First-Draft Submetering Protocol Roadmap Requirements Templates

Submetering Use Case Definition

Submetering Billing and Regulatory Requirements

Submetering Technical Requirements, Compliance, Standards

Submetering Communication Functionality, Standards, and Security Requirements

As of 12.08.2011

Pacific Gas and Electric Company
Southern California Edison
San Diego Gas & Electric

A California Investor-Owned Utilities joint initiative.

SB_GT&S_0644733

Abbreviations and Acronyms

AHJ	-	Authority Having Jurisdiction
ALJ	-	Administrative Law Job
ANL	-	Argonne National Labs
ANSI	-	American National Standards Institute
CCA	-	Community Choice Aggregator
CDFA/DMS	-	California Department of Food and Agriculture Division of Measurement Standards
CPUC	-	California Public Utilities Commission
CWMD	-	California County Weights and Measures (offices)
DA	-	Direct Access
DASMMD	-	Direct Access Standards for Metering and Meter Data
DMA	-	Data Management Agent
DOE	-	U.S. Department of Energy
DR	-	Demand Response
ESPI	-	Energy Services Provider Interface standard
EVSE	-	Electric Vehicle Supply Equipment
EVSP	-	Electric Vehicle Service Provider
FCC	-	U.S. Federal Communications Commission
GE	-	General Electric
HIPAA	-	Health Insurance Portability and Accountability Act (health care privacy and security standards)
MDMA	-	Meter Data Management Agent
MDMS	-	Meter Data Management System
MDU	-	Multi-Dwelling Unit
MSP	-	Meter Services Provider
NEC	-	National Electric Code
OAuth	-	Open Authorization (data security protocol enabling users to grant 3rd party access to web resources without sharing passwords)
OpenADE	-	Open Automatic Data Exchange (specifications for granting a 3rd party access to customer electricity data held by utilities)
OpenSG	-	Open Smart Grid (forum for the development of requirements for Smart Grid systems)
PCI	-	Payment Card Industry (data privacy and security standards)
PG&E	-	Pacific Gas and Electric
PLC	-	Power Line Communications
PQ Data	-	Power Quality Data
SCE	-	Southern California Edison
SDG&E	-	San Diego Gas and Electric
SM	-	Submeter
SUM	-	The SUM Group Security Solutions Company
TOU	-	Time of Use
UCAIug	-	Utility Communications Architecture International Users Group (not-for-profit corporation consisting of utility user and supplier companies that is dedicated to promoting the integration and interoperability of electric/gas/water utility systems through the use of international standards-based technology)
UL	-	Underwriters Laboratories
V2G	-	Vehicle to Grid (power flow)
VEE	-	Validation, Estimation, and Editing (of data estimates used in billing when actual data are not available)
VPN	-	Virtual Private Network

SB_GT&S_0644734

USE CASES

ISSUES and/or REQUIREMENTS	PRELIMINARY RECOMMENDATIONS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS	TIMING	COSTS
• All use cases must be identified	• Determine extent of submeter measurements, whether they are impacted down to the EV driver • Address net metering use case(s) • Address mobile submetering • Address community choice aggregators (CCAs) use case(s) • Address use of utility AMI	• Where does the power come from? • Can submeters be an in-line solution, complementary to customers with existing EVSE equipment? • Consideration of parallel metering • Inter-utility issue with mobile submetering • Is there a use case with no 3rd Party involvement (possibly near-term solution)? • EVSP role needs clarification (whether reselling electricity or just seeking to bill separately) • Possibility of customer's EVSE acting as DMA?	• Distinguish residential vs. commercial • Distinguish Single Family Home vs. MDU • Identify "who uses" and "who pays" • Identify any missing use cases / applications	• Use Cases Team	• Must be addressed before end of year	Factors • … • … Estimate • … • …
• An analysis of the use cases must be performed	• Use Direct Access as a starting point / reference point • Assess current capabilities of utility & 3rd Party systems • Assess current status of technical gaps to determine timing (Comms) • Clarify regulatory jurisdictions as they may impact cost & technical feasibility (Billing & Reg)	•	• Determine aspects of each use case, namely technological, legal and regulatory, cost (to consumers, customers, utilities, and 3rd parties), actor capabilities, national and/or collaborative requirements, & timing • With challenges, attempt to identify solutions and/or timing of solutions • Determine timing and cost of each use case (feasibility) • Place use cases into buckets corresponding to the 4 phases of the roadmap	• Use Cases Team • Billing & Reg Team • Comms Team •	• Occurs in conjunction with identification of use cases • Likely to be used as input for roadmap (due end of year)	Factors • … • … Estimate • … • …
• Short-term decisions may impact long-term approaches, costs, timing, etc.	• Identify which use cases are short term and which are long term	•	• Find discrepancies between short- and long-term decisions; go through each aspect of the use cases, which are identified in use case analysis	• Use Cases Team	• To be done before Protocol Report is completed (7/31/12)	Factors • … • … Estimate • … • …

