Grids to harness power of electric cars

Clive Cookson

Electricity grids could operate much more efficiently if they tapped the vast amounts of power stored in the batteries of electric and hybrid vehicles, to balance out fluctuations in supply and demand.

Vehicle-to-grid, or V2G, technology, which would enable electric car owners to make money while storing power for the grid, was unveiled at the American Association for the Advancement of Science meeting in San Diego on Friday.

The first experimental V2G system has just gone live at the University of Delaware, where three electric cars are connected to the grid whenever they are not being driven. “They are making five to ten dollars a day just by being plugged in,” said Kenneth Huber, technology manager for the PJM grid, which covers the mid-Atlantic states.

The two-way connection not only pulls in power to recharge the battery but also sends electricity back to the grid. V2G vehicles work like an electrical sponge, absorbing excess energy when demand for power is low, and returning some to the grid when demand is high, said Willett Kempton, project leader at the University of Delaware.

This sort of load balancing will become increasingly important as renewable energy sources, particularly wind, generate more electricity.

“Vehicles we have now provide freedom and meet the needs of individuals,” said Jeff Stein, engineering professor and V2G researcher at the University of Michigan. “Hybrid and electric vehicles can also be used in a completely different way, to be something that is defined as being part of the greater good in concert with others. It has fascinating possibilities.”

But the motive need not be altruism. Prof Kempton says his project suggests that an investment in V2G technology could pay off very fast for an electric car owner. Once the technology is commercialised, the additional costs of fitting a V2G-enabled battery and charging system would be about $1,500 – and the owner could make $3,000 a year through a load-balancing contract with the grid.

V2G is economically viable because electric car owners are buying batteries anyway, so it makes sense to use them for communal energy storage. It would be much more costly for electric grids to install stationary battery banks or other storage systems dedicated to load balancing.

Existing vehicles cannot easily be retrofitted with V2G but in the next five years as many as 1m electric cars are likely to be sold in the US. Several manufacturers are assessing the technology, says Prof Kempton. Tests have shown that V2G, installed properly, does not reduce battery life.

With each car providing 10 kilowatts of power, 1m V2G cars would provide a balancing reserve amounting to several gigawatts – reducing the need for power station construction.

Fonte: Financial Times, London, Feb. 19th 2010, Companies, online.