



## World's first cross-brand V2G demonstration conducted in Denmark

**With a fleet of four state-of-the-art vehicles from Mitsubishi Motors Corporation, PSA Groupe and Nissan, the Danish project, Parker, is now demonstrating that vehicles from different car brands can contribute to supporting the electricity grid. An important milestone for the roll out of V2G.**

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The aim of Parker is to demonstrate modern electric vehicles' ability to support and balance a power system based on renewable energy. To do so, Parker is testing a wide range of new and existing grid services to examine how electric vehicles can best contribute to balancing the power system and not least, whether electric vehicles can deliver such grid services across car brands – the first demonstrations have now been conducted.

"This is the first time, three major automotive brands come together to demonstrate cross-brand V2G just as it is the most thorough and systematic cross-brand V2G service demonstration ever conducted," says Peter Bach Andersen, Senior Researcher at the Center for Electric Power and Energy, DTU Electrical Engineering and Project Manager of Parker.

With the demonstrations kicked off in the second half of 2017, the project has now demonstrated that the vehicles are operational and able to deliver services across brands. The first tests conducted by Parker included grid services such as frequency regulation, voltage support and stacking.

### Several automotive brands enter the V2G market

For vehicles on a global scale to support the power system optimally, a universal definition for grid integration must be formed so that vehicles can connect with and balance the grid no matter brand and location, which is what the automotive brands Mitsubishi Motors Corporation, PSA Groupe and Nissan sets out to do in Parker together with Enel, Nuvve, Insero, Mitsubishi Corporation and the Technical University of Denmark (DTU).

"Mitsubishi Motors Corporation is a pioneer in EVs and PHEVs and has been working on use of these vehicles as a storage battery for more than 5 years. The V2G demonstration conducted here in Denmark is a study to utilise EVs and PHEVs as a power interchange tool for society," says Vincent Cobee, Corporate Vice President at the Mitsubishi Motors Corporation, and continues: "We do expect EVs and PHEVs as social infrastructure will become more indispensable than ever before in the near future."

Parker's fleet of vehicles consist of seven Enel chargers and four different series produced state-of-the-art electric vehicles from the three different automotive brands mentioned above. The vehicles have already integrated the V2G technology and are thereby capable of providing electricity back to the grid, which not only demonstrates the acceptance of V2G in the automotive industry, but also the partners' position as frontrunners of grid integration.

"We are proud to be a member of the Parker team, contributing our electric vehicle charging infrastructure technology as well as bringing in our expertise in smart grid development. For us, V2G presents significant business opportunities, and we are making great strides in the advancement of this technology within the overall smart grid development so we can assure a balanced power system based on renewable energy," says Alberto Piglia, Enel's Head of e-Mobility.

### Demonstrations will continue in 2017

Prior to the first demonstrations which were recently conducted, Parker has made a comprehensive test plan, containing 11 services, which will be tested during the winter of 2017. Here, the project will among other things assess the vehicles' ability to provide frequency regulation, grid overload prevention and do real-time charging in accordance with a CO2 signal which informs the vehicle of when the CO2 emission from energy producers are at their lowest.

"The first tests are the fundamental basis of the Parker project, creating a reference and validating a complex set of algorithms to deliver multiple services including frequency regulation and other ancillary services to the grid," says Gregory Poilasne CEO of Nuvve Corporation. "Now that we have demonstrated that these vehicles can perform, the Parker project can focus on scalability and proceed to studying larger fleets integration on the Grid," adds Poilasne.





By the end of the project period, which will run until July 2018, Parker will be able to define which grid services and technical capabilities electric vehicles across car brands must support, and how these are best combined to balance the power system. Such analyses will be conducted in 2018 where the project will also continue its work towards developing a Grid Integrated Vehicle (GIV) certificate and explore the most viable commercial opportunities for grid integrated vehicles.

Besides demonstrating on the beforementioned fleet, Parker is also interfacing with and pulling data from the Frederiksberg Pilot in Denmark, the world's first commercial V2G hub. Furthermore, the project draws on the knowledge from previous projects, EDISON and Nikola, which laid the foundation for understanding the electric vehicle's potential in balancing the Danish power system.

### Contact

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Or read more on the project website: [www.parker-project.com](http://www.parker-project.com)

### Facts about Parker

**Partners:** Project partners are Nissan, Mitsubishi Corporation, Mitsubishi Motors Corporation, PSA Groupe, NUVVE, Frederiksberg Forsyning, Enel, Insero and DTU Electrical Engineering (PowerLabDK).

**Duration:** The project period is August 2016 to July 2018.

**Funding:** The project has an overall budget of DKK 14,731,471 which is financed by ForskEL.

**Technology:** The technology used by the project has been thoroughly tested and validated. This includes the vehicles (Nissan, Mitsubishi, PSA Groupe), charging infrastructure (Enel) and aggregation software (NUVVE). The use of such mature components reduces the technology-related risks in the project.

**Parker's Fleet:** Parker's fleet of vehicles consist of four vehicles from three different brands; Nissan e-NV200 Evalia, Mitsubishi Outlander PHEV, Nissan Leaf and two Peugeot iOn. Furthermore, they consist of seven Enel 1.0 and 1.5 chargers.

### Background

The Parker project builds on two previous projects, EDISON and Nikola, which have already laid the foundation for understanding the electric vehicle's potential in balancing the Danish power system. Parker represents the next technology readiness level by allowing balancing services to be applied to a fleet of electric vehicles.