BILLING AND REGULATORY REQUIREMENTS

	ISSUES and/or REQUIREMENTS	Discussion Points	KEY TASKS OR ACTIVITIES	TIMING	COST	RESPONSIBLE ORGANIZATIONS
1	• Amend tariffs or develop new rule(s) **PRELIMINARY RECOMMENDATIONS** • Assess existing rates and rules to determine which areas will require new language or modifications • Identify and to detail relationships with 3rd Party MSP's • Leverage Direct Access rules (where / if applicable). What was put in place for Direct Access that would need to be done for AFV sub-metering in some form	• What was exactly done in Direct Access, what can be done, will we be addressing the same questions here? • DA rules, start with IOUs to look over and comment on	• Identify regulatory requirements of Protocol. What tariff provisions are needed such as registration, enrollment, billing arrangements, fees, dispute resolution, technical performance, eligibility, etc. • Identify required changes implied by Protocol. • Modify tariffs (rate schedules and rules) or create a new tariff (a new rule with reference to a technical protocol, or other solution) to align with approved Protocol • Develop any new technical protocol documents via working process as well as new forms to file with Commission • Make advice filling (Tier 2)	• Iterative process aligned with Protocol development schedule • Make compliance filing by due date and decision (September 3rd, 2012)	Factors • … • … Estimate • … • …	• Regulatory policy and affairs • Rate design groups • Law • Customer service organizations (Revenue Services, Meter Services and Customer Communication Services) • Information technology • Communication and training • Other stakeholders (parties to the proceeding)
2	• Establishment of the Customer / 3rd Party MSPs / Utility relationship introduces complexity to utility billing and service delivery, and this more complex relationship has higher potential for disputes **PRELIMINARY RECOMMENDATIONS** • Adopt appropriate rules, procedures, prerequisites, and fees to mitigate conditions likely to generate disputes • Leverage DA dispute rules as a starting point • Put rules and protocols in place to assure appropriate customer service contact for customers and utilities, such as availability during CA business hours	• Utilities and customers will need ability to contact third party MSPs in the event of billing issues or other disputes • Some 3rd party MSP's may have a business model that in the long run will have customers dealing directly with them in disputes • Submetering and other PEV services may introduce billing relationships beyond CPUC and Utility jurisdiction Spell out what each party will have to do and when	• Define the nature of the relationship between IOUs, Customers and 3rd parties, including: - Roles and responsibilities of each party - Performance expectations of all participants • -Rights and obligations of each party • Identify and detail expected dispute types • Identify methods for settling identified dispute types • Identify and detail incremental infrastructure needed to address these disputes Review adequacy of existing rules and file new rules as necessary with commission	• P to September 2012 filing, will need a vetting step to ensure all parties at least have reviewed proposals and supporting arguments. • Review process	Factors • … • … Estimate • … • …	• Utility and 3rd Party MSP • Regulatory Policy • Legal Team • IOU revenue services org • Customer service org • IOU Customer relations dept.

SB_GT&S_0644736

SB_GT&S_0644737

BILLING AND REGULATORY REQUIREMENTS

	ISSUES and/or REQUIREMENTS	Discussion Points	KEY TASKS OR ACTIVITIES	TIMING	COST	RESPONSIBLE ORGANIZATIONS
3	• Utilities will need to recoup incremental costs associated with sub-metering including data collection, assembly, and QC services provided to 3rd Party MSP's **PRELIMINARY RECOMMENDATIONS** • Identify costs and recommend method of recovery from fees, rates, or other means. • If appropriate, leverage current DA or CCA service fee structure, and/or assess allocation of costs to rates •	• Determine method for the utilities to request recovery through application to recover costs • Cost allocation – what and how are costs built in to EV rates? • Each utility may take a different approach to the cost allocation and recovery • At what point would this need to be submitted to recover costs through an application? Early decision point? • There are some use cases not covered under the regulatory directive, would need to consider leaving the doors open to allow for use cases at a later date	• Determine impact of each requirement on existing utility processes and systems for each use case • Identify O&M and Capital costs associated with each of the requirements • Review existing / forecast PEV-related O&M and capital expenditures in GRC to determine which costs are incremental to existing / forecast costs • Review costs to determine any overlap with costs included in 3rd party MSPs business models • Determine cost allocation within the utilities	• Make a submittal according to the decision • Then make a recommendation for filing an application on how to recoup costs (in advance of implementation) •	Factors • … • … Estimate • … • …	• Energy Division • IOU Law, Regulatory, and finance • DRA • Parties to the proceeding
4	• Providing sub-metered services with Direct Access (DA) or Community Choice Aggregation (CCA) customers expected to add complexity to the overall utility / customer relationship, and billing systems and processes **PRELIMINARY RECOMMENDATIONS** • Current DA rules were not designed to address sub-metering; DA meters measure the entire load., DA rules and protocols may require significant restructuring to properly facilitate sub-metering • Maintain existing rules that load cannot be split (you can have only one generation supplier) •	• Where DA is considered in this context, CCA should also be considered •	• Identify rights and obligations of DA customers, CCA customers, and 3rd Party MSP's • Review and expand the results of Item #2 (Dispute Resolution) to address DA and CCA customers • Identify incremental metering, billing, and customer service processes, O&M and Capital costs associated with providing submetering services to DA and CCA customers for inclusion in #3 above	• Ready by time report is due.	Factors • Could be costs • … Estimate • … • …	• IOU Regulatory / Law • IOU ESP and CCA Services • CCAs, ESPs, and other DA market participants as appropriate • MSP Law

