System offers greater security for charging of electric vehicles

By KASH CHEONG

RESEARCHERS have come up with a system that provides an extra layer of security for the charging of electric vehicles (EV) here.

The system helps guard against electricity theft or outages caused by attacks on the power grid through EV charging stations.

"Cities depend on power so ensuring reliability of the power supply is extremely important," said Dr Zhou Jianying, one of the Institute of Infocomm Research (I2R) scientists who came up with the system.

The institute hopes to test this secure charging mechanism on a fleet of 100 electric vehicles, which it will bring to Singapore in the second quarter of this year with Chinese carmaker BYD.

The new system will prevent crooks from plugging in malicious devices to overload the grid.

It also helps minimise the risk of hackers introducing computer viruses to multiple charging stations and causing them to draw more electricity than the grid can support. This can cause a power cut or even damage generators, Dr Zhou said.

The secure charging mechanism uses "complex authentication", involving a specialised charging station and a tamper-proof Intelligent Electronic Device installed in registered electric vehicles.

When an electric vehicle is plugged into a charging station, the station generates a random number, which is sent to the device. Backend servers, which control the charging station, generate another random number that is sent to the device through a cellular network.

The two numbers are processed according to an algorithm and an authenticating number is sent to the server.

Charging will start only when authentication is completed.

All communication between the device and servers is encrypted.

The system also scans for and prevents cyber-intrusions.

Besides providing greater security, the new system also has a demand-response function, which shows users the real-time price of electricity so they can decide when to charge their cars.

"EV users might decide to charge at off-peak hours to save money. This also reduces strain on the power company's generators," said Dr Zhou.

Currently, there are about 90 electric vehicles, owned mainly by commercial or academic institutions, on roads here.

More than 70 charging stations, which can only be accessed through ez-link cards registered with central EV charging operator Bosch, cater to them.

Electric car user Sam Zhang, 27, was all for greater security.

He said: "In an era of cyber-attacks, more security for charging stations is a good thing.

"If there is an extended outage, everyone suffers, not only EV users."

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