

Analysis of optimization strategies for utilization of second life BESS to achieve maximum savings

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Background

With the exponential growth in the stationary energy storage market for Li-ion batteries, there is a great potential for utilization of used EV batteries in stationary solutions. This will extend the lifetime of batteries, accompanied by a lower total carbon footprint over the lifetime. There are, however, a great deal of challenges with implementation of used EV batteries in stationary solutions, including state of health diagnostics and integration and control of the EV batteries, where functionality varies across EV battery types.

Results

In this project, second life EV batteries were repurposed, to investigate the potential for reuse as energy storage on three pilot sites, Lempäälä-talo, Trosvik school and Rudskogen Motor Centre. Two different EV batteries were utilized. In addition, the theoretical potential for savings on these pilot sites were studied. The three sites encountered different challenges, had a different set of boundary conditions and great variations in electricity production and consumption profiles.

Conclusions

For the two different EV battery types, it was possible to make an overall similar battery rack, where most of the design remains constant, and mainly software was adjusted to match differences between the EV battery types. Still, it was challenging to optimize and adjust to local conditions. The pilots highlighted that economic and operational performance strongly depends on local conditions such as electricity demand patterns, billing systems and regulatory frameworks, underlining the importance of context-specific implementation.