SB_GT&S_0644738

BILLING AND REGULATORY REQUIREMENTS

	ISSUES and/or REQUIREMENTS	Discussion Points	KEY TASKS OR ACTIVITIES	TIMING	COST	RESPONSIBLE ORGANIZATIONS
5	• Complexity and additional cost of multiple 3rd Party MSP's providing metering services at the master meter and multiple submeters **PRELIMINARY RECOMMENDATIONS** • Establish common interface protocol to receive data from the 3rd parties to the utility • Associate all submeters to one common master meter	• May not be a requirement for this protocol • Is this applicable for CCAs? • This may not be an issue. Already resolved within the DA context • Potential for apartment complex where tenants can select different 3rd party MSPs	• Dependent on which use cases will be in play for this protocol • Determine if this issue is already resolved through the use cases	• Early inventory of what is in scope for this protocol •	Factors • … • … Estimate • … • …	• IOU Regulatory • IOU and 3rd Party MSP Law •
6	• IOUs anticipate the need for subtractive billing as the method to process the submeter output into the utility billing stream and bill the premise and PEV loads separately **PRELIMINARY RECOMMENDATIONS** • Develop integration solutions applicable on a broad basis (manual and automated) •	• There is a whole tariff aspect to this and would want to look at usage patterns and implications for rate design and cost recovery • IT to understand who development for EV subtractive billing may be include future products • Understand variable and fixed components of each product • When does the data need to move from Party A to Party B • Identify boundaries to define what is included	• Understand methodology for subtractive billing • Determine the roles and responsibilities of each party • Review existing IT systems to determine the cost to implement subtractive billing through the development of new or enhancement of existing IT systems • Determine the cost to develop an interface to receive the 3rd party data • Develop the rules to receive 3rd party data • Understand (ref. metering team) what is technologically feasible • Define where is it that we're actually trying to go. What will it look like when we're done? (In stages…toward the "lofty goal.")	• IT development will be addressed with the Communications team • Rules for receiving 3rd party data will be guided by existing DA rules (pertaining to unbundling of the metering services) • SM Technical Requirements to address…	Factors • Understand the costs of various categories of subtractive billing • Identify differences between 3 IOUs • … Estimate • … • …	• Utility and 3rd Party MSP • Regulatory Policy • Legal Team • IOU revenue services org • IOU IT
7	• How we extend demand response controls to submeters **PRELIMINARY RECOMMENDATIONS** • There should be interval usage measurement • The submeter should have some capacity for demand response direct load control	• May be worthwhile to look into how this would work • Don't want to preclude any future requirements when addressing submetering • Specify in the protocols what would be enabled or excluded to meet these needs • Do we need Cal ISO involvement? (Can't answer right now. Could be beyond what we're trying to enable with submeters.) • Where are quick charging technologies today with respect to DR? (Appears	• Determine whether addressing this issue is in scope • Identify what we mean by "in scope." (can again be multiple stages of development), and what are the priorities. • Assess the technical feasibility of load control for a light-duty electric vehicle submeter. • Determine the necessary steps to implement DR load controls from the technical (standards / communications) and regulatory	• Early resolution is required	Factors • … • … Estimate • … …	• Utility and 3rd Party MSP • Regulatory Policy • Legal Team • IOU revenue services org • IOU IT • IOU Demand Response • CAISO

SB_GT&S_0644739

		to be out of scope for developing a submetering protocol.)	perspectives • (Suggest removing because of number and current status of DR programs.)			

SB_GT&S_0644740

BILLING AND REGULATORY REQUIREMENTS

	ISSUES and/or REQUIREMENTS	Discussion Points	KEY TASKS OR ACTIVITIES	TIMING	COST	RESPONSIBLE ORGANIZATIONS
8	• The possible combination of NEM and submetered services may add further complexity to the overall utility / customer relationship, and billing systems and processes **PRELIMINARY RECOMMENDATIONS** • NEM integration with Submetering protocol should be separate, focused effort after Dec 2011 roadmap filing, but acknowledged in the roadmap report. • CPUC: Main point of roadmap report: define the problem and potential ways to solve it. • SUM: Submetering could allow NEM customers to participate in market signal programs.	• At least half of customers will have EV and Solar • NEMMT (multiple technologies) can be expanded to include EVf • Need to determine what can be done (talk to Meter group about this) • Subtractive billing capabilities may not be the solution in this instance, will need to look at other solutions • Current net metering process and technology is not sufficient to provide direct PV to PEV measurement • Separate rates for master meter and sub meter add more complexity to measurement • If customer chooses to have master meter and sub meter on same rate, this could reduce the complexity from a price per kwh standpoint • Need to consider projected volume of customers that would fall in this scenario • Not noted in protocol guideline. Need to determine if this is in or out of the OIR decision. • This is going to come up a lot, and will do ourselves a disservice if we delay…need to address metering of NEM and PEV via or with PEV submeters. Need to identify possible variations of how PEV charging and NEM systems are metered, data communicated, and billing handled. • **Definitely need to note in the roadmap** • Use case team is adding a NEM use case	• Determine the technical and regulatory feasibility of combining NEM and submetering services. • Review and expand the results of Item #2 (Dispute Resolution) to address NEM customers • Identify incremental metering, billing, and customer service processes, O&M and Capital costs associated with providing submetering services to NEM customers for inclusion in #3 above • Determine measurement needed to integrate NEM and PEV Submetering • Determine tariff requirements resulting from integration • Determine technology capabilities needed to process integrated billing	•	Factors • … • … Estimate • … • …	• IOU Regulatory / Law • IOU ESP and CCA Services • PV suppliers • IOU Metering Standards • IOU Generation Interconnection • IOU RP&A • IOU DR and EE Programs

