Electric cars dangle the promise of earning money for their drivers

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Automated charging with Matrix Charging. Credit: © Easelink, 2019

Needed to clean up road transport, battery-powered vehicles might also act as warehouses of stored energy that the car owners could sell to electricity networks.

While drivers considering an electric vehicle (EV) might imagine the main benefit being less air pollution from their own journeys, EV batteries could also make money for car owners—and help countries stabilize their power grids.

The whole idea is premised on a simple fact: cars are stationary far more often than they are in motion.

Parking power

"Cars are parked for 95% of the time, so they can offer flexibility by providing electricity when there is more demand and by storing it when there is less demand," said Joana Mundó Olivé, chief executive officer of consultancy Ecoserveis in Spain. "That can help balance the grid and, at the same time, the end user can make additional revenues."

Ecoserveis is leading the V2Market project exploring how EV batteries can be integrated into the electricity system. They would serve as storage capacity for national power grids, allowing electric-car owners to sell energy to the networks when it is needed.

Vehicle-to-grid (V2G) technology offers potential answers to two big challenges for society as it seeks to counter more frequent—and increasingly severe—heat waves, storms and floods resulting from climate change.

One is cutting emissions from transport, which accounts for around a quarter of the EU's greenhouse-gas discharges. The second is increasing the use of renewable energy such as wind and solar power, whose intermittent nature is a headache for power-grid operators.

The EU has given the auto industry a big regulatory prod to accelerate the development of electric vehicles by agreeing to ban the sale of new

cars with a combustion engine as of 2035. Separate draft European legislation would increase the number of charging stations for EV drivers across the EU.

For consumers, being able to make money by selling energy to the grid should help encourage them to opt for electric cars.

Rules of the game

After initial market studies, V2Market is focusing on how the contracts governing the commercial relationships among energy suppliers, the power grid, charging-infrastructure providers and EV owners will look. This mix of actors also includes companies—known as aggregators—that negotiate with utilities on behalf of consumers.

V2Market, which runs until 2024, plans pilot tests in the metropolitan area of Barcelona, Spain later this year involving municipal-authority vehicles and individual EV owners.

Those trials will contribute to another major aim of the project: boosting public awareness and encouraging policymakers in more countries to put in place the rules needed for V2G to emerge on a broad scale. At present, few countries have passed legislation in this area.

"You need laws that allow this commercial relationship of selling electricity or capacity to the grid," said Mundó Olivé. "You also have to regulate the taxes and the role of the aggregator. There are new relationships to be built between different market actors."

V2Market will analyze data on electricity consumption and fluctuations in power prices at different times of day to help people predict the best hours to consume energy or feed it into the grid. Alerts sent to users via an app will prompt them to charge their car batteries when energy is

cheaper and sell it back to the grid when it is more expensive.

The project also explores the possibility of an electric-vehicle owner paying to use the EV battery, which would belong to an aggregator, rather than buying it outright. This idea, known as "servitisation," could reduce the initial outlay for an EV by around €10 000, according to Mundó Olivé.

Charging ahead

Elsewhere in the EV sphere, researchers and start-ups are moving ahead with other important technological steps. One is automated battery charging, which maximizes vehicles' connection time with the grid.

Automated charging is a prerequisite for intelligent charging, whereby an EV and a charging device share a data connection. The link enables the car owner to monitor and manage the charging process, making the best use of electricity supply and demand. Intelligent charging in turn allows the vehicle's battery to be used for V2G.

Automated charging was the focus of the Matrix Charging project, which ended in 2020.

Led by Austrian high-tech startup Easelink, the project developed a technology that automatically charges the battery of a parked EV.

The EV parks over a special pad, a connector gets lowered from under the car and the two meet to charge the battery, communicating through a secure Wi-Fi-based connection.

The pad can be installed in a public place, used outdoors or fitted in a private garage, according to Hermann Stockinger, founder and CEO of Easelink. The company is now seeking to commercialize the product

through technology licensing.

"When it comes to making money out of battery storage, we have a key technology," said Stockinger, who has a background in mechanical engineering and worked for German carmaker BMW before founding Easelink in 2016.

He believes EU backing has helped foster industry interest in the charging system.

The company is initially focusing on licensing the system to retrofit existing electric vehicles—an operation that would cost around €2 500 and take three to four hours—as the quickest way to scale up.

Taxis, municipal vehicles and premium users are expected to be the initial target groups.

Easelink is also putting the pad into operation at taxi stands in Vienna and Graz, Austria through an Austrian energy and climate initiative to electrify taxi fleets.

Starting in mid-2023, around 60 automatic-charging stations will be set up in the largest such project in Europe.

Greener grids

More generally, by ensuring the battery is charging whenever the car is parked, the pad can help owners maximize revenues from their batteries, according to Stockinger.

"You don't have the human factor of remembering to plug it in," he said. "You can set up a fully automated process."

Ultimately, achieving a higher renewables share will require a widespread intelligent charging system that automated charging is bringing ever closer.

"This is a key technology to deal with the volatility of renewable-energy sources," Stockinger said. "If vehicles are connected to the grid more often, they can be charged at the ideal time when green energy is available."

More information:

- V2Market
- Matrix Charging
- Transport and the European Green Deal

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