficiently receive data from the Submeter MDMA. These options may be offered to EVSPs as an alternative to the basic spreadsheet submission option, but cannot be required as the only data transfer method.
4. **Transfer Deadlines.** Submeter MDMA's must report data for a given billing period no later than three business days after the end of the billing period. Utilities should provide advance communication of these monthly deadlines to the Submeter MDMA to the extent that billing periods are known prior to the start of the Pilot Terms.

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5. **Transfer Testing.** Submeter MDMA must demonstrate ability to transfer a test meter data file, which can be successfully processed for subtractive billing by PG&E. The Transfer Testing may use the Minimum Transfer Requirement or the Alternative Transfer Requirement if offered by PG&E. Data transfer testing shall only be required during the MDMA registration process and thereafter as necessary.
6. **Process Updates.** Utilities may make periodic changes to the standard format for the MDMA to submit meter data. Submeter MDMA's may be required, at their cost, to make modifications and perform additional testing of their systems to support any changes required by the Utilities.

F. SUBMETER MDMA QUALIFICATION

Entities seeking to offer Submeter MDMA services for an electric vehicle (EV) submeter shall be required to submit a Submeter MDMA Registration Agreement if EVSP or entity seeks to offer such services. For Phase 1, the written request shall include the following information: name of the person or entity; business address and telephone number; intervals by which the EV submeter usage is measured, number of participants by customer class, utility service territory, whether the primary account is billed under a netting arrangement and all other data requirement found in the MDMA Registration form. Submeter MDMA's are required to register with the CPUC in order to participate in the Utilities' EV submetering programs. Upon receipt of the request, the CPUC's Energy Division (ED) shall be required to review the entities registration requirements. If the ED states that the proposed Submeter MDMA's educational and training requirements are sufficient, then the Submeter MDMA may begin offering Submeter MDMA services so long as it meets all the Submeter MDMA-related requirements.

G. SUBMETER MDMA VEE PERFORMANCE STANDARDS

1. Meet requirements established in the **"EV Submeter Pilot Data Reporting and Transfer Requirements" (Attachment 2)**
2. For the purposes of Phase 1 of the CPUC's EV "single customer of record" submetering pilot, the usage measured at the EV submeter will be used to allocate energy usage between a primary load and an electric vehicle. PG&E will accept the Submeter MDMA's data as being "valid" and bill both EV and primary accounts accordingly.
3. The Submeter MDMA must provide all of its EV submeter data to PG&E within 3 business days of PG&E's regularly scheduled meter read date. Any submetered data submitted after 5:00 pm Pacific Time of the third business day will not be incorporated into the customer's bill. If data is not received for any submeter billed interval within this timeframe, that interval will be considered as "zero" by PG&E when calculating the primary and EV submeter monthly bills. The 3 business day standard may be met by providing submeter data throughout the course of the month (e.g. on a weekly basis) if desired.

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H. METER SYSTEM TESTING

An independent third party evaluator (3PE) will be allowed to field test up to five percent of the EV submeters within each of the utilities service territories for each phase of the EV pilot to evaluate the accuracy of the overall metering system at a customer site. The 3PE shall be allowed to select which EV meters to test, and the Submeter MDMA and its customers' shall provide the necessary access and assistance to facilitate such testing.

The submeter MDMA's will propose methodologies for testing and calibration for IOU review, consent, and subsequent implementation.

Submeter Manufacturer Certification & Accuracy: EVSE providers shall provide the respective utilities with documentation of their compliance with the "EV Submeter Pilot Phase 1 Performance Standards for Metering and Meter Data Management Agents" in general and the results of accuracy testing specifically for each submeter by serial number.

Attachment 2

EV Submeter Pilot Phase 1

Data Reporting and Transfer Requirements

IOU & MDMA Suggested Updates

I. INTRODUCTION

This document is intended to describe the data format and data transfer processes necessary for a Submeter Meter Data Management Agent (MDMA) participating in Phase 1 of the CPUC ordered Electric Vehicle (EV) Submetering Pilot (Pilot). Submeter MDMA's are expected to meet certain performance standards in the EV Submetering Pilot¹, including transferring submeter data to the California Investor Owned Utilities (IOUs) for the purpose of Subtractive Billing. This document provides information on EV Submeter data formats and transfer methods to be used in the Pilot.

Submeter MDMA's are expected to transfer Submeter Data to the Utilities using one of two methods: Either the Minimal Transfer Requirement, or the Alternative Transfer Option. The Utilities may offer the alternative option, but it may not be required of Submeter MDMA for the Pilot. Details to implement the Minimal Transfer Requirement are the focus of this document.

Additional Submeter MDMA activities are beyond the scope of this document, such as the process for a Submeter MDMA to register with an IOU and to signup customers for the Electric Vehicle Submetering Pilot. These additional activities are referenced herein, but the details are outside of the scope of this document.