SB_GT&S_0644741

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	UTILITY COSTS
• Technical performance and functional design requirements and standards **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • EV participants jointly develop these, using DASMMD (Direct Access Standards for Metering and Meter Data) as baseline	*TOU, Timing, Synchronization* • TOU measurement is 60 min. for residential and 15 min. for commercial. • SCE keeps meters on standard time and do seasonal adjustments in the back office systems, not at the meter. There has been too much trouble with calendars and clocks in meters. • ECOtality: I agree we should reduce the number of synchronizations required, and that clock standards need to be established • CSMD: I don't believe that's happened yet. • The immediate task at hand is to determine kWh usage formats and to determine how calendar and clock requirements are handled. Agree with UTC approach. • SUM: Be careful about federal requirements and time changes • DMS: If time becomes a function of billing, then we would have some involvement *Local Meter Reading, Usage Estimation* • Is there a requirement about local meter reading that can be specified for MSPs? • We don't want data estimation to be the default solution when data isn't available. This is especially important for DR programs. • If tariffs change—e.g., DR—that can drive a change for the submeter *Error Tolerance Levels* • GE: There is a possibility that DMS will have to retool their requirements and testing. Current accuracy requirement is 1%, while meter capability is .01%. • There appear to be two requirements for DMS: Initial certification at 1%, re-certification at 2%. • Requirements are at a system level. *Accuracy Standards* • Utilities are driven by ANSI standards for testing while the state sets the tolerance levels • Regulations have not kept up with advancements in meter technology • DMS hasn't determined how to re-certify meters every 10 years • Utilities do annual sample testing among different meter types and will check when there are billing complaints (SCE and SDG&E do similar testing). Once installed the bulk of the testing is in the field, both for general accuracy and billing complaints. (PG&E to provide more information.) DASMMD standards are followed. • Wouldn't the utility still have the authority to set the standards for what would be used for billing? • We would accept what CDFA DMS specifies for accuracy.	• **IOUs define billing and usage parameters (load, time, etc.)** - Define interval data needs, or if we need interval data at all. - Define configuration needs - Confirm format of usage information, especially for time of use and associated clocks and synchronization, including impacts of federal requirements and time change impacts - Address V2G power flow scenarios in requirements in order to future-proof the technology - Verify that types of technical requirements, compliance, and standards identified are complete - Identify source documents offering requirements that can either be used as is, as models, or for ideas ▪ Review DASMMD standards for appropriateness, make comments on what's appropriate and what isn't (e.g., multiple users of same meter during the day) ▪ Check F&A DMS documents (Reference Manual) posted on web (need to assure accuracy, avert tampering) ▪ Gary Fox has documents and can share them - Establish percent error tolerance ▪ Should be on par with a utility meter (or better), if it's used for customer billing purposes ▪ Confirm utility accuracy requirements ▪ Confirm that CDFA DMS creates the standards for billing accuracy ▪ Confirm CDFA DMS processes for testing embedded meters and meters with TOU/synchronization clocks that can communicate wirelessly - Recommend how to synchronize submeter time clocks with utility meters on the premises, including: ▪ Defining data storage requirements: ▫ Data quantity ▫ Duration of storage ▫ Duration of intervals - Recommend local meter reading requirements ▪ If we can't get the data remotely, how do we get it locally? We need to determine that this is a requirement. - Recommend meter data estimation requirements when it is not available locally either ▪ VEE (data Validation, Estimation, and Editing)	• IOUs responsible for identifying for DMS how the submeters should be configured to support submetering & subtractive billing; • IOUs provide functional design requirements documentation and technical support • CDFA/DMS responsible for adopting specifications and establishing requirements • MSPs responsible for implementation	• Dependent on tariff requirements. • Need language on meter clock and calendar. • Approximately 1-3 months (just tech functional design) • Need to integrate discussions w/ MSPs and DMS • But if requirements cause a change in standards that will extend the time frames.	Factors • Labor only • Communication Estimate • No incremental cost

SB_GT&S_0644742

	It's the same requirement imposed on the utilities. It should be the same level, or on par, with existing meter accuracy standards. • SDG&E: That's very important; SM accuracy has to be the same as other meters. *Other* • Utilities may have different parameters. Won't necessarily be one set of requirements; need to maintain flexibility.	Rules for situations in which data doesn't exist and estimations are required			

