

How Electric Car Batteries Might Aid the Grid (and Win Over Drivers)

Automakers are exploring energy storage as a way to help utilities and save customers money, turning an expensive component into an industry asset.



By **Jack Ewing**

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Electric cars are more expensive than gasoline models largely because batteries cost so much. But new technology could turn those pricey devices into an asset, giving owners benefits like reduced utility bills, lower lease payments or free parking.

Ford Motor, General Motors, BMW and other automakers are exploring how electric-car batteries could be used to store excess renewable energy to help utilities deal with fluctuations in supply and demand for power. Automakers would make money by serving as intermediaries between car owners and power suppliers.

Millions of cars could be thought of as a huge energy system that, for the first time, will be connected to another enormous energy system, the electrical grid, said Matthias Preindl, an associate professor of power electronic systems at Columbia University.

“We’re just at the starting point,” Dr. Preindl said. “They will interact more in the future, and they can potentially support one another — or stress one another.”

A large flat screen on the wall of the Munich offices of the Mobility House, a firm whose investors include Mercedes-Benz and Renault, illustrates one way that carmakers could profit while helping to stabilize the grid.

The graphs and numbers on the screen provide a real-time picture of a European energy market where investors and utilities buy and sell electricity. The price changes from minute to minute as supply and demand surge or ebb.

The Mobility House buys power when solar and wind power is abundant and cheap, storing it in electric vehicles that are part of its system and plugged in around Europe. When demand and prices climb, the company resells the electricity. It’s a classic play: Buy low, sell high.

People in the automobile and energy industries have been talking for years about using car batteries for grid storage. As the number of electric cars on the road increases, those ideas are becoming more tangible.

Renault, the French carmaker, is offering Mobility House technology to buyers of its R5 electric compact car, for which the company began taking orders last month. The car, which Renault will begin delivering in December, starts at 29,490 euros (about \$32,000) in France.

Buyers who opt in will get a free home charger and sign a contract allowing Renault to draw power from the vehicles when they are plugged in. R5 owners will be able to control how much power they give back to the grid and when. In return, they'll get a break on their electricity bills.

“The more they plug in, the more they earn,” said Ziad Dagher, a Renault executive in charge of the program. Renault estimates that participants could cut 50 percent from their home energy bills.

Renault, which will offer the technology in France before rolling it out in Germany, Britain and other countries, will share in the profits that the Mobility House generates from energy trading.

If such services prove successful, the financial argument for electric vehicles, an important tool against climate change, will become stronger.

“It would really drive E.V. adoption,” said Adam Langton, a BMW executive who works on energy issues.

BMW already offers software that allows owners to charge their electric cars when renewable energy is most abundant. That allows the company to earn carbon credits and pay customers who take part in the program.

A new generation of electric vehicles that BMW will begin selling next year, known as the Neue Klasse, will have so-called bidirectional capability, meaning the cars will be able to take electricity from the grid and release it back in addition to using the energy to power their motors.

Ford was a pioneer in two-way charging with the F-150 Lightning pickup, which can [power a home during a blackout](#). General Motors, Hyundai and Volkswagen also offer or plan to offer cars with bidirectional charging. As such vehicles become more common, the storage potential could be enormous.

By the end of the decade, an estimated 30 million electric vehicles could be on U.S. roads, up from about three million now. All those cars could store as much power as a day's output from dozens of nuclear plants.

But of course those millions of cars may also put a strain on the grid, which is already getting increasing electricity demand from heat pumps and data centers, said Aseem Kapur, chief revenue officer at GM Energy, a unit of General Motors that provides services to electric vehicle owners. By helping to smooth out demand, “E.V.s can be a significant resource,” he said.

But a few problems need to be worked out before that vision can be realized.

Owners may not be eager to have their cars serve the grid because they are worried that constant charging and discharging will wear down their batteries faster.

Some energy experts said the degradation would be insignificant, especially if utilities drew on only a small fraction of a battery's capacity. Renault is dealing with that issue by offering participants in its energy storage program the same eight-year, 160,000-kilometer warranty that people who don't take part receive.

Another challenge is that some U.S. utilities and the state regulators that oversee them prefer running centralized grids in which energy flows almost entirely in one direction — from power plants to homes and businesses.

To overcome resistance from utilities, Maryland last month adopted a law that requires them to accommodate bidirectional charging schemes and provide financial incentives.

There is growing recognition that electric vehicle batteries are valuable investments that most owners will actively use for only a few hours a day.

“We want to unlock the full value of electric vehicle batteries,” said Gregor Hintler, chief executive of the Mobility House for North America.

If all the electric cars in New York City were used as storage, said Dr. Preindl, the Columbia professor, “those vehicles would be the most valuable power plant in New York by far.”

Consolidated Edison, the utility that serves New York City and some of its suburbs, is exploring how managing charging times and using electric vehicles for storage could help it cope with the fast growth of battery-powered cars.

Contrary to popular fears, “the grid is not going to collapse” because of electric cars, said Britt Reichborn-Kjennerud, the director of e-mobility at Con Ed. “The bigger concern is that if we don’t plan differently for this very fast-increasing load, the grid won’t be ready in time to support the transition.”

Con Ed supplies the power to a Bronx depot for New York City [electric school buses](#), where Mobility House software allows more vehicles to use the facility.

Fleets of electric vehicles owned by businesses or governments are a particularly promising form of backup energy storage. Vans or trucks have large batteries and tend to have predictable routes and schedules.

Ford Pro, the commercial-vehicle division of Ford Motor, has begun offering free chargers to customers who allow them to be switched off during peaks in electricity demand. Owners also save on their electricity bills.

Ford provides the software to manage the chargers and accommodate customers’ driving needs, and it manages the relationship with utilities. Ford is testing the service in Massachusetts before expanding it to other states. The next step will be a two-way system that allows the vehicles to send energy to the grid.

“What smart charging can do is cut costs,” said Jim Gawron, director of charging strategy at Ford’s electric vehicle division. “That has been a key barrier for customers.”

A correction was made on June 5, 2024:

An earlier version of this article incorrectly described how much money, according to a Renault executive, participants in a program that sends power from their car batteries to the grid could save on their home energy bills. Customers could cut their energy bills by 50 percent, not 15 percent.

[Jack Ewing](#) writes about the auto industry with an emphasis on electric vehicles. [More about Jack Ewing](#)

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