

City of Newark first in nation using cars to power grid

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Shot of electric car owned by Willett Kempton, UD Professor of Marine Policy. Kempton plugs in the car at his home every night and on campus during the day. When not in service, he says, it stores enough electricity to power 7-8 houses on his block for 30 minutes. Credit: Kathy Atkinson, University of Delaware

This month, the City of Newark, Delaware became the first electric utility in the US to use a car to store and provide power for the local electric grid.

The vehicle, which runs on electricity alone, is specifically designed to store energy and improve grid reliability. University of Delaware researchers helped develop the concept, called Vehicle-to-Grid (V2G). With the City of Newark's approval, the UD team is now conducting V2G testing at two outlets within the City's service territory.

Cities including San Francisco and Austin, TX have seriously considered the idea, but Newark (population: 30,000) is the first to officially put it into action.

University of Delaware Associate Professor of Marine Policy Willett Kempton explained how the technology benefits the grid operator. Currently, there is no energy storage built into the electric grid system, meaning that electricity usage and electricity generation must be simultaneous. As fluctuating renewable sources, such as solar and wind power, become a larger fraction of our electric generation, energy storage will help grid operators smooth power output fluctuations.

"Wind tends to blow stronger at night when the electric load is low," he said. "If electric vehicles charged at night with wind power, the grid operator could use the energy in the batteries, when vehicles aren't needed for driving and are plugged in, to help maintain grid reliability. The vehicle owner would then be paid for providing these energy services at a greater value than what they paid for the electricity."

Those savings add up to thousands per year.

Kempton plugs his car in at his Newark home, and while it sits, he says, it stores enough energy to power 7 to 8 homes on his block for approximately 30 minutes.

Kempton and his team plan to have a fleet of six vehicles by the end of 2009, two at UD and four operated by the state of Delaware. The test fleet will be used to demonstrate multiple V2G vehicles working together and supplying energy as a single power plant. The City of Newark's approval paves the way for larger-scale adoption of V2G electric vehicles nationwide, helping to advance the nation's electric grid infrastructure and reduce oil consumption.

The City of Newark is responsible for ensuring the energy source will

not feed power back to the grid when power lines are down. This approval process for V2G electric vehicles is similar to the process used to certify solar photovoltaic systems. It is critical to maintaining the safety of line workers during a power outage.

Sam Sneeringer, the City's Assistant Electric Director, describes the reasoning behind the certification process by saying, "Solar PV systems and V2G vehicles are tested to the same standards and treated the same within the city's approval process because electricity from the car's batteries or from a solar panel is indistinguishable to the electric grid and presents the same potential safety risks to linemen."

The University of Delaware and utility company, Delmarva Power, conducted initial testing of this safety requirement before the vehicle was thoroughly tested to IEEE standards at the National Renewable Energy Laboratory in Golden, Colo.

Source: University of Delaware

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