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Technical performance and functional design requirements and standards *(continued)* **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • EV participants jointly develop these, using DASMMD (Direct Access Standards for Metering and Meter Data) as baseline *(continued)*	*Accuracy Standards (continued)* • SUM: In speaking with consumers, they're also looking for similar levels of accuracy in NEM situations. • CSMD: I don't believe any of our systems have a clock in them. This hasn't been relevant to the mobile home parks, so industry hasn't developed this equipment. • TOU, IDR, interval data needs will drive requirements into submeter manufacturing. • Other • ANL: It would be nice to have a table of submeter vendors. • ANL: Shouldn't we be defining what we want in the future, rather than looking at what EVSE manufacturers are doing today? • ANL: Computational power demands will increase significantly. • The ideal way to do this project would be: Use Case Team → Billing & Regulatory → Tech & Comms Requirements • ANL: Point of contact question. Who is a good point of contact to give DOE the official line on what's happening with CPUC? DOE is currently getting different information from different sources. (A little bit of misinformation goes a long way.) • DOE should be referencing the October 27 Workshop Report and December 31 Roadmap Report as the proper source. • Will refer DOE to Adam Langton at CPUC.	• Narrow the use case scenarios (meters don't care who's plugging in, but there are requirements on the billing side, which is complicated) • Can we have a one size fits all use case scenario? This becomes very complicated and time-consuming.	• Refer to Use Case Team		
		• The task at hand is to determine the jurisdiction of the submeter, and that will drive the accuracy requirements. In California we've heard over time that DMS has the jurisdiction over submetering in California in a billing application. If there's a final transaction going on CDFA DMS drives the accuracy requirements. • If tariffs change—e.g., DR—that can drive a change for the submeter. Tariffs can drive the need for much more complex submeters. • Is there a requirement about local meter reading that can be specified for MSPs? • We don't want data estimation to be the default solution when data isn't available. This is especially important for DR programs .	• Refer to B&R Team		
		• Determine how data communication technology, standards, security will affect the metering hardware	• Inform Comms Team		

SB_GT&S_0644743

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Certification and Audit of submeters and submetering equipment/sites **PRELIMINARY RECOMMENDATIONS (10.27.2011)** Dept. of Food & Agriculture Division of Measurement Standards (CDFA/DMS) oversees certification process (reference: DASMMD)	*Current CDFA/DMS Procedures, Guidelines, Tools* • Current understanding is that meter approval is in multiple stages: (1) Basic meter type/technology certification; (2) Then individual meters are certified at County Weights and Measures Departments (CWMD); (3) Every 10 years meters are re-certified - Determine how testing and certification occur with meters built into EVSE (cordset and charger) and automotive equipment • Current reference manual covers traditional utility socket meter, and not a submeter connected to something else. • ECOtality: We currently have a meter that is internal to our equipment which you can see from the outside. That meter could be certified. The meter is being used by some utilities and incorporated it into our level 2 EVSE. Would we need to expose this meter to the outside? If the EVSE is certified, would this meter need to be physically mounted on the outside? - DMS: Our preference would be that the meter be exposed so a cabinet doesn't have to be opened up. • Coulomb: Is it reasonable to have a display that is a separate device than the meter displaying the energy usage on the outside? - DMS: Yes. • We need to define and standardize what needs to be read out on the meter (cum. Hours, hours by time period, etc.) - DMS: We have to compare the metering and readout to double-check them • DMS not experienced with TOU, embedded meters, <u>or</u> wireless communication of metering data *MSP Certification Requirements* • Coulomb: Is there a federal certification body for multi-state certifications? - We don't think there is one. - But in the DASMMD there is language about using a nationally recognized testing lab (NRTL). There are independent testing labs out there marketing their services to whoever needs a product tested. They would test according to the standards applying to those devices. • Coulomb: Would we have to certify state by state then? • IOU: Probably. • GE: Only California has existing language on submeters • IOU: But if you go by what CA has there's a chance the other states would accept it. *Other* • IOUs may have input on certification and audit requirements and processes, but basically this is a CDFA/DMS activity.	• CDFA/DMS establishes process to <u>certify and audit</u> technical requirements (as defined above) - Testing and auditing approaches - 100% vs. sampling - Re-certification requirements and timing - How the meters are to be tested - How meter certification is documented - Roles and responsibilities - Understand current CDFA/DMS/CWMD processes, and confirm that they are the drivers of this process. ▪ SCE would accept that process as established by CDFA DMS ▪ SDG&E: Uncertain as to accuracy requirements of CDFA as compared to existing accuracy levels; so there could be an issue if there is a mismatch ▪ CPUC: I have the same question; I thought utilities set their own standards for utility meters - Clarify circumstances requiring 100% vs. a sampling of meters for certification - Clarify whether CDFA/DMS and/or CWMD can adjust their current processes and requirements - Understand how submeter manufacturers can prove accuracy prior to (or instead of) testing and certification - Determine how submeter accuracy auditing can occur with meters built into EVSE (cordset and charger) and automotive equipment - Determine how EVSE, cordset, and automaker submeter manufacturers ▪ Submit new meter types for initial certification ▪ Submit products as sold to County Weights and Measures ▪ Submit products decennially for re-certification	• IOUs responsible for identifying for DMS how the submeters should be configured to support submetering & subtractive billing; • IOUs provide functional design requirements documentation and technical support	• DMS' timeline • 6-12 months max, certainly < 1 year (including county weights and measures) • NOTE: DMS activity is on the critical path of utilities developing a submetering protocol. If DMS has to start from scratch it could take a long while.	<u>Factors</u> • Labor only • Communication <u>Estimate</u> • No incremental cost

