Emulating Batteries with Deferrable Energy Demand
Invited Presentation

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Abstract—We investigate the ability of a homogeneous collection of deferrable energy consumers to behave as a battery; that is, to absorb and release energy in a controllable fashion up to fixed and predetermined limits on volume, charge rate and discharge rate. We derive bounds on the batteries that can be emulated and show that there is a fundamental conflict between the ability to absorb and release energy at high rates. Finally, we introduce a new class of dynamic priority-driven feedback policies that balance these abilities, and characterize the batteries that they can emulate. This work is done in collaboration with Daria Madjidian, Mardavij Roozbehani.