DELIVER
Energy More Intelligently

BUILDINGS | CARBON CAPTURE AND STORAGE | FUEL CELLS | NUCLEAR | POLICY | **PLANNING**
RENEWABLES | **SMART GRID** | STORAGE | SUSTAINABLE MOBILITY | SUSTAINABILITY ANALYSES

GIVING RETIRED ELECTRIC VEHICLE BATTERIES NEW LIFE

Alharbi, T., Bhattacharya, K., and Kazerani, M.

The battery in an electric vehicle (EV) faces serious performance demands every time the driver steps on the accelerator or the brake. So after a number of years, when its capacity has dropped 20 to 30 per cent, it gets replaced.

But that retired battery can still function well in less demanding applications — like stationary energy storage systems of microgrids — where the fluctuations in power/energy and charge are much smaller.

Because the sun doesn't always shine and the wind doesn't always blow, renewable energy microgrids need to incorporate either a way to store surplus energy or a back-up generator to fill the gaps. Repurposed EV batteries offer an attractive alternative to expensive new batteries or polluting diesel generators.

Now, a new tool developed by WISE researchers makes that choice easier.

Electrical engineering doctoral candidate Talal Alharbi, and professors Kankar Bhattacharya and Mehrdad Kazerani began by assessing how different classes of EV batteries degrade during their first life powering vehicles.

Using those insights, they then developed a microgrid planning model. This tool lets microgrid developers determine the optimal size and power rating of repurposed batteries to use in their project. It also predicts how quickly their energy capacity will degrade after installation, identifying the year they will require replacement.

As more consumers make the shift to electric vehicles, the discarded EV batteries will begin piling up. Thanks to WISE researchers, microgrid developers can put this growing resource to good use — and cut microgrid costs at the same time.

Researchers: Talal Alharbi, ***Kankar Bhattacharya,*** *and* ***Mehrdad Kazerani***

Source: Alharbi, T., Bhattacharya, K., and Kazerani, M. (2019). Planning and Operation of Isolated microgrids based on repurposed electric vehicle batteries. *IEEE Transactions on Industrial Informatics*, 15 (7), 4319-4331.

READ ARTICLE