SB_GT&S_0644744

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Certification and Audit of submeters and submetering equipment/sites *(continued)* **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • Dept. of Food & Agriculture Division of Measurement Standards (CDFA/DMS) oversees certification process (reference: DASMMD) *(continued)*	*CDFA/DMS Authority* • CSMD: Until CPUC decides that submeters are subject to DMS regulation, I'll have nothing to do with it… - Adam to forward decision. We may need new standards and processes. - Adam to get a call together with DMS to discuss these issues, and to get David Lazier to join us on these calls. - Ron described meter from England with comparable accuracy	• CPUC/CDFA/DMS clarify the jurisdiction of the submeter in California, and identify guiding documents (F&A DMS, regulation, legislation). - DMS has not verified its role in sub-metering; responsibility may be delegated to county weights and measures. There appears to be flexibility in existing standards. - Verify in field reference manual. - Check with legal • IOUS determine whether certification requirements come from submeter manufacturers, utilities, and/or CPUC. (Certification requirements should come from the CDFA DMS with input from the utilities or CPUC.)	• Refer to Billing & Regulatory Team		
	Dispute Resolution • Customer complaints usually start at the county level; disputes then move to the submeter manufacturer and then to the utility. There are implications for the auditing process depending on who owns the billing dispute process.	• IOUs determine impact of dispute resolution processes on the auditing process	• Refer to Billing & Regulatory Team		

SB_GT&S_0644745

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Requirements for installation, maintenance, and testing of submeter and related equipment compatible with the utility meter usage data **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • EV participants jointly develop these, using DASMMD (Direct Access Standards for Metering and Meter Data) as baseline submeter is capable of providing interval data (e.g. 15 minute interval data configuration)	*Roles and Responsibilities* • EVSE, cordset, and auto manufacturers have to figure out how to maintain this device with respect to testing and accuracy • Utilities need to support the registration of these SMs when installed *Other* ECOtality: What impact will vehicle-to-grid (V2G) power flow have an impact on submetering? Will we need a whole new protocol for this? IOUs: We'll need a bi-directional meter. That would be driven the rates and tariffs. If that comes into play, IOUs: Good point. We might need to include that in technical design that submeters need to be bidirectional. (to future-proof them) IOUs: There have been discussions about this concept. It's not that big of a deal with solid state electronics today. IOUs: If scope of decision is charging only, generation would not be included in the protocol, but we need to be mindful of it. (Get Billing & Regulatory opinion on this.) ECOtality: This would fall into the category of net metering. Submetering should probably follow that approach/work. CPUC: Something to address, don't want to preclude it with what we're doing now.	• Utilities develop: - Requirement for shut-down/de-energizing circuits during installation of submeters, particularly at commercial sites. - What it takes to associate the meter with a particular premises meter/account and network (registration) in fixed and mobile meter scenarios ▪ Establishing communication between submeter and premises meter ▫ There are multiple ways to get the data back to the cloud ▫ There are multiple types of submeters to be profiled as well (Comms team addressing) • MSPs identify source documents offering installation, maintenance, and testing requirements either usable as is, as models, or for ideas - Review DASMMD contents; determine what's appropriate and what isn't - Identify EVSE, cordset, and auto manufacturer materials; determine what's appropriate (as is, as a model, or to generate ideas) and what isn't • MSPs determine how to verify the quality of submeter data - How to obtain data for verification purposes ▪ Locally and remotely ▪ Relates to VEE rules for verifying quality of data once retrieved into MDMS - How to know when a meter is out of tolerance ▪ Generally, at a high level, when we retrieve data you stop getting it. Or, the data looks way out of whack; the numbers don't compare with the premises meter; it's grossly wrong. - Validation should be provided by meter reader (MDMA) • MSPs: - Benchmark EVSE, cordset, automaker, utility processes for data verification - Determine how to correct and/or replace submeters discovered to be out of tolerance - Determine how to handle reconfigurations based on utility rates and programs - For example, shifting from 60 min. intervals to 15 min. intervals - Determine how to fix/update software and firmware issues	• MSPs responsible for requirements definition and implementation, with specifics spelled out in the tariffs • Utilities provide direction on key requirements and how to work effectively with the utilities	• 1 – 2 months	Factors • Labor time adapting current electrician and other training, web info Estimate • … • …

