

An economic analysis of used electric vehicle batteries integrated into commercial building microgrids

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Abstract— Current policies in the U.S. and other countries are trying to stimulate electric transportation deployment. Consequently, plug-in electric vehicle (PEV) adoption will presumably spread among vehicle users. With the increased diffusion of PEVs, lithium-ion batteries will also enter the market on a broad scale. However, their costs are still high and ways are needed to optimally deploy vehicle batteries in order to account for the higher initial outlay. This study analyzed the possibility of extending the lifecycle of PEV batteries to a secondary, stationary application. Battery usage can be optimized by installing used battery packs in buildings' microgrids. Employed as decentralized storage, batteries can be used for a microgrid's power supply and provide ancillary services (A/S). This scenario has been modeled with the Distributed Energy Resources Customer Adoption Model (DER-CAM), which identifies optimal equipment combinations to meet microgrid requirements at minimum cost, carbon footprint, or other criteria. Results show that used PEV batteries can create significant monetary value if subsequently used for stationary applications.

Index Terms—

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Citation:

Beer, S.; Gómez, T.; Dallinger, D.; Momber, I.; Marnay, C.; Stadler, M.; Lai, J.; "An economic analysis of used electric vehicle batteries integrated into commercial building microgrids", IEEE Transactions on Smart Grid, vol.3, no.1, pp.517-525. March, 2012.