Breaking Energy

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Open Standards Needed to Facilitate EV Charging and Demand Response

By EDWARD DODGE
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Greenlots is a global electric vehicle (EV) charging and network management company based in Singapore and San Francisco. Greenlots is a leading advocate for open standards in EV charging and their *SKY Smart Charging* platform is the only enterprise management solution that enables demand response to help utilities manage power loads on the grid.

Greenlots recently partnered with Southern California Edison to pilot the first test of Automated Demand Response (ADR) with Open Charge Point Protocol (OCPP) to gauge customer response and behavioral changes to various demand response pricing strategies.

To conduct the pilot, SCE deployed 80 Level 2 chargers in October 2014, and is among the first large-scale pilots to use open standards protocols OpenADR 2.0b and OCPP in combination for electric vehicle charging.

Greenlots CEO Brett Hauser said, “We see utilities as a critical part of the EV ecosystem. Our solution is an enabler for them to evolve their business models around EV charging and demand response applications and to embrace the new distributed energy paradigm.”

Demand response is the concept of tailoring power usage to variances in power supply and price. For EV charging this means that customers can choose to charge their vehicles at different times and/or at different charging rates in exchange for differential pricing.

Automated Demand Response is simply the use of computers and internet communications to enable demand response to be completely automated and seamless to the user. Historically, demand response has been a manual operation, where utilities would communicate directly to customers to get them to manage their power usage in accordance with electron availability.

Greenlots is a member of the OpenADR Alliance, which is an industry organization dedicated to foster the development and adoption of the OpenADR Smart Grid standard. OpenADR is a communications protocol that standardizes messaging for dynamic price and reliability signals used by utilities, Independent Systems Operators and other participants on the power grid. OpenADR hopes to bring network protocol standardization to power grids globally, much in the same way that TCP/IP enables all devices on the internet to speak the same language.

OCPP is a communications layer between EV charging stations and central management systems. OCPP is still an emerging standard that is not formally recognized by international standards bodies nor adopted across the entire EV industry. There is great hope that OCPP will emerge as an international standard ensuring that hardware can operate across vendors’ networks and prevent customers being stuck with useless equipment should their vendor go out of business.

Hauser says that the point of an open standard is so “you can mix and match various EV charging stations with any back end you choose to use. Those putting out EV infrastructure don’t know all the use cases today. Whatever they do today might not be what they need tomorrow and they need flexibility and scalability.”

Greenlots uses OCPP in their enterprise management system which allows them to be technology agnostic in terms of what hardware they can install and support. There are also competing standards on the hardware side, but the use of OCPP as a software standard reduces some of the costs in supporting a variety of hardware.

There is a range of choices for charging hardware, and all have different capabilities. Level 1 is the slowest, using only household 120v AC for a slow trickle charge. Level 2 is 240v AC at varying amperages for faster charging. DC Fast Charging is currently faced with 3 competing standards: CHAdeMO, J1772, and Tesla’s proprietary Superchargers. Greenlots can leverage OCPP to support all the hardware options (except Tesla who operates their own chargers) and installs DC Fast Chargers with both CHAdeMO and J1772 plugs on them.

Credit: Greenlots

“Setting up EV infrastructure is part art and part science, the art is how do you set it up so people can come and use it, and then when they are done how to let the next person come in and start their charge.”

Lower-speed charging can be more useful in some scenarios where customers are spending more time away from the car. For instance in a mall, you might want charging that can take an hour, rather than fast charging where it is done in 20 minutes.

Brett Hauser described the situation, “there was a lot of effort to roll out Level II chargers (AC 240v), and what we found was that those Level II charging stations have less than a 10% utilization rate. They help in some cases to give people range confidence…but they are never used because there are not many use cases where you want to sit around in public and plug in to 240, you just don’t have the time.”

“But DC Fast Charger is a different ball game, it’s more like a gas station model and has a lot of relevance in the market place. Which is why we have been focused on them and are very proud and happy that we have one-third of the market and continue to grow that space.”

As the EV industry matures it is critical that common standards are adopted that allow consumers and manufacturers alike to avoid the pitfalls of dead-end hardware. Having competing options for cables and chargers and communications retards adoption rates of electric vehicles and slows investment in infrastructure. Adopting common standards sends the signal that the EV industry is growing up and ready and to be a part of the 21st century smart grid.

Topics: Demand Response, Electric Vehicle Charging, Electric Vehicles, EV Charging Networks, EVs, Greenlots, Power Grid, Utilities