



Project update

Dual use vehicles offer valuable power reserve

Project details		Key aims
Project title	Assessing the System Benefits of Dual Use Electricity Storage	
Participant	University of Strathclyde, Glasgow, United Kingdom	
Start date	2007	<ul style="list-style-type: none"> • Demonstration of a power network utilizing energy stored in batteries of electric vehicles • Development of a control system for vehicle fleets doubling as mobile power sources • Energy storage that overcomes the cost barriers of dedicated storage systems.
Project summary		
<p>Electric vehicles are being tested as mobile power providers in an E.ON International Research Initiative project seeking innovative solutions for energy storage. The utilization of 'dual use' electric vehicles, whose primary function is foremost for transport utility, could offer an alternative large-scale storage option for grid applications.</p> <p>The project will examine the potential to control large numbers of vehicle battery</p>	<p>packs to operate bi-directionally with the power grid: charging the vehicle from the grid; delivering power from the vehicle to the grid.</p> <p>A major advantage of the dual use concept is that it may reduce the cost barriers faced by many storage schemes as the capital cost of the storage medium, i.e., the batteries, is already factored into the purchase of vehicles for transport use, and hence does not depend solely on the economics of grid storage.</p>	<p>The project is based at the Department of Electronic and Electrical Engineering at the University of Strathclyde in Glasgow. It was proposed by Senior Lecturer Dr Andrew Cruden and Professor David Infield, Professor of Renewable Energy Technologies.</p> <p>Initial estimates suggest that a fleet of 30 delivery vans could provide a power output which, depending on the type of battery technology involved, is equivalent to between 1.5MW - 2.1MW.</p>

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In-depth studies into the patterns of use of public and private transport vehicles were launched as this project got under way.

This project aims to fully understand the potential of utilising the battery packs of the growing number of electric buses, taxis and cars as mobile energy stores. The work intends to investigate whether the concept is technically feasible and cost effective.

Preliminary work involved the collection of information from a major UK bus company, a city taxi fleet and, for private cars, from a UK Government national time use survey.

This information was used to examine scenarios in which electric vehicles were substituted for current commercial and private vehicle fleets, taking account of total vehicle numbers, number of vehicles parked and plugged

into the power system, travel to and from base depots and sample journey routes.

Analysis of the possible future power demands and energy contributions of these electric vehicles focused on their complex uses, which include commuting, and business and private purposes in many different locations.

The details for the vehicles were compiled to provide:

- Energy consumption figures during normal daily usage
- Typical availability of batteries for charging and discharging power to the grid
- Models to calculate the likely profiles of battery usage each day.

In addition, the project team investigated the potential impacts and benefits of dual use transport on a

UK-style large interconnected power system.

This work models the effects of various levels of vehicle energy storage in leveling load demands on the network.

These assessments are based on average seasonal days during a full year, using aggregate load profiles throughout the day and typical generation costs.

An additional key outcome will be the extra value that this type of energy storage capability can add to intermittent renewable energy by absorbing power at times of over production.

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