SB_GT&S_0644746

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Certification of submeter workers/providers **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • EV participants jointly develop these, using DASMMD (Direct Access Standards for Metering and Meter Data) as baseline	*Roles and Responsibilities* • In DA the IOUs certified employees and their training, because they're touching utility equipment. • Installers need to meet certain qualifications/state requirements	• MSPs identify source documents offering testing equipment manufacturer, data processing, and worker certification methods that can either be used as is, as models, or for ideas - Review DASMMD contents; determine what's appropriate and what isn't - Identify EVSE, cordset, and auto manufacturer materials; determine what's appropriate (as is, as a model, or to generate ideas) and what isn't • MSPs develop a worker training, certification, and auditing process - How training, certification, and auditing occur - How training, certification, and auditing results are documented - Responses for out of conformance results - Determine roles and responsibilities • DMS develops a submeter testing equipment certification process - How certification occurs - How certification results are documented - Responses for out of conformance results - Determine roles and responsibilities	• MSP certifies • DMS to provide guidelines for worker requirements • IOUs to provide recommendations	• 4 – 6 months	Factors • … • … Estimate • … • …

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Certification of Data Management Agents	*What are we talking about?* • We're talking about certifying the DMAs providing data for billing purposes. *Roles and Responsibilities* • 3rd party DMAs have to be certified to OpenEV interface standards. Who has responsibility for this? Today in the DA world MDMAs are certified by utilities (forced on utilities because no one else could do it). This role is undesirable for cost and other reasons. • We'd have to meet with MDMAs to check on how well they were meeting data requirements (time, quality) • DMS certifies data, shouldn't they certify the DMA as well, the provider of the data? CPUC and DMS don't have authority in this area.		• MSP certifies		

SB_GT&S_0644747

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Safety risk (equipment, workers, customers) **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • Use applicable and existing national and state standards & requirements (e.g. UL, NEC, FCC, ANSI, DASMMD)	*Definition and Background* • Mitigating potential damage to life and property • Meters are embedded in equipment. • This refers to building equipment to various standards applying to electrical devices installed in residential, commercial, industrial premises. • Safety requirements are driven by local jurisdictions (electrical inspectors and guiding documents can differ depending on location and resource availability) • First you have to make the device and have it comply with applicable standards, and then there's an installation process that has to comply with local safety standards. *Existing Safety Standards* • UL is standard agreed with. Main standard. It is required. It's about the safety of the overall equipment as a device by itself. • UL 2594 is the standard used by most EVSE manufacturers for L1 and L2 charging stations. *Defining and Implementing Safety Standards* • Product use needs to be listed. This is already part of the NEC Section 90.7, calls for a testing laboratory. Makes it possible for AHJs to complete assessments without inspections of internal components. • There is the local AHJ, which will vary across the state and country. It's a local thing, so you have to comply with local jurisdiction requirements driven by NEC and various other local codes. (Installation side). There will be installation instructions from the manufacturer, and the AHJ will check for compliance. *Other* • These different metering scenarios and charging levels feed into the use case work. But the safety—and certification—needs are related to the type of device. • SCE is doing testing and evaluation of a smart receptacle (110v). Also working with DOE US Drive on a standalone submeter that could be inserted in a circuit for a non-smart EVSE. The Roadmap should include continued investigation.	• The task here is for MSPs to map the standards to the type of device based on its electrical parameters and how it makes a connection. Hard-wired vs. plug in device have different requirements. - Look at issues by location of meter. • MSPs identify applicable standards (on manufacturing side) and develop requirements - This should be a fairly routine process for manufacturers • Part of certification process by DMS (UL or ANSI certified equipment meets DMS requirements. Installation should be referred to building code agencies.)	• MSPs (e.g., EVSE manufacturers) and DMS certification and audit processes		
	• Many EV drivers might be interested in 110 volt charging on a submetering basis. • 8 hours of home and workplace charging can be handled with 110 v. • In the future, if we can handle L2 240v like a dryer circuit, EVSE equipment could just become plug-in equipment if homes come with 240v and rated amperage. Would that fulfill technical requirements? • This is valid. I submitted to use case team the idea of a dumb EVSE. • There are already manufacturers with plug in 50 amp equipment. Tesla has 70 amp and 90 amp on the way. • There's a case for a smart submeter standalone unit or in line. The service providers could cover a lot of those cases.	•	• Refer to Use Case Team		

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Accurate billing **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • Use applicable and existing national and state standards & requirements (e.g. ANSI, DASMMD)	• Contents moved to first issue on developing technical requirements.				

METERING TECHNICAL REQUIREMENTS, COMPLIANCE, STANDARDS REQUIREMENTS

ISSUES and/or REQUIREMENTS	DISCUSSION	KEY TASKS OR ACTIVITIES	RESPONSIBLE ORGANIZATIONS / INDIVIDUALS	TIMING	COSTS
• Reliable submeter **PRELIMINARY RECOMMENDATIONS (10.27.2011)** • Use applicable and existing national and state standards & requirements (e.g. ANSI, DASMMD)	*Consumer Elements* • People have to know that once you get to certain point in time it's time to replace the device. Utilities give premises meter requirements to manufacturers. Originally called out in ANSI. Life expectancy of solid state equipment has dropped from electro-mechanical days. • Consumers will use a device as long as they can (beyond designed life and accuracy levels). CSMD needs to revisit the recertification/accuracy verification interval. *Utility Preferences* • Utilities want the meter device to have a safe and accurate life time of 20 years (SCE-specific) allowing for temperature, humidity, vibration, voltage variation *Roles and Responsibilities* • Mainly up to the device manufacturers to determine the expected life of their equipment. *Changing State Recertification Requirements* • CSMD: Given this issue, should recertification be more often than 10 years? • Let's defer this to CSMD and the manufacturers	• We need to establish a reliability statement and parameters such that the meter maintains its accuracy over its expected life. At a high level the submeter has to perform its function reliably and accurately over its expected life. • Investigate whether meter recertification should be more often than 10 years • This all has to be spelled out in the initial certification process, which describes initial evaluation and ongoing testing	• CDFA DMS, CSMD and EVSE manufacturers		