II. TERMS AND DEFINITIONS

CSV – Comma Separated Values. The spreadsheet file format used in the Minimal Transfer Requirement. It is also a format used for Green Button subscription files.

DUNS number - Data Universal Numbering System. A nine digit number assigned by Dun & Bradstreet unique to a single business entity.

NAESB - North American Energy Standards Board. NAESB is the standards organization that created the ESPI standard, which is used by Green Button.

UTC Time - Coordinated Universal Time (UTC). A signed positive 64 bit integer value representing the number of seconds from midnight Jan 1, 1970, in UTC, not counting leap second corrections to UTC (35 seconds through 2012). So 5:00 PM EDT on September 22, 2013, has a UTC Time value of 1379883600")

¹ See: Phase One Performance Standards For Metering And Meter Data Agents Participating In California's Electric Vehicle Submetering Pilot

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UUID - Universally Unique Identifier. UUID is used to identify entities such as Customer and Submeter MDMA's.

III. DATA FORMATS

This section describes the data file formats to be used in the Pilot. The two data formats available for this pilot are a Spreadsheet file format or the Green Button XML format. The spreadsheet format is for the Minimal Transfer Requirement.

A. Minimal Transfer Requirement

The spreadsheet data file format and name conventions are described below.

1. Spreadsheet Data Format

The Spreadsheet format is a simplified derivation of the Green Button XML format. The spreadsheet format allows Submeter MDMA's to transfer in one file EV Submeter data for multiple submeters and multiple days. The spreadsheet includes field headers with the following titles and meaning. The spreadsheet shall be transmitted in CSV file format.

Field Title	Field Description
Customer UUID	Assigned by IOU after a Registered Submeter MDMA completes the Customer enrollment with the IOU.
Interval Duration	Duration of data interval for the Read Quantity represented in seconds. Interval Duration is either "0900" for 15 minute intervals or "3600" for 60 minute intervals. Interval Duration is specified by the IOU based on the Primary Meter's unit of measure and/or the IOU's Subtractive Billing processes.
Read Date & Time	Date & Time for the start (beginning) of the data interval. Read Date & Time is expected to be at the top of the hour for 60 minute intervals (e.g., UTC Time equivalent of 10:00 am, 11:00 am,), or on the quarter hour for 15 minute intervals (e.g., UTC Time equivalent of 10:15 am, 10:30 am, 10:45 am, 11:00 am). A read Date & Time record is required for every interval every day, even when the Read Quantity is zero. (Formatted UTC Time, see terms and definitions)
Read Quantity	Interval value in Watt hours. (Formatted Decimal 12/6 with zero padding on the right, and none on the left)
Date Processed	Date the data was loaded into the spreadsheet by Submeter MDMA. (Formatted UTC Time, see terms and definitions)

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Below is an example of the spreadsheet file: (UTC Seconds in the example represent UTC Time)

36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369728900,40.640000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369729800,41.120000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369730700,43.040000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369731600,41.280000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369732500,39.840000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369733400,39.360000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369734300,40.000000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369735200,40.000000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369736100,39.200000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369737000,40.160000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369737900,40.000000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369738800,45.440000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369739700,45.280000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369740600,43.520000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369741500,38.880000,1370844900
36c8dc0f-ceee-4203-8ff9-05d2feeca7e7,900,1369742400,46.080000,1370844900

Customer UUID
assigned by
IOUs.

Duration

Read Start
(UTC Seconds)

Quantity
Consumed

3rd Party
Processed Date
(UTC Seconds)

2. Spreadsheet File Minimum Data Transfer Requirements

To facilitate data processing and possible data troubleshooting, minimum data transfer requirement are defined.

1. No partial day data will be processed by the IOU.
 - a. Spreadsheet files shall contain a minimum of 24 hours of interval data. (e.g., 96 consecutive intervals assuming 15 minute intervals, or 24 consecutive intervals assuming 60 minute intervals.)
 - b. Spreadsheet files shall contain a read Date & Time record for every interval, even when the interval's Read Quantity is a zero or a missing value.
 - c. Missing values shall be represented with a zero values.
 - d. SCE and SDG&E expect 96 consecutive intervals in a day; PG&E expects 24 consecutive intervals in a day for Residential submeters and 96 consecutive intervals in a day for Commercial & Industrial submeters.
2. IOUs recommend daily file transfers.
 - a. Daily file transfers may contain Date & Time records for multiple days.
 - b. Daily file transfers containing Date & Time records for multiple days, shall contain all expected consecutive intervals (e.g., no missing intervals or gaps in intervals)
 - c. Daily file transfers may contain repeated or corrected Date & Time records. IOU will use the most recently received and processed interval record(s), when billing the submeter data. IOU may not correct Date & Time records for intervals previously billed.

