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Title: Co-optimizing the Smart Grid and Electric Public Transit System

Abstract: We consider electric public transportation buses in an urban area, which can provide ancillary services to the smart grid during off-schedule times. In particular, we consider a multi-period optimal power flow (OPF) problem that also decides the optimal charging/discharging times and locations for each bus. In doing so, the transit authority and the ISO co-optimize the power system to minimize the total operational cost of the grid, while ensuring that the buses are fully charged before starting their routes on the next day. We demonstrate the capabilities of the model and the benefit obtained via a coordinated strategy. Our study is motivated by a project with a large transit authority in California.

Key words: smart grid, electric vehicle, multi-period opf