SB_GT&S_0644749

COMMUNICATION FUNCTIONALITY, STANDARDS, AND SECURITY REQUIREMENTS

ISSUES and/or REQUIREMENTS	PRELIMINARY RECOMMENDATIONS & DISCUSSION	KEY TASKS OR ACTIVITIES	TIMING	Integration COST (Utility)	RESPONSIBLE ORGANIZATIONS/ CROSS CUTTING ISSUES
• Establish an interface between 3rd parties and utilities to share 3rd party sub-metering data for billing purposes	• Utilize existing utility systems to implement interface standard • Utilize the NAESB Energy Services Provider Interface (ESPI) standard • Leverage the OpenSG OpenADE working group to create an ESPI profile or necessary document modifications to align with proposed sub-metering phased approach	• EV profile will be drafted within Submetering Communications, Std & Sec. team and shared with OpenADE for verification. ○ Need to choose data types to determine if revisions need to made (e.g., Usage Data, PQ data) ○ Possible sub-team work • Develop 3 way sub-metering contract for 3rd party sub-metering • Implement ESPI sub-metering profile on utility and EVSP systems • Identify requirements for revisions to ESPI (e.g., advanced use cases)? • Testing, Certification, Interoperability, Security	• Depends on many system-wide factors (development, testing and certification, implementation…) • Updates provided to ESPI in 2012 (if necessary for fixed sub-metering or advanced use cases) • Ability to certify by middle of next year •	Factors • • … Estimate • … • …	• Work will be conducted within CPUC Submetering Comms, Std & Comm team. OpenSG OpenADE working group. Expected participants include California IOUs, Interested EVSPs, and other interested parties. • Determine next steps for advanced use cases (e.g., Use Cases 4 & 5)
• Implement ESPI on end device (sub-meter) to interface with service provider directly (for sub-metering only purposes)	• Could be implemented w/ current technology as alternative to Use Case 1&2 • Could add a 3rd party in at a later date • Similar to VOIP. Certified device list able to call home (?) when plugged in to the internet • Security? 3rd party management-certificate? ○ Benefit: Direct communication b/t sub-meter and utility • VPN through homeowners internet connection • Servicing? Access? • EVSP Networks in use for value Added Services? ○ Synchronization problems • EVSE Wi-Fi possibility • Other comms connections for upgrades, etc. • Sub-meter identified as conformant	• Determine priority compared to other use cases • Determine OAuth and ESPI implications • Next Steps?	• Depends on priority compared to existing use cases (Use Case team?)	Factors • • … Estimate • … • …	• Use case (and RegulatoryTeam?) to look at
• ESPI conformance certification and interoperability	• Use the certification authority and processes in development by UCAIug and OpenSG OpenADE	• Participate in UCAIug and OpenSG OpenADE committees • Interoperability testing	• By middle of next year	Factors • … • … Estimate	• Test plan development, Testing and Certification w/in OpenSG OpenADE • OpenSG

SB_GT&S_0644750

				… • …	OpenADE (participation encouraged) and iinterop committee

SB_GT&S_0644751

COMMUNICATION FUNCTIONALITY, STANDARDS, AND SECURITY REQUIREMENTS					
ISSUES and/or REQUIREMENTS	**PRELIMINARY RECOMMENDATIONS & DISCUSSION**	**KEY TASKS OR ACTIVITIES**	**TIMING**	**Integration COST (Utility)**	**RESPONSIBLE ORGANIZATIONS/ CROSS CUTTING ISSUES**
• Privacy and Security of the customer and energy consumption data	• Common security and privacy requirements for customer and energy information (at rest and in transit). E.g., ESPI security requirements on utility side • Included as part of the contractual relationship between customers, 3rd parties, and utilities (Terms and Conditions)	• Review ESPI security requirements • Determine who owns the "global effort" of ensuring data security. • Determine what level should be attained (HIPAA, PCI, credit cards?) • Determine responsibility and where this work should be completed • Determine if existing standards available or in place are sufficient	•	Factors • Dependent on level of cert. • … Estimate • … • …	• DOE Report (http://energy.gov/gc/downloads/department-energy-data-access-and-privacy-issues-related-smart-grid-technologies) • Pertains to Technical Requirements group and Use Cases?
• Communication standards for submeters	• 3rd party communication complies with defined requirements identified in contractual relationship between customers, 3rd parties, and utilities •	• Define which use cases could involve standardized comms	•	Factors • … • … Estimate • … • …	• Use Case group should look at where/if sub-meter communication is in scope (e.g., standardization)

SB_GT&S_0644752