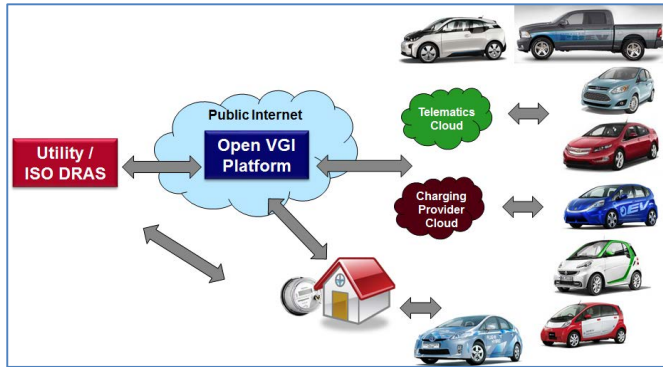


Open Platform for Plug-in Vehicle–Grid Integration



Open Platform For Grid Services

- Secure, open, extensible and scalable, and utility-friendly platform to integrate PEVs into DR and DSM programs, with open data access
- Single interface for all PEVs through public internet, telematics, cloud-based and direct channels
- Functional platform for utility pilot projects of PEV controlled charging
- Operational data for measurement & verification and data around consumer preferences for PEV usage

Background, Objectives, and New Learnings

Plug-in Electric Vehicles (PEVs) are a rapidly growing class of smart, connected load with a nationwide installed base over 270,000. Utilities have an opportunity to manage the charging of PEVs in a manner consistent with demand response (DR) and demand-side management (DSM) objectives. However, the PEV infrastructure and load management landscape is fragmented with PEV and charging network providers positioning themselves as aggregators seeking to leverage their proprietary telematics, charging networks and interfaces. This complexity has been stifling the integration PEVs into DR and DSM delivery channels, and thereby preventing potential benefits from accruing to utilities, PEV customers, and society-at-large.

EPRI's Electric Transportation program has been engaged with eight leading global PEV manufacturers over the last two years to develop the proof-of-concept for a utility-friendly, open standard platform to streamline the management of PEV charging. This platform could enable utility access to data on vehicle energy use, charging profiles, and consumer response to various signals or inducements to affect charging. With such capabilities, utilities would be able to integrate all PEVs in their service territories into DR and DSM programs. This work culminated in the successful public demonstration of the open platform concept in October 2014.

The objective of this project is to advance the open platform concept into the product development and testing stage. It will assess the effectiveness of an open standards-based platform to seamlessly integrate PEV charging with grid objectives through DR and DSM mechanisms. The project consists of the following activities:

- Create requirements and use cases for a unified grid services platform that is secure, low-cost, open and extensible
- Develop an architecture and functional

representation of a platform that enables PEV integration into DR and DSM use cases

- Assess the performance of the platform against utility industry requirements through field trials at utility host sites

Expected new learnings from this project include:

- Define key parameters for inclusion of PEV charging into utility DR and DSM programs
- Architecture and design of selected open platform in comparison to prevailing approaches
- Effectiveness of a functional representative platform to integrate PEVs into DR or DSM programs.
- Ability of an open platform to provide distribution system load visibility through PEVs acting as 'sensors' at various end nodes.

Benefits

The benefits of participating in this project include:

- Gain a keener understanding of industry requirements for integrating PEVs into DR and DSM programs
- Acquire insight into multiple architectural approaches for an open integration platform
- Develop firsthand experience by applying the platform in your service territory

The subsequent development and implementation of an open platform through this project can help utilities:

- Manage and influence PEV charging to attain load shaping goals and improve system flexibility
- Improve asset utilization
- Reduce operating costs

- Enhance regulatory compliance with resource planning and DSM
- Improve system load factor and improve overall system efficiency

An open platform to integrate PEVs with the grid would also benefit PEV customers through:

- Greater ability to visualize and control vehicle electricity usage
- Potential bill savings through access to enhanced utility offerings for flexible PEV charging

The benefits of utilizing PEVs for flexible charging to meet grid objectives would ultimately accrue to ratepayers and society through more optimal use resources, deferred investments, and avoided emissions.

Project Approach and Summary

This project leverages prior base-funded EPRI work, and has three parts:

- Requirements
- Implementation
- Field Trial-based Data Reporting

The Requirements task is expected to include the formation of a steering committee comprised of participating companies that can both contribute to, and learn from, industry requirements that enable development of a secure, scalable and extensible platform to deliver a variety of grid services through open interfaces on both the utility side and PEV side.

The Implementation task intends to include collaboration between the project participants and technology developers to distill the broad spectrum of utility interfaces into open standards-based channels that enable integration of PEVs into DR and DSM programs.

The Field Trial and Data Reporting task is expected to involve setting up a uniform data reporting methodology and providing reports that measure DR and participating effectiveness as well as customer participation and behavior drivers.

Beyond this project, future work is envisioned to integrate additional end devices, such as smart thermostats, and other value-creating grid services beyond DR and DSM into this open platform.

Deliverables

Funders will receive the following deliverables:

- Technical documentation with utility and end-device requirements and use cases for an open, secure, scalable and extensible platform for grid services such as DR and DSM

- Architecture and design document comparing and contrasting the selected platform architecture with prevailing approaches
- Functional platform architected to meet requirements developed by the project participants
- Field trial and operational data from implementing the platform for selected grid services through a variety of use cases

Price of Project

The price to participate in this project is \$100,000. The span of the project is 30 months – funding can be paid up front or allocated by year. The project qualifies for Tailored Collaboration (TC) or Self Directed Funding (SDF). EPRI expects to have over 20 participants in the project spanning both the utility and automotive industries.

Project Status and Schedule

This project is scheduled to commence in December 2014 and run through June 2017.

Who Should Join

This project offers participants in the utility and automotive industries an open and fully functional DR and DSM implementation platform that is secure, scalable and extensible. It is ideally suited for utilities with growing penetration of PEVs as well as organizations that need to respond to regulatory imperatives around DR, integrated DSM programs and compliance with renewable portfolio standards.

Contact Information

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