

Technology Pioneer Opel Advances Electric Mobility

MeRegioMobil: Tangible view of the energy of the future

Electric Meriva: Mobile storage for the smart power grid of tomorrow

Rüsselsheim. Opel has joined forces with MeRegioMobil to advance future mobility by developing three demonstration electric Merivas. Funded by the German Ministry of Economics and Technology, the research project has the goal of integrating electrical vehicles as mobile energy storage units in the intelligent power grid (smart grid) of tomorrow.

"These demonstration vehicles, along with others GM has announced in other markets, will be used to study the practicality, user friendliness, and acceptance of electric vehicles among consumers. With our demonstration, we are making an important contribution to the definition of European standards for energy infrastructure, electricity saving technology and data communications," said Opel's Vice President of Engineering, Rita Forst.

Testing of bi-directional charging technologies

Opel will use MeRegioMobil to study new intelligent charging technologies that could be applied to models in the future. The electric Meriva features electronic controls which permit high power electrical refueling using both a 230-volt household current as well as 400 volt three-phase AC. The system is designed so that it can fit into a smart grid and the battery can recharge whenever electricity from renewable sources such as wind or solar energy is available and economical.

Conversely, the demonstration will explore the capability of the car to feed power back into the grid via the bi-directional charging system when the car is not in use and the driver permits it. This demonstration of two-way charging technology will test the practicality of distributed energy storage in car batteries for home usage.

The electric Meriva has a 60kW / 82hp electric motor with torque output of 215 Nm. Thanks to the battery's total energy of 16 kilowatt hours, a range of 64 km and a top speed of 130 km/h are possible. Opel's engineers integrated the electric drive without making concessions on luggage capacity or comfort. "The electric Meriva may look like the production car, but is a pure research-vehicle. We are testing charging at high currents in less than one hour, as well as the communication protocols between the vehicle and charging station," Forst said.

Data exchange between power generators, vehicles, infrastructure and users

Under the leadership of the energy group EnBW, other members of the consortium include: Opel, Daimler, Bosch, SAP, Stadtwerke Karlsruhe, the Karlsruhe Institute of Technology (KIT) and the Fraunhofer Institute for Systems and Innovation Research (ISI).

KIT will use the first electric Meriva. Two more will soon enter service at Stadtwerke Karlsruhe and EnBW. KIT and the Fraunhofer Institute for Systems and Innovation Research have built a "Smart Home" on the south campus of Karlsruhe University. The home's 60-square meter building area is equipped with the usual appliances including refrigerator, oven, dishwasher and washing machine and gets its energy from a photovoltaic cell as well as a micro combined heat and power plant. A charging station connects the Meriva as a storage unit to this local energy grid.

"MeRegioMobil is an outstanding E-Mobility project in which we are able - together with our partners - to conduct real-time testing of an intelligent, bi-directional charging management with electric vehicles for the first time. The electric Opel Meriva is a real milestone for the research project.

In the future we will be able to store energy from renewable sources in the battery of the electric vehicle and then, when there is less wind supply we can retrieve it," said Lars Walch of EnBW Energy Baden-Württemberg AG, and project leader of MeRegioMobil.

"Now that we have the electric Meriva, we can start the active phase of MeRegioMobil: Thanks to such inter-disciplinary cooperation, we can investigate the chances and challenges of connecting the electric vehicle into the energy system of our Smart Home demonstration and research laboratory with a real car," said Prof. Hartmut Schmeck, spokesman for MeRegioMobil at KIT: "The possibility of delivering power from the vehicle to the network is unparalleled, no other electric vehicle can do this. Using the potential of the stabilizing effect of the vehicle battery for the power grid can only be developed through new concepts of intelligent information and communication technology."

Communications technology plays a key role in the MeRegioMobil project. Depending on how the residents want to use the Meriva, they can distribute the energy easily between home and vehicle by computer. This ensures that the electric Meriva always has enough energy to meet transportation needs and enables some buffering of green power from the photovoltaic equipment.

The participating energy providers are currently building hundreds of public charging stations in the project region of Baden-Württemberg. There, the demonstration vehicles can be re-charged at a variety of destinations using renewable energy. The goal of this infrastructure usage is also to test a new data communication and billing system similar to the system used for mobile-phones; in the future, users of electric vehicles should be able to recharge at any energy provider. Users then receive the one bill from their energy provider.

Opel and GM are committed to emissions-free mobility

"Our contribution to MeRegioMobil is embedded in GM's global corporate strategy of developing and demonstrating electric vehicles in daily use," Forst said.

General Motors is committed to delivering a range of electrified vehicle technologies, offering a portfolio of solutions that will allow customers to choose the vehicle that best meets their needs. Deep experience and expertise in batteries, electric motors and power controls will ensure GM provides the best possible choices when it comes to vehicle electrification technologies.

The Opel Ampera, with extended-range capability, is an industry-leading solution for customers who seek battery electric driving for most commutes and more than 500 km of total range. GM also is establishing battery electric vehicle demonstration fleets around the world to better understand urban driving patterns, battery charging, infrastructure and customer acceptance of electric vehicles in various global markets. At the same time, GM is investing in start-up companies with innovative ideas to accelerate next-generation electrification technologies.

"Electric mobility opens for Opel and the entire automotive industry the door to greater independence from fossil fuels and can deliver transportation with zero vehicle emissions." Forst said.