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3. Date & Time records should not be delayed by more than three days. Records delayed by three or more days may not be processed for billing, due to the Pilot requirement that meter data is to be sent 3 days after the customer's billing period.

3. Spreadsheet File Name Structure

The CSV spreadsheet files transferred by the Submeter MDMA to PG&E shall use the following file naming structure:

"MDMA-DUNS_IOU-DUNS_EVSP_YYYYMMDDHHMMSS.CSV"

File Name Component	Component Description
MDMA-DUNS	The nine digit DUNS Number of the Submeter MDMA registered with the IOU and provided to the IOU as part of the Submeter MDMA's Registration process. (Format numeric 9, all formatting dashes omitted)
IOU-DUNS	The nine digit DUNS Number of the IOU and provided by the IOU as part of the Submeter MDMA Registration process. (Format numeric 9, All formatting dashes omitted)
EVSP	Hard coded "EVSP" to identify the file as part of the EV Submetering pilot application.
YYYYMMDDHHMMSS	The date and time the spreadsheet file was created by the Submeter MDMA, based on MDMA's local time as determined by MDMA. Purpose of this file name component is to determine time sequence of files sent from an individual MDMA.
Example file name: "987654321_123456789_EVSP_20130428245959.csv"	

B. Provision of UUIDs to Submeter MDMA's

The provisioning of UUIDs consists of transferring the Customer UUIDs from the IOU to the Submeter MDMA. . The Customer UUIDs are assigned by IOU after the MDMA's approved registration into the EV Submetering Pilot, and after a Registered Submeter MDMA submits a valid Customer Enrollment form to IOU. The Customer UUIDs are sent by encrypted email from IOU to the MDMA or by the EVSP Enrollment report described below in section Enrollment and Exception Reporting to Submeter MDMA's.

The Customer UUIDs will be sent to the Submeter MDMA in a CSV file containing both the UUID and the corresponding Unique Submeter Device Identifier (aka, Submeter Serial Number) for the customer's service. See EVSP Enrollment Data Format below for more details.

IV. DATA TRANSFER METHODS

The IOUs each have slightly different methods to send and receive Minimal Transfer Requirement spreadsheet files and Green Button XML format files. This section describes PG&E's methods.

ELECTRIC VEHICLE SUBMETERING METER DATA MANAGEMENT AGENT (MDMA) REGISTRATION AGREEMENT

PG&E uses sFTP to receive both the Spreadsheet Format and Greenbutton Format data files from MDMA's. For the phase 1 pilot, PG&E will only support receiving the Spreadsheet format from MDMA's and only provide MDMA's enrollment files (no providing of Exception Reporting files for phase 1).

PG&E's preference is for MDMA's to push data files to our hosted sFTP servers (Inbound) and to pull enrollment files from our SFTP servers (outbound).

Per PG&E's preferred method, PG&E will provide MDMA's the following information:

1. IP Address
2. Assigned Username
3. Password or log in key (for key connectivity)
4. MDMA's to provide PG&E:
 - a. Name, email, and telephone number of MDMA's connectivity contact person(s).
 - b. Filename(s)

If file encryption is required, PG&E will provide the MDMA with PG&E's PGP Public Key. If necessary, PG&E can support pulling data files from MDMA's external servers (inbound) and pushing enrollment files to MDMA servers (outbound). To support this, PG&E will require the following information from the registered MDMA:

Files Inbound to PG&E:

1. SSH2 RSA 2048-bit key. This is used for validating the sFTP Connection. PG&E does use passwords as an alternative.
2. Hostname / IP address
3. Download folder path
4. Filename(s)
5. Name, email, and telephone number of MDMA's connectivity contact person(s).

Files Outbound from PG&E:

1. Hostname / IP address
2. Username
3. Password (or log-in key will need to be exchanged)
4. Upload folder path
5. Name, email, and telephone number of MDMA's connectivity contact person(s).

If file encryption is required, PG&E will provide the MDMA with PG&E's PGP Public Key.

V. ENROLLMENT AND EXCEPTION REPORTING TO SUBMETER MDMA'S

Enrollment information and reporting of errors or exceptions in the submeter CSV Spreadsheet format from PG&E to Submeter MDMA may be provided in CSV formats described below. These reporting CSV files will be transferred from PG&E to the Submeter MDMA using the outbound Data Transfer Methods described above.

A. Enrollment and Exception Reporting File Name Structure

The CSV files transferred by PG&E to Submeter MDMA shall use the following file naming structure:

ELECTRIC VEHICLE SUBMETERING METER DATA MANAGEMENT AGENT (MDMA) REGISTRATION AGREEMENT

"MDMA-DUNS_IOU-DUNS_EVSPENROLLMENTS_YYYYMMDDHHMMSS.CSV"
"MDMA-DUNS_IOU-DUNS_EVSEXCEPTIONS_YYYYMMDDHHMMSS.CSV"

See the Spreadsheet File Name Structure section above for additional description of the file name components.

