

EnergyIP E-Car Operation Center: Managing the Opportunity of eMobility

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Next time an EV passes you, consider that the driver will be contributing thousands of dollars toward potentially lowering your electricity rates by charging the car over its lifetime.

For the non-participating ratepayer, Siemens estimates the 10-year value of increasing throughput of kWh through the transmission and distribution grid is nearly \$3,100 per electric vehicle. Not to mention the fuel savings to the driver which are even more. Nor the many other benefits of EVs - above all economic development, emission reductions, and improved health outcomes.

However, the upside can only be harnessed by ensuring that the accompanying challenges are effectively managed. Millions of EVs will be added to the electric grid over the next several years, along with the related charging infrastructure. This load can range from a 7.2 kW Level 2 home charger that will triple the house's peak demand, to 20 MW charging depots for transit bus and Class 8 truck fleets. There's plenty of generation capacity across the U.S. to provide the energy, but the system isn't sized to handle all these vehicles if charged on peak. Big data comes into play: millions of EVs, chargers, and drivers to track; hundreds of millions of charging sessions with consumption, peak demand, and often payments to record; interconnection of chargers to the grid and integration of EVs into the energy markets to optimize them.

The technology solutions to manage these inherent grid challenges exist today:

- Smart chargers equipped with remote communications and on-board sub-meters enable time-of-use rates and EV-only tariffs – so EV drivers can get low off-peak prices without exposing their entire home or business to dynamic prices. The data also can be sent to the utility for use in distribution operations and planning, peak forecasting, demand response programs, and more.
- Software platforms to manage the chargers and the charging events to keep most charging away from the highest usage hours and charge at the lowest rates possible for the users. Such managed charging can be integrated with grid services to reduce congestion, defer infrastructure upgrades and provide resiliency to grid operators; supply wholesale capacity and ancillary services; and maximize emissions reduction benefits by aligning charging with surplus renewable generation, while minimizing the need for peaking generation.

The Siemens E-Car Operations Center is the utility's brain of eMobility. EnergyIP E-Car OC manages the charging infrastructure and the grid, connecting the chargers and providing processed data to external systems for use in further process such as billing and program management. The system addresses charging infrastructure, EV drivers, companies involved in eMobility services, wholesale market participants, and electric utilities. Provided in the cloud, EnergyIP E-Car OC can manage multiple companies and a variety of charging services, including public, private, and fleet operations.

EOC has three functional modules: one for managing chargers, one for managing customer contracts, and the third to manage charging events intelligently – according to the status of the grid or the current price of energy. The system is open and interconnected to the rest of the charging world, enabling integration with other utility and third-party systems and supporting roaming platforms for seamless billing across charging networks.

A web portal and smartphone app are also available. Users can see the real-time status of chargers, reserve specific stations, and manage their charging history and status of their contract for charging services, including any RFID cards they have.

Today, EnergyIP E-Car OC is in operation in the cloud, both in Europe and North America. Several thousand public chargers are managed every day across multiple countries and serving a wide range of EV drivers. The software was developed in partnership with a large European utility, which continues to add onto the number of chargers as EV adoption advances.

While EV adoption has been dramatic in California, growth has been slower in other states. At the same time, we are seeing the rate of Americans purchasing EVs accelerate as the vehicles become more popular and additional, lower cost models come to market. The opportunity is both unprecedented and, in terms of electrification of a major sector of the economy, unlikely to be matched by any other in the coming decades.

Every utility should consider how to be ready to seize the \$3,000 per vehicle opportunity while handling the challenges. Part of that readiness is getting some experience with a software platform having the essential functionality, such as Siemens EnergyIP E-Car OC.

Chris King
Chief Policy Officer, Digital Grid for Siemens AG
chris_king@siemens.com

For additional information:
www.siemens.com/e-car-oc

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Digital Grid
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100 Technology Drive
Alpharetta, GA 30005
United States

For more information, please contact our Customer Support Center:
Phone: +49 180 524 70 00
E-mail: support.energy@siemens.com

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