



Measuring & Reporting Energy Consumption with Electric Vehicle Supply Equipment (EVSE)

Electrum Charging Solutions | Rev. Mar 07, 2017

To: Kelly Kienleitner | Chief Instructor



ELECTRICAL
JOINT TRAINING
COMMITTEE



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INTRODUCTION TO ELECTRUM CHARGING SOLUTIONS

Who we are; Electrum Charging Solutions is a solution based company providing our customers with the knowledge and expertise to meet and even exceed their requirements for Electric Vehicle charging. Our company Head Office is based in Surrey, BC.



What we do; Using our industry leading expertise, Electrum Charging Solutions supports our clients through the selection, design and installation of Electric Vehicle Supply Equipment (EVSE) at their facilities.

Our Mission; At Electrum Charging Solutions our Mission is to provide industry leading Electric Vehicle Charging Technology and service offering a complete end to end Turnkey Solution. This includes as required;

- Consulting
- Design
- Installations
- Service
- Repair
- Custom Branding
- Signage & Stall Painting Services
- Custom Mounting Systems
- Metering Solutions

Key Head Office Staff

Hazel Rempel	Chris Loyer	Damion Litrel
Consulting & Sales Energy Solutions Manager	Project Management	Energy Solutions Specialist
24 years Electrical Industry	12 years in Sales & Automotive	Journeyman Electrician EVITP Trained
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Our knowledgeable staff have worked with EVSE Equipment and Metering Solutions for many years. Electrum adheres strictly to the BC Electrical Code ensuring all of our equipment is certified and our installations meet CEC requirements. We have extensive experience with major EVSE and Metering Manufacturers.

METERING EVSE

There are two ways to measure electrical consumption from EVSE. Site hosts can use either Networked EVSE units or deploy Submeters on site, however the functionality varies significantly.

Networked EVSE - Networked EVSE connects to a Network Service Providers platform most commonly over a cellular network. The Network Service Provider has the ability to collect not only payments for use of the equipment, but also data for the purposes of reporting to the site manager. Data collected to name a few of the parameters are number of sessions, energy consumed and GHG data. Networked metering is considered to be highly accurate and does not require on site metering equipment. There are network fees associated with the use of these units. Costs can vary from \$3500 for the least expensive level 2 single port EVSE unit to \$7000 for a level 2 dual port high functionality unit. User fees should not be based on kWh consumed, fees are to be flat rate to pay for the use of the equipment, space and other associated costs. Organizations can view and manage information with access from a computer or other devices. They can see and manage EVSE at multiple sites on a web based management platform. **PROS**, *networked units provide a simple way to gather more than just energy consumption, providing user authentication, access control, priority charging and grid compliancy. Networked units also offer scalability, future proofing and allow for upcoming grid compliance. They also offer driver support by phone.* **CONS**, *networked EVSE is more expensive than a basic EVSE unit with a meter, and there are annual networking fees.*

Submetering EVSE - Submeters are designed to work on the building (site) side of the utility meter, used to measure panel loads and/or specific electrical circuits. There are a variety of meters on the market with a wide range of accuracy. Energy consumption and other criteria can be gathered at desired intervals and reported in a variety of ways dependent on what is required. The most common uses for Submeters would be for Building Energy Management and/or Revenue Collection. There are single point meters and meters that measure more than one point, referred to as Multi meters.




If a Property Manager wants to charge for actual kWh's consumed they must deploy a Measurement Canada Revenue Grade Meter with minimum .5% accuracy class rating, they will also have to apply for a Measurement Canada Contractor Number to enable them to bill/resell kW's. Consideration must be given for the guidelines put forth by Measurement Canada as well complying with the local utility act.

https://www.bchydro.com/content/dam/hydro/medialib/internet/documents/appcontent/your_account/BC_Hydro_Electric_Tariff.pdf Meters need to be sealed and inspected by a Measurement Canada (MC) accredited service provider. The Property Manager must register as a contractor reseller of power (utility) and get a MC contractor number which must be displayed on the meter seal and not tampered with. The meter must be sealed at an accredited shop and the reseller must pay for a Measurement Canada inspection within the first year of installation. Inspection costs are made up of labor, travel and other expenditures including an electrician on site to access the service. Details on the Electricity and Gas inspection act can be found at <http://laws-lois.justice.gc.ca/eng/acts/E-4/page-1.html#docCont> Note Multi residential buildings in BC may have strata laws and restrictions that do not permit kWh billing.

Revenue Grade (non MC Canada approved) metering and flat rate billing. There are Meters that meet the technical Measurement Canada requirement, but are not inspected and sealed. Billing the EV driver would be a flat rate charge assuming all costs for offering EV Charging as a service and does not single out kWh. (Just like Networked EVSE)

For retrofits & new builds, there are single point meters with weights and measures / MC Canada approvals coming. These meters offer revenue grade accuracy and are optimal for flat rate billing applications. Meter installation is cost effective when the electrician is already on site working in the electrical room installing EVSE equipment. Communication hubs (software to manage multiple meter points) include the first single point meter and more meter measurement points can be added as you go. Meter costs are affected by phasing as it affects the number of CT's and labour time to install the CT's. With multi meters phasing affects how many points can be measured with the unit. For example 24 element meter units on a dual phase will measure 12 loads or meter points, if three phase that turns into measuring 8 loads. If you do not want to manually read the meters on site, monthly data reporting is available for a cost. Cost will depend on the end user requirements. What is not factored into the cost (Table A) below is monthly/annual costs of reporting from the meter if not doing manual reads, and costs to install a communications drop if one does not already exist on site. It does not include EVSE equipment.

Table A

Example Metering Cost Estimates - Per Meter Point				
Type	Rev Grade .5% or better	MC Sealed	Meter Cost (Dep. On phasing)	Est, Installed, Comissioned, MC inspected
Single Point single phase (manual read)	Yes	No	\$400	\$600
Single Point single phase (manual read)	Yes	Yes	\$700	\$1,900
Single Point comm hub*			\$1400 - \$2000	\$2,500
Multi Meter 24 element (with comm)	Yes	No	\$400 - \$1250	\$533 - \$1600
Multi Meter 24 element (with comm)	Yes	Yes	\$500 - \$1500	\$666 - \$2000
* Reporting Hub + single meter allows more single meter add ons Multi Meters come with on board communication.				
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><u>Multi Meter</u></p>  </div> <div style="text-align: center;"> <p><u>Single Point Meter</u></p>  </div> <div style="text-align: center;"> <p><u>Comm. Hub</u></p>  </div> </div>				

PROS, installing non-networked EVSE with metering generally offers a lower up-front cost than a networked EVSE unit. Annual network fees are not applicable. However, web based rather than manual meter reading & reporting can add monthly or annual fees. **CONS**, Submetering systems only deliver energy consumption at predetermined intervals. It does not deliver pre calculated GHG reduction information, number of sessions, unique users etc. Consideration also needs to be given to the electrical code with respect to non-load managed EVSE. This infrastructure will increase your future electrical service requirements and is not controllable or grid compliant. This infrastructure does not offer EV driver phone support or first level diagnostics. Manual metering reading & billing and any GHG calculations will add workload for the property administrator.

At Electrum Charging Solutions we typically recommend Networked units wherever possible. We feel smart charging technology will be required to meet future Station Owners, EV Drivers and Utility Provider's needs. Our goal is to provide a solution that meets the requirements based on the station owners needs which could include networked or sub metered charger solutions.

We are available at your convenience for consultation.