B. EVSP Enrollment Data Format:

Field Title	Field Description
Transaction Type	Valid values are: <ul style="list-style-type: none"> "New Enrollment" "Enrollment Termination" (Formatted alpha-numeric)
Customer UUID	Assigned by IOU after a Registered Submeter MDMA completes the Customer enrollment with the IOU. The "New Enrollment" transaction file is the vehicle to initially transmit the UUID to the MDMA. Submeter MDMA will receive a Customer UUID for every Unique Submeter Device Identifier.
Unique Submeter Device Identifier	The Unique Submeter Device Identifier (aka Submeter Serial Number on the Customer Enrollment Form) provided by the Submeter MDMA during the Customer enrollment process. This identifier is unique to each submeter and provided by the MDMA. This identifier is expected not to change during the Phase I pilot. In the event of a submeter replacement, MDMA shall report data for the replacement submeter using the previously assigned Customer UUID. (Formatted alpha-numeric maximum 17 characters)
Effective Date	First date IOU will accept Submeter data from the MDMA. (Formatted UTC Time, see terms and definitions)
Termination Date	Date of the last day the EV submetering data will be used for subtractive billing. A new enrollment will not have a Termination Date (blank field); an Enrollment Termination will have a Termination date. For the Phase I pilot an Enrollment Termination will be sent after the 11 th billing month. MDMA are expected to submit to IOU an Enrollment Termination, in the event their customer discontinues Submetering service. (Formatted UTC Time, see terms and definitions)

C. EVSP Exception Data Format:

If the IOU processing the MDMA's submetering data detects an error or exception within the spreadsheet data file, the IOU, at its own discretion, may elect to provide the MDMA with an exception notice. One method of sending an exception notice from the IOU to the submeter MDMA is an Exception Data file in the following format:

ELECTRIC VEHICLE SUBMETERING METER DATA MANAGEMENT AGENT (MDMA) REGISTRATION AGREEMENT

Field Title	Field Description
Customer UUID	Assigned by IOU after a Registered Submeter MDMA completes the Customer enrollment with the IOU.
Originating File Name	CSV file name provided by the Submeter MDMA which generated the exception (formatted MDMA-DUNS_IOU-DUNS_EVSP_YYYYMMDDHHMMSS.CSV)
Date Processed	Date Processed by PG&E. (Formatted UTC Time, see terms and definitions)
Exception Error	<p>A description of the error generated by the CSV file provided by the Submeter MDMA. Example exception-errors may include:</p> <ul style="list-style-type: none"> Invalid Enrollment - Customer and/or Device Invalid. Invalid Data - Negative Values not allowed. Invalid Data - Partial Data Found. Invalid Data - Data received that is before or after the enrollment. Invalid Enrollment - Customer and/or Device Invalid. <p>(Formatted alpha-numeric, up to 255 characters)</p>

VI. ALTERNATIVE TRANSFER OPTION (GreenButton format)

The IOUs may offer an alternative data transfer option, but the option may not be required of Submeter MDMA for the Pilot. The Alternative option described in this document is the Extensible Markup Language (XML) Green Button format.

The expected XML data format for EV Submetering data is the forthcoming NAESB Green Button Connect My Data standard for bulk transfer (Bulk Standard). This forthcoming standard is under development by NAESB and expected to be completed in early 2014.

The XML format for the Bulk Standard is a modification of the NAESB Green Button Connect XML². The batch modifications to the Green Button Connect XML are outlined in the document titled Authorization and Bulk Transfer in Green Button Connect My Data.³ Section 2.5 of the document describes Use Case #13: Bulk Transfer of Multiple Authorized Resources.

Please note the majority of the document titled Authorization and Bulk Transfer in Green Button Connect My Data, relates to an OAuth Authorization method which is not utilized in the EV Submetering Pilot.

The current ESPI Schema is available at the following webpage:

http://naesb.org/termsofuse_form.asp?doc=espi.xsd

² See REQ.21 – Energy Services Provider Interface, NAESB 2010,
http://www.naesb.org/ESPI_Standards.asp

³ See:
http://osgug.ucaiug.org/sgsystems/OpenADE/Shared%2520Documents/Testing%2520and%2520Certification/GreenButtonTestPlan/referenceMaterial/GreenButtonAuthorization.docx&sa=U&ei=mhFYU9PoLYWrAT1jYHoCQ&ved=0CBsQFjAA&usg=AFQjCNEwqtjaVvo3Al6tgJlkeBnBt_3C1g