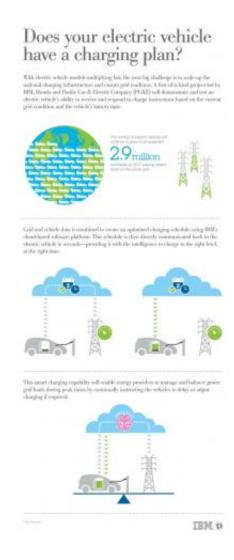# IBM, partners enable smarter charging for electric vehicles

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IBM announced that it has teamed with American Honda Motor Co.,

Inc. and Pacific Gas and Electric Company (PG&E) on a new pilot project that will allow communication between electric vehicles (EVs) and the power grid. This project will demonstrate and test an electric vehicle's ability to receive and respond to charge instructions based on the grid condition and the vehicle's battery state. With visibility into charging patterns, energy providers will have the ability to more effectively manage charging during peak hours and create consumer-friendly programs to encourage electric vehicle adoption.

The energy requirements for electric vehicles will challenge the current power grid as plug-in vehicle counts continue to grow to an expected 2.9 million worldwide by 2017. This project has the potential to ease the infrastructure and consumer concerns associated with the mass adoption of EVs, by adding another layer of agility to the EV charging process. This level of intelligence will help make charging seamless for consumers, while ensuring the electricity source is reliable and the infrastructure is stable.

This demonstration combines grid and vehicle data to create an individualized charging plan for Honda's Fit EV battery electric vehicles (BEV), using IBM's cloud based software platform. By utilizing the existing in-vehicle communications system in the Honda Fit EV, the electric vehicle can interact with utilities and the grid, creating a direct channel for sending and receiving usage information that could improve local grid management.

"This pilot project with IBM and Honda will help us demonstrate that third-party providers have the systems and capabilities to help meet some of the challenges that electric vehicles could place on the power grid as their adoption increases in the coming years," said Saul Zambrano, senior director for consumer products for PG&E. "With updated charging patterns for EVs, we have the ability if needed, to shift demand to non-peak times to ensure the reliability of the grid so that we

can continue to deliver safe, reliable and affordable energy to our customers."

Once plugged into a charge post, the Honda Fit EV initiates a charge request via the vehicles telematics system, an integrated telecommunication application that is often used for navigation. This request is sent to IBM's Electric Vehicle Enablement Platform where vehicle data such as battery state and grid data received from PG&E, is combined to create an optimized charge schedule, which is then communicated back to the vehicle in seconds. Using this aggregated data, the vehicle has the intelligence to charge to the level that is needed while factoring any current grid constraints.

Using real time and simulated data, the system will test and demonstrate the ability to alter, as well as adapt charging patterns based on grid conditions. This smart charging capability will enable energy providers to manage the power used by EVs during peak times by instructing vehicles to delay or adjust charging if required.

"One of Honda's main objectives is to work to advance technologies that can address society's environmental and energy concerns through both alternative powertrain technologies, like our 2013 Honda Fit EV battery electric vehicle, and through groundbreaking research initiatives similar to the Smart Charge project that we are collaborating on with IBM and PG&E," said Steven Center, vice president of the Environmental Business Development Office at American Honda. "It is our hope that these technologies and infrastructure will pave the way for EVs of the future to be synched to local electric grids to intuitively and seamlessly manage charging experiences."

Additionally, the IBM EV platform can collate historical EV charging data and create a profile that can be used to forecast the location and duration of EV charge loads. For example, the program can determine

how many EVs are plugged in one neighborhood and the time it will take for each to reach a full charge. This level of insight will allow utilities to optimize grid operations and help reduce the chance of outages – a possible concern as the number of EVs increase.

"The growth and success of EV adoption is reliant upon many factors, ranging from vehicle price and performance, to infrastructure readiness, to the consumer experience – a scope that cannot be addressed by one sole industry," said Allan Schurr, Vice President, Strategy and Development of IBM's Global Energy and Utilities Industry. "This project with [Honda](link) and PG&E represents a significant step towards building an intelligent infrastructure that integrates capabilities and technologies across three major players. We are creating a system that allows [electric vehicles](link) to communicate with the power grid – this is groundbreaking."

Convenient Consumer Charging

By communicating information directly to the vehicle, this project has the potential to significantly improve driver services. For example, the IBM's cloud based platform could provide charge post location information and availability directly to the EV, using the telematics and Satellite-Linked Navigation to guide the driver to the most convenient place to charge.

This project along with the recently announced EKZ Smartphone Application (app) pilot will help engage consumers and encourage more drivers to "plug in." The smartphone app shows the vehicles battery level, range of travel distance, vehicle location, and current energy costs in real time. This technology coupled with the ability to communicate directly with charging stations via a GPS system, will offer consumers a uniquely "connected" driving experience.

In addition to the two pilot projects, IBM is currently a member of the EcoGrid EU consortium, a group focused on developing an energy grid that uses at least 50 percent of renewable energy sources, such as wind power, solar energy and biogas. Instead of just using car batteries to balance the load like EDISON, the EcoGrid consortium is using appliances, heat pumps and electric water heaters to also store excess energy.

Provided by IBM